International Civil Aviation Organization

Western and Central Afric Office
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Dakar, Senegal, 18-19 April 2011

Agenda Item 5.1: Position of ICAO for the World Radiocommunication Conference 2012 (WRC 12)

(*Presented by the Secretariat)*

SUMMARY

This paper reviews the agenda for the ITU WRC-12, discusses points of aeronautical interest and provides the ICAO Position for these agenda items.

The ICAO Position aims at protecting aeronautical spectrum for radio-communication and radionavigation systems required for current and future safety-of-flight applications. In particular, it stresses that safety considerations dictate that exclusive frequency bands must be allocated to safety critical aeronautical systems and that adequate protection against harmful interference must be ensured. It also includes proposals for new aeronautical allocations to support new aeronautical applications.

Support of the ICAO Position by Contracting States is required to ensure that the position is supported at the WRC-12 and that aviation requirements are met.

Action by the meeting is at paragraph 4.

CONTENTS

Attachment
Agenda for ITU WRC-12

1. INTRODUCTION

1.1 This paper contains the ICAO Position on issues of interest to international civil aviation to be decided at the 2012 ITU World Radiocommunication Conference (WRC-12). The agenda of the conference is contained in the attachment. The ICAO Position should be considered in conjunction with section 7-II of the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies* (Doc 9718, 5th Edition-2010) (Civil aviation frequency allocations – ICAO policies and related information). Doc 9718 is available on website http://www.icao.int/anb/panels/acp (see webpage: Repository). Also available at the above-mentioned website are the ITU WRC Resolutions referenced in the ICAO Position.

1.2 The draft ICAO Position on issues of critical concern to aviation which are on the agenda of the WRC-12 (originally WRC-11 but rescheduled), was developed to reflect the outcome of studies conducted in the ACP, NSP and ITU-R.
On 22 June 2009, the draft ICAO position was presented to and approved by the Council (C-DEC 187/9). The approved position was transmitted to States and international organizations under cover of State letter E 3/5-09/61, dated 30 June 2009.
When approving the ICAO position, the Council requested the Secretary General to submit it to the ITU WRC-12 together with any additional supporting material from ICAO studies.

1.2 The present document contains such additional material as developed by the Commission with the support of the Aeronautical Communication Panel (ACP) and the Navigation System Panel (NSP) and will be reviewed by the Commission on May/June 2011. The additional material complements and updates the original position and reflects the latest results of studies completed within ICAO and ITU.

1.3 ICAO supports the working principle as utilized in studies for WRC-07 and reflected in the WRC-07 Conference Preparatory Meeting report material on Agenda Item 1.6. In particular that compatibility of ICAO standard systems with "existing or planned aeronautical systems operating in accordance with international aeronautical standards will be ensured by ICAO". Compatibility of ICAO standard systems with non-ICAO standard systems will be addressed in ITU.

2. SPECTRUM REQUIREMENTS FOR INTERNATIONAL CIVIL AVIATION

2.1 The safety of air operation is dependent on the availability of reliable communication and navigation services. The Eleventh Air Navigation Conference (AN-Conf/11), which was held in Montreal, Canada from 22 September to 3 October 2003, noted that States, international organizations and ICAO had embarked on communication, navigation and surveillance/air traffic management (CNS/ATM) systems planning, intended to improve aircraft operations by making use of modern CNS/ATM technologies. The AN-Conf/11 endorsed the global air traffic management operational concept, to be used as guidance for the development of ICAO CNS/ATM related provisions. The planning horizon used for the concept was up to and beyond the year 2025.

2.2 The development of new CNS/ATM provisions is highly dependent upon the availability of radio frequency spectrum that can support the high integrity and availability requirements associated with aeronautical safety systems, and demands special conditions to avoid harmful interference to these systems. It was recognized by AN-Conf/11 that currently available spectrum for CNS/ATM systems may need to be supplemented with new allocations to enable the introduction of new systems in aviation while the requirements for spectrum for current systems are to be maintained until a future undetermined period. **Article 4.10** of the Radio Regulations states that ITU Member States recognize that the safety aspects of radionavigation and other safety services requires special measures to ensure their freedom from harmful interference. These factors need to be taken into consideration in the allocation, assignment and use of frequencies for aeronautical systems. In particular, the sharing of aeronautical safety services with other aeronautical services or non-aeronautical services must be considered with extreme care. Where sharing conditions cannot meet the above requirements, exclusive aeronautical allocations need to be secured to preserve the integrity of aeronautical services.

2.3 The demand for access to airspace is continuously increasing. Whilst recognizing the current global economic climate, total world airline scheduled passenger traffic in terms of passenger-kilometres has been predicted to grow at an average annual rate of 4.6 per cent up to the year 2025 [Ref: "*Outlook for Air Transport to the Year 2025* (Circular 313)*"*]. The continuous increase in air traffic movements as well as the additional requirement for new and emerging applications such as unmanned aircraft systems are placing increased demands on both the aviation regulatory and air traffic management mechanisms. As a result the airspace is becoming more complex and the demand for frequency assignments and hence spectrum allocations is increasing. Whilst some of this demand can be met through the improved spectral efficiency of new radio systems it is inevitable that existing allocations may need to be broadened or additional aviation spectrum allocations sought to meet this demand. While it is expected that WRC-12 will be able to address a majority of these requirements, consideration by future conferences (WRC-15 and beyond) will be necessary to fully meet the future aviation requirements.

2.4 The draft ICAO Position was developed in 2008 with the assistance of the Aeronautical Communications Panel (ACP) Working Group F (frequency) and was reviewed by the Air Navigation Commission (ANC) at the tenth meeting of its 179th Session on 18 November 2008. Following the review by the ANC, it was submitted to ICAO Contracting States and international organizations for comment. After final review of the ICAO Position and the comments by the ANC on 5 May 2009, it was approved by Council on 22 June 2009. When the ICAO Position was established, studies were ongoing in the Navigation Systems Panel (NSP) and Aeronautical Communications Panel (ACP), in ITU and in regional telecommunication organizations, in particular on the XXX, as well as the YYY. The ICAO studies were completed by March 2011 and an update to the ICAO Position was reviewed by the ANC on xx May 2011 (187-x) and approved by Council on xx June 2011 (193/xx).. States and international organizations are requested to make use of the ICAO Position, to the maximum extent possible, in their preparatory activities for the WRC-12 at the national level, in the activities of the regional telecommunication organizations[1] and in the relevant meetings of the ITU.

3. AERONAUTICAL ASPECTS ON THE AGENDA FOR WRC-12

Note 1.— The statement of the ICAO Position on an agenda item is given in a text box at the end of the section addressing the agenda item, after the introductory background material.

[1] African Telecommunication Union (ATU), Asia-Pacific Telecommunity (APT), European Conference of Postal and Telecommunications Administrations (CEPT), Inter-American Telecommunication Commission (CITEL), Arab Spectrum Management Group (ASMG) and the Regional Commonwealth in the Field of Communications (RCC).

*Note 2.— No impact on aeronautical services has been identified from WRC-11, Agenda Items **1.6**, **1.8**, **1.10**, **1.11**, **1.13**, **1.16, 1.17**, **1.18, 1.20, 1.24**, **2, 3**, **5**, **6**, **7,** and **8.1** which are therefore not addressed in the position.*

WRC-12 Agenda Item 1.1

Agenda Item Title:

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-07).

Discussion:

Allocations to the aeronautical services are generally made for all ITU Regions and normally on an exclusive basis. These principles reflect the global process of standardization within ICAO for the promotion of safety and to support the global interoperability of radiocommunication and radionavigation equipment used in civil aircraft. In some instances, however, footnotes to the ITU Table of Frequency Allocations allocate spectrum in one or more countries to other radio services in addition or alternatively to the aeronautical service to which the same spectrum is allocated in the body of the table.

The use of country footnote allocations to non-aeronautical services in aeronautical bands is generally not recommended by ICAO, on safety grounds, as such use may result in harmful interference to safety services. Furthermore, this practice generally leads to an inefficient use of available spectrum to aeronautical services, particularly when the radio systems sharing the band have differing technical characteristics. It also may result in undesirable (sub)-regional variations with respect to the technical conditions under which the aeronautical allocations can be used. This can have a serious impact on the safety of aviation.

A number of footnotes in aeronautical bands that should be deleted for safety and efficiency reasons are discussed below:

a) In the bands used for the ICAO standardized non-directional beacons (NDB), (255 - 526.5 kHz), Footnote No **5.72** allows for the use of the bands 283.5 - 490 and 510 - 526.5 kHz by Norwegian fixed stations located north of 60°. The use of NDBs in these bands is expected to continue for the foreseeable future. Whilst operation of these fixed links has not caused a problem in the past, it would be preferable if the footnote allocation could be removed.

b) In the bands used for the ICAO instrument landing system (ILS), (marker beacons 74.8 - 75.2 MHz; localizer 108 - 112 MHz and glide path 328.6 - 335.4 MHz) and the VHF omnidirectional radio range system (VOR); 108 - 117.975 MHz, Nos. **5.181**, **5.197** and **5.259** allow for the introduction of the mobile service on a secondary basis and subject to agreement obtained under No. **9.21** of the Radio Regulations when these bands are no longer required for the aeronautical radionavigation service. The use of both ILS and VOR is expected to continue. In addition, WRC-03, as amended by WRC-07, has introduced No. **5.197A** stipulating that the band 108 - 117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev. WRC-07)**. The use of the band 108 - 112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. As a result, access to these bands by the mobile service is not feasible, in particular since no acceptable sharing criteria that secure the protection of aeronautical systems have been established to date. Nos. **5.181**, **5.197** and **5.259** should now be deleted since they do not represent a realistic expectation for an introduction of the mobile service in these bands.

c) In the band 1 215 - 1 300 MHz, which is used by civil aviation for the provision of radionavigation services through No. **5.331.** Footnote No. **5.330** allocates the band in a number of countries to the fixed and mobile service. Given the receiver sensitivity of aeronautical uses of the band, ICAO does not support the continued inclusion of an additional service through country footnotes. ICAO would therefore urge administrations to remove their name from the No. **5.330**.

d) In the band 1 559 - 1 610 MHz, which is used for elements of the ICAO global navigation satellite system (GNSS), Nos. **5.362B** and **5.362C** allow the operation of the fixed service in some countries on a primary basis until 1 January 2010 and on a secondary basis until 1 January 2015. This band is allocated, on a worldwide, primary basis, to the aeronautical radionavigation service (ARNS) and to the radionavigation-satellite service (RNSS). The band already supports operation of two prime elements of the global navigation satellite system (GNSS), i.e. GLObal NAvigation Satellite System (GLONASS) and global positioning system (GPS), the standards for which have been adopted into ICAO SARPs. SARPs for other RNSS systems, such as the European Galileo system, are under development. Studies undertaken in preparation for WRC-2000 indicate that a geographical separation distance exceeding line-of-sight (in the order of 400 km) between aircraft using GNSS and stations of the fixed service is required to ensure safe operation of GNSS. This is a very severe restriction, which can prohibit the safe use of GNSS over wide areas around any fixed service installation. Were a fixed service to be introduced into this band then harmful interference situations could arise leading to disruption to GNSS, affecting the safety of aircraft in flight. Thus, the WRC-2000 agreement to terminate all use by the fixed service in this band in 2015 still constitutes a severe and unacceptable constraint on the safe and effective use of GNSS in some areas of the world. It is, therefore, recommended that deletion of these allocations be effective from 2011.

e) In the band 4 200 - 4 400 MHz, which is reserved for use by airborne radio altimeters, No. **5.439** allows the operation of the fixed service on a secondary basis in some countries. Radio altimeters are a critical element in aircraft automatic landing systems and serve as a sensor in ground proximity warning systems. Interference from the fixed service has the potential to affect the safety of all weather operations. Deletion of this footnote is recommended.

ICAO Position:

To support the deletion of No **5.72** as access to these bands by the fixed service could create the potential for harmful interference to important radionavigation systems used by aircraft to navigate especially in the North Sea.

To support deletion of Nos. **5.181, 5.197** and **5.259**, as access to these bands by the mobile service is not feasible and could create the potential for harmful interference to important radionavigation systems used by aircraft at final approach and landing as well as the aeronautical mobile service introduced as a result of WRC-03 and 07.

To support deletion of No. **5.330** .as access to the band by the fixed and mobile services could potentially cause harmful interference to services used to support aircraft operations.

To support the deletion of Nos. **5.362B** and **5.362C** as of 2011 in order to remove harmful interference that can be caused by the fixed service to essential aeronautical radionavigation satellite functions in the band 1 559 - 1 610 MHz and to permit the full utilization of GNSS services to aircraft on a global basis.

To support deletion of No. **5.439** as a measure to protect safety critical operation of radio altimeters in the band 4 200 - 4 400 MHz.

Note 1.— Administrations indicated in the footnotes mentioned in the ICAO Position above which are urged to remove their country names from these footnotes are as follows:

*No. **5.72***	*Norway*
*No. **5.181***	*Egypt, Israel and Syrian Arab Republic*
*No. **5.197***	*Pakistan and Syrian Arab Republic*
*No. **5.259***	*Egypt, Israel and Syrian Arab Republic*
*No. **5.330***	*Angola, Bahrain, Bangladesh, Cameroon, Chad, China, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Mozambique, Nepal, Pakistan, the Philippines, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Togo, United Arab Emirates, and Yemen*
*No. **5.362B***	*Algeria, Armenia, Azerbaijan, Belarus, Benin, Bulgaria, Democratic People's Republic of Korea, France, Gabon, Georgia, Germany, Guinea, Guinea-Bissau, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Nigeria, Pakistan, Poland, Romania, Russian Federation, Senegal, Spain, Swaziland, Tajikistan, Tanzania, Turkmenistan, Uganda, Ukraine, and Uzbekistan*
*No. **5.362C***	*Chad, Congo, Egypt, Eritrea, Iraq, Israel, Jordan, Malta, Qatar, Somalia, Sudan, Syrian Arab Republic, Togo, and Yemen*
*No. **5.439***	*Libyan Arab Jamahiriya and Iran (Islamic Republic of)*

WRC-12 Agenda Item 1.2

Agenda Item Title:

Taking into account the ITU-R studies carried out in accordance with Resolution 951 (Rev. WRC-07), to take appropriate action with a view to enhancing the international regulatory framework.

Discussion:

The growing use of radiocommunications in modern society for applications from mobile communications, through item tracking to surveillance has led to an increase in demand for spectrum. Whilst new and innovate technologies are increasing the efficiency with which these services are provided, demand has still outpaced the efficiencies made.

There is a view within a number of administrations that the current ITU processes for addressing additional spectrum needs are not flexible enough to meet the timescales demanded by industry. Resolution **951** seeks to review the way in which spectrum at the global level is managed with a view to adopting best practices which it is hoped will enable even greater efficiencies to be achieved in the way spectrum is assigned and used.

Aviation is reliant on spectrum being available for the provision of communications, navigation and surveillance functionality. Given the safety criticality of the systems supporting this functionality they are designed to be robust and require an environment that is free from interference.

Resolution **951** potentially offers aviation an opportunity to improve the flexibility with which spectrum allocated to aeronautical services can be used as well as potentially tighten the regulatory provisions that ensure the protection of aviation systems. Conversely it also has the potential to reduce the protection afforded to aviation systems if the appropriate action is not taken to ensure that greater flexibility does not lead to greater risk of interference.

ICAO Position:

Support new provisions or modifications to existing provisions that improve the flexibility with which spectrum allocated to aeronautical safety services can be used by aviation and/or tighten regulatory provisions that enhance the protection of aviation systems.

Ensure that any other measures taken at WRC-11 under Agenda Item 1.2 do not have an adverse impact on the use or protection of aeronautical systems.

WRC-12 Agenda Item 1.3

Agenda Item Title:

To consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies, in accordance with Resolution 421 (WRC-07).

Discussion:

Unmanned aircraft systems (UASs) have proven the ability for an aircraft to be piloted remotely over significant distances, as well as work at shorter ranges either within or out-of-sight of the remote pilot. However, such flights have taken place in segregated airspace, ensuring the safety of both the air vehicle itself as well as other airspace users.

Based on the potential for UASs to operate reliably, a number of commercial applications have been identified from emergency services to high altitude communications platforms. Additionally, applications have been identified where UAS technology could provide a commercial and/or safety benefit by replacing either the pilot or co-pilot onboard a manned aircraft.

As a result, the deployment of UASs is expected to be significant, with a requirement for operation throughout the airspace structure. The current provisions of providing segregated airspace will therefore become impractical and hence a way must be found to allow these aircraft to integrate with the current airspace users in a safe and seamless manner.

This agenda item therefore seeks to identify the spectrum requirements necessary to support the safe operation of UASs in current and future airspace structures. UASs will require high integrity communications link(s) between the unmanned aircraft (UA) and remote control centres capable of relaying the necessary air traffic control messages as well as flight critical aircraft information. In addition, sense and avoid functions may require new sensors on the UA to provide situational awareness.

Command and Control

For UASs to safely integrate with existing airspace users the remote pilot must be able to reliably monitor the status of the UA, pass control instructions to that UA, and also interact with the relevant air traffic controller appropriate to the airspace within which the UA is flying. For UA flying/manoeuvring in a localized area this might be provided by a line-of-sight link. However, for UA flying trans-horizon this may require the use of a combination of a terrestrial radio network or a satellite network.

Relay of Air Traffic Control (ATC) Communications

Safe operation of aircraft manned or unmanned depends on the communication with ATC. The rules of air traffic rely on the fact that the pilot acts according to instructions received from ATC. If the pilot does not sit in the aircraft, this means for the ATC system operated today, that a voice channel has to be maintained to relay information from radio in the aircraft to the pilot on ground and back. Early concepts assume that this function could be part of the command and control links if the voice is digitized.

Sense and Avoid

The safe flight operation of UA necessitates advanced techniques to detect and track nearby aircraft, terrain and obstacles in order to ensure they avoid these objects in a manner equivalent to that achieved by manned aircraft. These advance techniques may require the use of additional radio systems and hence spectrum. The remote pilot will need to be aware of the environment within which the aircraft is operating and be able to identify the potential threats to the continued safe operation of the aircraft and take the relevant action. Given the scarcity of spectrum, care must be taken to ensure that the spectrum requirements identified to meet such applications are kept to a minimum.

It should be noted that the aeronautical future communications system may be able to prove some capacity to meet the requirements for both command and control (including the relaying of ATC communications) as well as sense and avoid applications but care must be taken when dimensioning both systems to avoid double accounting. A number of existing allocations to the aeronautical mobile satellite (route) service such as the allocation in the frequency range 5 000 - 5 150 MHz might provide some of the capacity required although issues with existing and planned systems will need to be resolved.

Payload

The spectrum requirements to support the functionality of a payload are not critical to the safe operation of that aircraft. Therefore this agenda item whilst recognizing the need for spectrum to support the payload, specifically excludes the allocation of spectrum at WRC-12 under this agenda item for payload applications. However it does call for the development of an ITU-R Report or Recommendation on how to accommodate UAS payload requirements. Therefore ICAO would oppose the use of this agenda item to seek new spectrum allocations to meet payload requirements.

ICAO is expecting to develop standards and recommended practices (SARPs) for UAS communications systems. In order to develop SARPs, spectrum for UAS for safety and regularity of flight, and in particular when the UAS operates in civil airspace, will need to be accommodated under an allocation to the aeronautical mobile (R) service, aeronautical mobile satellite (R) service, or the aeronautical radionavigation service, in order to receive the necessary status and sufficient protection from harmful interference. To use an allocation of a relevant parent service (e.g. use of the mobile satellite service for the provision of an aeronautical mobile satellite (R) service) then a footnote is needed. Such a footnote must clearly identify the band being used to provide the aeronautical safety service as well as the appropriate level of priority and pre-emption. Other provisions may also be required.

Studies are being undertaken within the ITU-R to determine if operation of UA in non-segregated airspace under other radio services (currently not AM(R)S, AMS(R)S or ARNS) can be accommodated. When mature, the results of these studies will need to be considered by ICAO to determine if the safety of life aspect of UA operation can be met and if SARPs should be developed based on such allocations.

In addition to the safety communications detailed above, most UAS also need spectrum for the operation of a payload. Agenda Item 1.3 requires no action by WRC-12 on this subject. Therefore ICAO would not support the use of this agenda item to seek new spectrum allocations to meet payload requirements.

Existing AM(R)S, AMS(R)S and ARNS allocations should be examined to check whether they can provide suitable bandwidth before new allocations to these services are considered.

If a new AM(R)S allocation is made in the band 5030 – 5091 MHz, the existing coordination mechanism for AMS(R)S in that band (i.e. No. 9.21) should be reviewed and perhaps replaced. Such a modification may facilitate effective coordination between those services. Coordination with existing ARNS will also need to be considered.

ICAO Position:

To support, based on the results of studies identified in Resolution **421**, any modification to existing allocations, or new allocations required to accommodate UAS operations in non-segregated airspace while maintaining the safety and regularity of flight of all types of aircraft.

Accordingly, to ensure that allocations used, in particular, for UAS command and control, ATC relay and sense and avoid in non-segregated airspace are in the AM(R)S, AMS(R)S and/or ARNS and do not adversely affect existing aeronautical systems

To oppose the use of this agenda item to seek new spectrum allocations to meet payload requirements.

WRC-12 Agenda Item 1.4

Agenda Item Title:

To consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112 - 117.975 MHz, 960 - 1 164 MHz and 5 000 - 5 030 MHz in accordance with Resolutions 413 (Rev. WRC-07), 417 (WRC-07) and 420 (WRC-07).

Discussion:

As a result of WRC-07 allocations for the aeronautical mobile (route) service (AM(R)S) were either made or modified to support the aeronautical future communications infrastructure (FCI). In particular, an AM(R)S allocation in the bands 112 - 117.975 MHz was modified, and another was added to the band 960 - 1 164 MHz, in accordance with Resolutions **413** and **417** respectively. The resolutions in part specify regulatory restrictions on the operation of AM(R)S in those bands, including that systems are limited to those meeting ICAO standards. (i.e. "systems operating in accordance with international aeronautical standards"). Compatibility of the AM(R)S with ICAO standardized systems will be addressed in ICAO. Compatibility with in-band and adjacent band non-ICAO systems identified in the resolutions will be addressed in the ITU.

WRC-12, Agenda Item 1.4 allows aviation the opportunity to complete the studies necessary to answer questions raised in Resolutions **413** and **417** and propose to WRC-11 any additional regulatory measures that might be required to facilitate the introduction of new AM(R)S systems in the bands 112 - 117.975 and 960 - 1 164 MHz. Additionally it allows, under Resolution **420**, aviation to seek a new allocation to AM(R)S in the frequency band 5 000 - 5 030 MHz for surface applications at airports provided that requirements for that system cannot be satisfied in the 5 091 - 5 150 MHz band, and that it is compatible with RNSS in the 5 000 - 5 030 MHz band and the radio astronomy service (RAS) in the adjacent 4 990 - 5 000 MHz band.

ICAO will work with the ITU to provide the relevant data and technical expertise to allow the required compatibility studies between the FCI and non-ICAO standardized systems identified in the resolutions to be undertaken in a timely manner. As agreed, any compatibility issues between ICAO standardized systems will be undertaken within ICAO.

ITU-R studies have been completed or are underway for each of the frequency bands referenced in the agenda item. The results of those studies indicate:

- Resolution 413: that no harmful interference will arise from the introduction of AM(R)S systems in the band 112-117.975 MHz into analogue FM broadcasting receivers below 108 MHz and that the both services can operate on a compatible basis.

- Resolution 417: that sharing between AM(R)S systems and non-ICAO ARNS systems is feasible only under condition of frequency separation and/or imposing technical and operational constraints on AM(R)S systems. Studies will define the operational and technical means to facilitate sharing between AM(R)S systems operating in the band 960-1 164 MHz and the RNSS operating in the band 1 164-1 215 MHz.

- Resolution 420: that compatibility in the band 5000 – 5010 MHz is feasible, assuming conditions as specified in Report ITU-R M.2168-1. With regard to the band 5 010-5 030 MHz, neither the AM(R)S operational environment nor the RNSS signal characteristics are sufficiently defined to finalize ITU-R studies, so no allocation is proposed for the AM(R)S in this band.

ICAO Position:

To support as required, based on the results of studies identified in Resolution **413**, the inclusion in the Radio Regulations of further regulatory measures that will facilitate the introduction of future AM(R)S systems in the band 112 - 117.975 MHz.

To support as required, based on the results of studies identified in Resolution **417**, the inclusion in the Radio Regulations of further regulatory measures that will facilitate the introduction of future AM(R)S systems in the band 960 - 1 164 MHz.

If the spectrum requirements for surface applications at airports cannot be fully accommodated within the 5 091 - 5 150 MHz band, and based on the results of successful compatibility studies identified in Resolution **420**, support a new allocation to the AM(R)S in the band 5 000 - 5 030 MHz.

WRC-12 Agenda Item 1.5

Agenda Item Title:

To consider worldwide/regional harmonization of spectrum for electronic news gathering (ENG), taking into account the results of ITU-R studies, in accordance with Resolution 954 (WRC-07).

Discussion:

The use of terrestrial portable radio equipment by services ancillary to broadcasting is an essential element to the way global news coverage meets the public expectation for instant images of internationally news worthy events such as natural disasters. This agenda item seeks to address the spectrum needs associated with such equipment. As the scope of this agenda item is not limited in terms of frequency bands within which studies can take place, except by the practicality of the ENG equipment, aeronautical bands could be targeted.

ICAO Position:

To oppose any allocation that would adversely affect the interests of aviation.

WRC-12 Agenda Item 1.7

Agenda Item Title:

To consider the results of ITU-R studies in accordance with Resolution 222 (Rev. WRC-07) in order to ensure long-term spectrum availability and access to spectrum necessary to meet requirements for the aeronautical mobile-satellite (R) service, and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz.

Discussion:

WRC-07 agreed on Agenda Item 1.7 for WRC-12 to consider the results of ITU-R studies to ensure long-term spectrum availability and access to spectrum necessary to meet the requirements for aeronautical mobile-satellite (R) service (AMS(R)S) in accordance with Resolution **222 (Rev. WRC-07)**.

In 1995, ICAO standardized the use of the satellite frequencies in the bands 1 525 - 1 559 MHz (space-to-Earth) and 1 626.5 - 1 660.5 MHz (Earth-to-space) as an essential element for the aeronautical safety communication service via satellite communication systems.

Up until 1997 the MSS sub-bands 1 545 - 1 555 MHz (space-to-Earth) and 1 646.5 - 1 656.5 MHz (Earth-to-space) were allocated exclusively to the AMS(R)S for communications relating to safety and regularity of flights.

WRC-97 adopted new generic MSS allocations in the 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz bands. In replacement of the exclusive AMS(R)S allocation it adopted No **5.357A** giving priority and protection to AMS(R)S in the MSS sub-bands 1 545 - 1 555 MHz and 1 646.5 - 1 656.5 MHz.

WRC-2000 reviewed the studies called for by WRC-97 and Resolution **222** (WRC-2000) was adopted, indicating (under its resolves) that:

- administrations shall ensure that the spectrum needed for AMS(R)S communications within priority categories 1 to 6 of **Article 44** in the bands where No. **5.357A** applies is accommodated; and,

- administrations shall ensure that MSS operators carrying non-safety-related traffic yield capacity to accommodate the spectrum requirements for AMS(R)S communications.

Also, in response to Resolution **222** "invites ITU-R", the ITU-R developed Report **M.2073** "Feasibility and practicality of prioritization and real-time pre emptive access between different networks of mobile-satellite service in the bands 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz". This report identified a number of significant technical, operational and economic issues that would have to be overcome to make prioritization and intersystem real-time *pre-emptive access between different networks* a reality.

Accordingly the report concluded, *inter alia*, that "prioritization and intersystem real-time *pre-emptive access between different networks* " is not practical and, without significant advance in technology, it is unlikely to be feasible for technical, operational and economical reasons. As a consequence such an approach cannot be used as an effective method to ensure long-term spectrum availability and protection for the AMS(R)S communications in these bands.

Although No. **5.357A** gives priority status for AMS(R)S versus other MSS, in practice the current application of the regulatory conditions governing such priority status does not satisfy spectrum requirements for AMS(R)S. This situation has raised some strong concerns for the civil aviation community.

In addition, since 1997, the allotment of spectrum to mobile-satellite service providers has been organized under the provisions of various regional Memoranda of Understanding (MoU). The allotments agreed under the provisions of these MoUs are not available in the public domain and are not known to ICAO. This makes it virtually impossible for aviation to develop long-term planning for using this spectrum. ICAO has also been informed that the current provisions and procedures for AMS(R)S under these MoUs (which effectively bypass the open coordination process as is normal under the provisions of the ITU) are insufficient to satisfy future demand for AMS(R)S spectrum.

Accordingly, based on all the above, WRC-07 adopted Agenda Item 1.7 for WRC-12 and modified Resolution **222** calling for, in summary:

(a) studies on existing and future spectrum requirements of AMS(R)S;

(b) the assessment of whether the long-term requirements of the AMS(R)S can be met within the existing allocations with respect to No. **5.357A**, while retaining unchanged the generic allocation for the mobile-satellite service in the bands 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz;

(c) completion of studies to determine the feasibility and practicality of technical or regulatory means in order to ensure adequate access to AMS(R)S spectrum, other than the coordination process (see Resolves 1 of **Resolution 222 (Rev. WRC-2007)**) or the means considered in Report ITU-R **M.2073**;

(d) the studies of existing MSS allocations, or identification of new allocations, "only for satisfying" the requirements of the AMS(R)S if these requirements (referred to above in (a) and (b)) cannot be met.

Resolution **222** also invites ICAO to participate in the above studies within the ITU-R.

In this connection, it should be noted that it is extremely important to ensure that allocations under No. **5.357A** should incorporate the strengthened regulatory provisions and technical means resulting from the studies called for in (c).

Furthermore, the studies under Agenda Item 1.7 should take into account the number of aircraft already equipped with standardized AMS(R)S technology, the life cycle of the AMS(R)S systems spread over several decades and the technical and operational advantages of using the bands identified in No. **5.357A**. Every effort should be made to ensure the long term spectrum availability and access for AMS(R)S in these bands.

The results of ITU-R studies under this agenda item show that long-term AMS(R)S spectrum requirements up to the year 2025 can be accommodated within the available 2 × 10 MHz frequency bands defined by RR No. **5.357A**.

Resolution **222** contains a number of provisions that clarify the protection of AMS(R)S in the bands 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz. Depending on decisions taken by WRC-12 consequential action may be required to preserve the provisions in the Radio Regulations and to improve transparency in the total coordination process.

Information note: There are other WRC-12 agenda items, which look at requirements for mobile satellite spectrum, such as Agenda Item 1.3 and Agenda Item 1.25.

ICAO Position:

Taking into account the results of ITU-R studies, support further regulatory provisions to strengthen AMS(R)S access to the bands 1 545 - 1 555 MHz and 1 646.5 -1 656.5 MHz including, if required, changes to No. **5.357A**, No. **5.362A** and Resolution **222**.

WRC-12 Agenda Item 1.9

Agenda Item Title:

To revise frequencies and channelling arrangements of Appendix 17 to the Radio Regulations, in accordance with Resolution 351 (Rev. WRC-07), in order to implement new digital technologies for the maritime mobile service.

Discussion:

Within the frequency range 4 - 10 MHz, various frequency bands are allocated to the aeronautical mobile (R) service and the allotment plan for these frequency bands is in **Appendix 27** to the Radio Regulations. Aviation must be satisfied that the introduction by the maritime mobile service of any new modulation techniques, and or changes to the table contained in **Appendix 17**, must not cause harmful interference to the aeronautical mobile (R) service.

ICAO Position:

Ensure that the introduction by the maritime mobile service of any new modulation techniques, and or changes to the table contained in **Appendix 17**, does not cause harmful interference to the aeronautical mobile (R) service.

WRC-12 Agenda Item 1.12

Agenda Item Title:

To protect the primary services in the band 37 - 38 GHz from interference resulting from aeronautical mobile service operations, taking into account the results of ITU-R studies, in accordance with Resolution 754 (WRC-07).

Discussion:

The frequency band 37 - 38 GHz is currently allocated on a primary basis to the fixed, mobile, space research (space-to-Earth) and the fixed-satellite (space-to-Earth) services. Aeronautical mobile services which are not excluded from the mobile service allocation have the potential to cause interference to other systems operating in this band. This agenda item, noting that there are currently no aeronautical systems deployed or planned to be deployed in the band seeks to ensure that the existing systems operating in the band continue to be able to operate without fear of interference from aeronautical mobile systems.

Technical protection limits for existing co-primary systems should be introduced such that AMS can be developed in a manner that ensures compatibility with those existing systems.

ICAO Position:

To oppose excluding aeronautical use of the existing mobile service allocation in the band 37 - 38 GHz.

To support the use of technical protection limits to ensure that any future AMS system in the band 37 - 38 GHz will be compatible with other co-primary services.

WRC-12 Agenda Item 1.14

Agenda Item Title:

To consider requirements for new applications in the radiolocation service and review allocations or regulatory provisions for implementation of the radiolocation service in the range 30 - 300 MHz, in accordance with Resolution 611 (WRC-07).

Discussion:

The radiolocation service operating in the VHF frequency range is coming under increased pressure from co-frequency fixed and mobile services. There is therefore a need to allocate spectrum within the frequency range 30 - 300 MHz that can accommodate radars displaced by the fixed and mobile service and also meet emerging requirements for greater resolution and range for various space object detection applications. This agenda item seeks to identify a suitable spectrum allocation in the frequency range 30 - 300 MHz that can support the needs of the radiolocation service.

Aviation operates a number of services in various bands within the frequency range 30 - 300 MHz including the instrument landing system (ILS), VHF omni-directional ranging (VOR) and air-ground communications. It is essential that these systems continue to be afforded the protection that they require to meet the demanding requirements of a safety of life service. In general, ICAO does not support the shared use of spectrum between aeronautical safety services like ARNS, AM(R)S and AMS(R)S and other (non-aeronautical) services. The frequency bands listed below are already heavily used and will continue to be heavily used with the implementation of new aeronautical systems:

74.8 - 75.2 MHz	Marker beacons
108 - 112 MHz	ILS localizers, GBAS, VOR
112 - 117.975	VOR, GBAS, GRAS, air-ground communications
117.975 - 137 MHz	Air-ground communications

In addition, due to the potential for high powered transmitters in the radiolocation service, compatibility studies should consider adjacent aeronautical bands, as well as those that could be impacted by spurious and harmonic emissions.

ICAO Position:

Oppose, under this agenda item, any change to the allocations in the 74.8 - 75.2 MHz, and/or 108 - 137 MHz bands.

Ensure that any allocation made as a result of this agenda item does not adversely affect the operation of existing and planned aeronautical systems.

WRC-12 Agenda Item 1.15

Agenda Item Title:

To consider possible allocations in the range 3 - 50 MHz to the radiolocation service for oceanographic radar applications, taking into account the results of ITU-R studies, in accordance with Resolution 612 (WRC-07).

Discussion:

There is an increasing interest, on a global basis, in the operation of high-frequency oceanographic radars for the measurement of coastal sea surface conditions to support environmental, oceanographic, meteorological, climatologically, maritime and disaster mitigation operations. Currently there are no HF radiolocation allocations in which to operate such radars. This agenda seeks to address this shortfall by making a suitable allocation in the frequency band 3 - 50 MHz that can operate in harmony with current services within the stated frequency range.

Within the frequency range 3 - 50 MHz there are a number of allocations to the aeronautical mobile (R) service. These allocations are used to provide long range, over the horizon air traffic control, flight information and operational control services over the oceans and remote areas of the world. Any new allocation must ensure that the protection currently afforded to the aeronautical mobile (R) service is not compromised.

ICAO Position:

Ensure that any allocation made as a result of this agenda item shall not cause harmful interference to the operation of existing and planned aeronautical systems that operate in or adjacent to the frequency band 3 - 50 MHz.

WRC-12 Agenda Item 1.19

Agenda Item Title:

To consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution 956 (WRC-07).

Discussion:

The advantages and disadvantages of software-defined and cognitive radio systems for aviation are discussed below:

Software-Defined Radios

Although aviation has a long history with multi-mode radios where several functions (e.g. ILS, DME, MLS, VOR) are combined in a single unit, a software-defined radio system is a radiocommunications system where components that have typically been implemented in hardware (i.e. mixers, filters, amplifiers, modulators/demodulators, detectors. etc.) are instead implemented using software on a computer or other embedded computing devices. This gives the capability for the radio to tune over a large frequency range and use any modulation scheme that can be implemented via software. Once produced a change of frequency or modulation scheme can be achieved through a simple software upload.

The flexibility these radios have means that they offer significant benefits to radio users as changes to the radio system can be achieved in a short space of time without having to purchase new hardware and is being studied as part of the flexible airborne architecture concept. However as a change in radio parameters can be achieved through a software upload, if the regulation of the use of these radios is not sufficiently robust they could be prone to misuse or computer viruses causing them to operate on frequencies that they were not originally intended to. It is therefore essential that the relevant measures are put in place to ensure that a software defined radio cannot operate in an aeronautical band unless certified and installed by a qualified manufacturer and similarly that aeronautical software defined radios cannot unintentionally change characteristics from those for which they have been certified.

Cognitive Radio Systems

Cognitive radio systems are software defined radios that operate by automatically changing their transmission or reception parameters to communicate efficiently avoiding interference with licensed or unlicensed users. This alteration of parameters is based on the active monitoring of several factors in the external and internal radio environment, such as radio frequency spectrum, user behaviour and network state. These systems rely on being able detect all transmitters. Many aeronautical systems however are based on a ground-based transmitter providing a service to airborne receivers. In that case it is very possible for a cognitive radio to be beyond the line-of-sight of the transmitter but still within line-of-sight of the airborne receiver. This can result in interference to that receiver. It is therefore essential to ensure that the correct regulatory provisions are put in place to protect aeronautical services.

ICAO Position:

To support the inclusion of regulatory measures in the Radio Regulations that preclude the operation of software defined radios in the bands allocated to aeronautical services unless they are intended and have been properly certified for use in an aeronautical application.

To support the inclusion of regulatory measures in the Radio Regulations that preclude the operation of cognitive radio systems in bands allocated to aeronautical services.

WRC-12 Agenda Item 1.21

Agenda Item Title:

To consider a primary allocation to the radiolocation service in the band 15.4 - 15.7 GHz, taking into account the results of ITU-R studies, in accordance with Resolution 614 (WRC-07).

Discussion:

Radars in the radiolocation service operate on a primary basis worldwide in the band 15.7 - 17.3 GHz. Emerging requirements for increased resolution and range accuracy necessitate wider emission bandwidths. This agenda item seeks to provide adequate spectrum for new radar systems by considering that the band 15.4 - 15.7 GHz be additionally allocated on a primary basis worldwide for the radiolocation service.

This band is used by aeronautical radar systems (ground and airborne) operating under the ARNS allocation. They cater for short-range surveillance and precision functions. In aviation, they find considerable application in precision monitoring, approach and surface detection functions as well as for airborne weather radar (AWR) systems where their shorter wavelength is suitable for the detection of storm clouds. One of the vital safety functions of AWR is to give warning of hazardous weather and ensure safe separation of aircraft from hazardous weather conditions. In most countries the carriage of AWR by aircraft is a mandatory requirement.

These aeronautical radars are to remain in service for many years into the future. The allocation of the radiolocation service in these bands needs to be based upon the results of studies in ITU-R, demonstrating that sharing with the radionavigation service on a primary basis is feasible. These studies should also result in ITU-R regulatory provisions and recommendations where necessary stipulating the conditions of the use of these bands by the radiolocation service. Any allocation to the radiolocation service on a primary basis should be considered with a condition indicating that the radiolocation service shall not cause harmful interference to nor claim protection from the (aeronautical) radionavigation service.

ICAO Position:

Accept the primary allocation of the radiolocation service in the band 15.4 - 15.7 GHz, on the basis of agreed studies showing compatibility which take into account the protection of the use of this band by aviation.

Any allocation to the radiolocation service in this band shall be made with the condition that no harmful interference is caused to the aeronautical radionavigation service and that no protection is required to the radiolocation service from the aeronautical radionavigation service.

WRC-12 Agenda Item 1.22

Agenda Item Title:

To examine the effect of emissions from short-range devices on radiocommunication services, in accordance with Resolution 953 (WRC-07).

Discussion:

This agenda item seeks to study emissions from short-range devices (SRD)s, in particular radio frequency identification (RFID), inside and outside the frequency bands designated in the radio regulations for industrial, scientific and medical (ISM) applications to ensure adequate protection of radiocommunication services. The scope of Agenda Item 1.22 appears to be very broad which is therefore of concern to aviation as it is not clear whether aeronautical bands will be affected. From the wording of the resolution it is uncertain whether it seeks to find new non-ISM bands for SRDs or to make regulatory provisions to protect other services including aeronautical services from SRDs. Furthermore, in ITU-R the term SRD is largely undefined. For example, Recommendation **SM.1538.2**, "for the purpose of the Recommendation" defines SRDs as "intended to cover radio transmitters which provide either unidirectional or bidirectional communication and which have low capability of causing interference to other radio equipment". In Resolution **953** (WRC-07) they are defined as "radio transmitters or receivers, or both, and hence are not considered as ISM applications under No. **1.15".** Neither definition, nor the wording of the agenda item or the resolution, sufficiently constrain the actions that could occur.

The effect of some short range devices on existing radiocommunication systems has been studied by the ITU and various regional radio regulatory bodies. For example, ITU within TG 1/8 has extensively studied the effect of a specific short range device technology, ultra wideband, on existing radiocommunication systems. The conclusion of that study is that without constraints, those short-range devices have the potential to cause harmful interference to certain aviation systems.

SRDs normally operate on a licence exempt basis. Considering the mobility of aircraft and the large "viewing" area to which aircraft are exposed, together with the variability and uncertainty of a significant number of factors (such as SRD emitter density, signal characteristics, activity factors) necessary for the interference analysis of such devices with systems operating within aeronautical safety services, SRD devices should in general not be operated in frequency bands allocated to safety services. In those cases where such use cannot be avoided, administrations should take all steps necessary to ensure that SRD devices do not cause harmful interference to the reception by stations operating under a safety service allocation. The level of harmful interference into safety systems needs to be determined on a case-by-case basis in form of a safety analysis. This analysis would assess the use being made of the safety system and demonstrate that the required levels of integrity, reliability, and availability are still maintained under all operational conditions. Factors such as the impact on link budget margins for safety services, and measures to preclude interference from SRD devices that malfunction need to be considered.

Given the safety nature of the services provided by aeronautical systems, the broad scope of the agenda item, and based on studies currently conducted, it is essential that relevant regulatory provisions are included in the Radio Regulations to ensure that short-range devices cannot cause harmful interference to aeronautical systems.

ICAO Position:

Oppose operation of short-range devices in any bands allocated to aeronautical services.

Support the inclusion in the Radio Regulations of appropriate regulatory provisions (see Resolution **953**) to ensure that short-range devices, operating outside of aeronautical bands, do not cause harmful interference to aeronautical systems operating in allocated aeronautical bands.

WRC-12 Agenda Item 1.23

Agenda Item Title:

To consider an allocation of about 15 kHz in parts of the band 415 - 526.5 kHz to the amateur service on a secondary basis, taking into account the need to protect existing services.

Discussion:

Aeronautical non-directional beacons (NDB) operate in parts of the band prescribed for study under this agenda item. Whilst the long-term goal may be to remove NDBs from use, this is unlikely to be achieved in the near future. It is therefore essential to ensure that whatever action is taken under this agenda item does not adversely affect NDB operations.

ICAO Position:

To ensure that any allocation made to the amateur service shall not cause harmful interference to the operation of aeronautical systems operating under allocations to the aeronautical radionavigation service.

WRC-12 Agenda Item 1.25

Agenda Item Title:

To consider possible additional allocations to the mobile-satellite service, in accordance with Resolution 231 (WRC-07).

Discussion:

This agenda item seeks to identify new allocations that can be made to the mobile satellite service in both the Earth-to-space and space-to-Earth directions with particular focus on the frequency range 4 - 16 GHz.

Report **M.2077** already indicates a shortfall of spectrum available for the satellite component of IMT, however studies need to be done to identify additional spectrum for MSS systems which are not part of the satellite component of IMT.

It is not expected that AMS(R)S allocations will be addressed under this agenda item. Care must be taken however to ensure any regulatory action taken as a part of this agenda item does not impact existing ARNS, AM(R)S or AMS(R)S allocations, or any new allocations that may come as a result of studies under Agenda Item 1.3 or 1.7.

Work within the ITU-R to address this agenda item has identified a number of frequency bands in the range 4 – 16 GHz currently used by the radionavigation service for such systems as radio altimeters, MLS and radars. A number of candidate bands have been identified for further detailed studies, including the following ARNS bands:

- 5 150-5 250 MHz (for MSS s-E),
- 13.25-13.4 GHz (for MSS s-E), and
- 15.43-15.63 GHz (for MSS E-s).

It is essential that these aeronautical allocations remain fully protected and that no new allocations are made that adversely affect aeronautical safety systems operating within these allocations.

ICAO Position:

To oppose any allocation that would adversely affect the interests of aviation.

WRC-12 Agenda Item 4

Agenda Item Title:

In accordance with Resolution 95 (Rev. WRC-03), to review the resolutions and recommendations of previous conferences with a view of possible revision, replacement or abrogation.

ICAO Position:

Resolutions:

Resolution No.	***Title***	***Action recommended***
18 *(Rev WRC-07)*	Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict	No change
20 *(Rev. WRC-03)*	Technical cooperation with developing countries in the field of aeronautical telecommunications	No change
26 *(Rev. WRC-07)*	Footnotes to the Table of Frequency Allocations in Article 5 of the Radio Regulations	No change
27 *(Rev. WRC-07)*	Use of incorporation by reference in the Radio Regulations	No change
28 *(Rev. WRC-03)*	Revision of references to the text of ITU-R recommendations incorporated by reference in the Radio Regulations	No change
63 *(Rev. WRC-07)*	Protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment	No change
95 *(Rev. WRC-07)*	General review of the resolutions and recommendations of world administrative radio conferences and world radiocommunication conferences	No change
114 *(Rev. WRC-03)*	Studies on compatibility between new systems of the aeronautical radionavigation service and the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in the frequency band 5 091 - 5 150 MHz	No change
205 *(Rev. MOB-87)*	Protection of the band 406 - 406.1 MHz allocated to the mobile-satellite service	No change
207 *(Rev. WRC-03)*	Measures to address unauthorized use of and interference to frequencies in the bands allocated	No change

Resolution No.	*Title*	*Action recommended*
	to the maritime mobile service and to the aeronautical mobile (R) service	
217 *(WRC-97)*	Implementation of wind profiler radars	No change
222 *(Rev. WRC-07)*	Use of the bands 1 525 - 1 559 MHz and 1 626.5 - 1 660.5 MHz by the mobile-satellite service	Modify as necessary based on studies carried out under WRC-11, Agenda Item 1.7
225 *(Rev .WRC-07)*	Use of additional frequency bands for the satellite component of IMT-2000	No change
339 *(Rev. WRC-07)*	Coordination of NAVTEX services	No change
354 (WRC-07)	Distress and safety radiotelephony procedures for 2 182 kHz	No change
356 (WRC-07)	ITU maritime service information registration	No change
405	Relating to the use of frequencies of the aeronautical mobile (R) service	No change
413 *(WRC-07)*	Use of the band 108 - 117.975 MHz by aeronautical services	Modify as necessary based on studies carried out under WRC-12, Agenda Item 1.4 and other studies
417 (WRC-07)	Use of the band 960 - 1 164 MHz by the aeronautical mobile (R) service	Modify as necessary based on studies carried out under WRC-12, Agenda Item 1.4
418 (WRC-07)	Use of the band 5 091 - 5 250 MHz by the aeronautical mobile service for telemetry applications	No change
419 (WRC-07)	Considerations for use of the band 5 091 - 5 150 MHz by the aeronautical mobile service for certain aeronautical applications	No change
420 (WRC-07)	Consideration of the frequency bands between 5 000 and 5 030 MHz for aeronautical mobile (R) service surface applications at airports	Delete after WRC-12 (WRC-12, Agenda Item 1.4)
421 (WRC-07)	Consideration of appropriate regulatory provisions of the operation of unmanned aircraft systems	Delete after WRC-12 (WRC-12, Agenda Item 1.3)
608 *(WRC-03)*	Use of the frequency band 1 215 - 1 300 MHz by systems of the radionavigation satellite service	Delete after studies completed
609 *(WRC-07)*	Protection of aeronautical radionavigation	No change

Resolution No.	*Title*	*Action recommended*
	systems from the equivalent power flux-density produced by radionavigation satellite service networks and systems in the 1 164 - 1 215 MHz band	
610 *(WRC-03)*	Coordination and bilateral resolution of technical compatibility issues for radionavigation satellite networks and systems in the band 1 164 - 1 300 MHz, 1 559 - 1 610 MHz and 5 010 - 5 030 MHz	No change
611 (WRC-07)	Use of portion of the VHF band by the radiolocation service	Delete after WRC-12 (WRC-12, Agenda Item 1.14)
612 (WRC-07)	Use of the radiolocation service between 3 and 50 MHz to support high-frequency oceanographic radar operations	Delete after WRC-12 (WRC-12, Agenda Item 1.15)
614 (WRC-07)	Use of the band 15.4 - 15.7 GHz by the radiolocation service	Delete after WRC-12 (WRC-12, Agenda Item 1.21)
644 *(Rev. WRC-07)*	Telecommunication resources for disaster mitigation and relief operations	No change
705 *(MOB-87)*	Mutual protection of radio services operating in the band 70 - 130 kHz	No change
729 *(WRC-07)*	Use of frequency adaptive systems in the MF and HF bands	Delete after WRC-12
748 (WRC-07)	Compatibility between the aeronautical mobile (R) Service and the fixed satellite service (Earth-to-space) in the band 5 091 - 5 150 MHz	No change
754 (WRC-07)	Consideration of modification of the aeronautical component of the mobile service allocation in the 37 - 38 GHz band for protection of other primary service in the band	Delete after WRC-12 (WRC-12, Agenda Item 1.12)
805 (WRC-07)	Agenda for the 2011 World Radiocommunication Conference	Delete after WRC-12
951 *(Rev. WRC-07)*	Options to improve the international spectrum regulatory framework	Delete after WRC-12
953 (WRC-07)	Protection of radiocommunication services from emissions by short range devices	No change
956 (WRC-07)	Regulatory measures and their relevance to enable the introduction of software-defined radio and cognitive radio systems	No change

Recommendations:

Recommendation No.		*Action recommended*
7 *(Rev. WRC-97)*	Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences	No change
9	Relating to the measures to be taken to prevent the operation of broadcasting stations on board ships or aircraft outside national territories	No change
71	Relating to the standardization of the technical and operational characteristics of radio equipment	No change
75 *(WRC-03)*	Study on the boundary between the out-of-band and spurious domains of primary radars using magnetrons	No change
401	Relating to the efficient use of aeronautical mobile (R) worldwide frequencies	No change
608 *(Rev. WRC-07)*	Guidelines for consultation meetings established in Resolution **609 (WRC-03)**	No change

WRC-12 Agenda Item 8.2

Agenda Item Title:

To recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 806 (WRC-07).

Discussion:

The aerospace industry is developing new commercial aircraft to provide airlines and the flying public more cost-efficient air transportation while maintaining required levels of safety and reliability. One important way of accomplishing these aims is to reduce aircraft weight while providing multiple and redundant methods to transmit safety-related information within and on an aircraft. The utilization of wireless technologies may accomplish these goals while providing environmental benefits and cost savings to manufacturers and operators.

Installed Wireless Avionics Intra-Communications (WAIC) systems are one potential way to derive these benefits. WAIC systems consist of radiocommunications between two or more transmitters and receivers on a single aircraft. Both the transmitter and receiver are integrated with or installed on the aircraft. In all cases, communication is part of a closed, exclusive network required for aircraft operation. WAIC systems will not provide air-to-ground or air-to-air communications. WAIC systems will be limited to safety and regularity-of-flight related applications.

New Report ITU-R M. 2197 provides findings on the technical characteristics and operational requirements of WAIC systems for a single aircraft. Current aeronautical services allocations may not be sufficient to permit the introduction of WAIC systems due to the anticipated WAIC bandwidth requirements.

Therefore, ICAO supports a WRC-15 agenda item to conduct studies and take appropriate regulatory action to accommodate WAIC systems.

ICAO Position:

To support a future WRC-15 Agenda Item to make necessary regulatory changes to the ITU-R Radio Regulations for Wireless Avionics Intra-Communications (WAIC) systems.

4. ACTION BY THE MEETING

The meeting is invited to:

a) Take note of the information given;
b) Consider and support the ICAO Position for WRC 12 by developing a relevant conclusion;
c) Update the Future work Programme of AFI/FMG/2 accordingly.

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Attachment to Appendix A

ITU-R RESOLUTION 805 (WRC-07)

Agenda for the 2011 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2007),

considering

a) that, in accordance with No. **118** of the ITU Convention, the general scope of the agenda for a world radiocommunication conference should be established four to six years in advance and a final agenda shall be established by the Council two years before the conference;

b) Article **13** of the ITU Constitution relating to the competence and scheduling of world radiocommunication conferences and Article **7** of the Convention relating to their agendas;

c) the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

recognizing

a) that this conference has identified a number of urgent issues requiring further examination by **WRC-11**;

b) that, in preparing this agenda, many items proposed by administrations could not be included and have had to be deferred to future conference agendas,

resolves

to recommend to the Council that a world radiocommunication conference be held in 2011 for a period of four weeks, with the following agenda:

1. on the basis of proposals from administrations, taking account of the results of **WRC-07** and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action with respect to the following items:

1.1 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-07)**;

1.2 taking into account the ITU-R studies carried out in accordance with Resolution **951 (Rev. WRC-07)**, to take appropriate action with a view to enhancing the international regulatory framework;

1.3 to consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies, in accordance with Resolution **421 (WRC-07)**;

1.4 to consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112 - 117.975 MHz, 960 - 1 164 MHz and 5 000 - 5 030 MHz in accordance with Resolutions **413 (Rev. WRC-07)**, **417 (WRC-07)** and **420 (WRC-07)**;

1.5 to consider worldwide/regional harmonization of spectrum for electronic news gathering (ENG), taking into account the results of ITU-R studies, in accordance with Resolution **954 (WRC-07)**;

1.6 to review No. **5.565** of the Radio Regulations in order to update the spectrum use by the passive services between 275 GHz and 3 000 GHz, in accordance with Resolution **950 (Rev. WRC-07)**, and to consider possible procedures for free-space optical-links, taking into account the results of ITU-R studies, in accordance with Resolution **955 (WRC-07)**;

1.7 to consider the results of ITU-R studies in accordance with Resolution **222 (Rev. WRC-07)** in order to ensure long-term spectrum availability and access to spectrum necessary to meet requirements for the aeronautical mobile-satellite (R) service, and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz;

1.8 to consider the progress of ITU-R studies concerning the technical and regulatory issues relative to the fixed service in the bands between 71 GHz and 238 GHz, taking into account Resolutions **731 (WRC-2000)** and **732 (WRC-2000)**;

1.9 to revise frequencies and channelling arrangements of Appendix 17 to the Radio Regulations, in accordance with Resolution **351 (Rev. WRC-07)**, in order to implement new digital technologies for the maritime mobile service;

1.10 to examine the frequency allocation requirements with regard to operation of safety systems for ships and ports and associated regulatory provisions, in accordance with Resolution **357 (WRC-07)**;

1.11 to consider a primary allocation to the space research service (Earth-to-space) within the band 22.55-23.15 GHz, taking into account the results of ITU-R studies, in accordance with Resolution **753 (WRC-07)**;

1.12 to protect the primary services in the band 37-38 GHz from interference resulting from aeronautical mobile service operations, taking into account the results of ITU-R studies, in accordance with Resolution **754 (WRC-07)**;

1.13 to consider the results of ITU-R studies in accordance with Resolution **551 (WRC-07)** and decide on the spectrum usage of the 21.4-22 GHz band for the broadcasting-satellite service and the associated feeder-link bands in Regions 1 and 3;

1.14 to consider requirements for new applications in the radiolocation service and review allocations or regulatory provisions for implementation of the radiolocation service in the range 30-300 MHz, in accordance with Resolution **611 (WRC-07)**;

1.15 to consider possible allocations in the range 3-50 MHz to the radiolocation service for oceanographic radar applications, taking into account the results of ITU-R studies, in accordance with Resolution **612 (WRC-07)**;

1.16 to consider the needs of passive systems for lightning detection in the meteorological aids service, including the possibility of an allocation in the frequency range below 20 kHz, and to take appropriate action, in accordance with Resolution **671 (WRC-07)**;

1.17 to consider results of sharing studies between the mobile service and other services in the band 790-862 MHz in Regions 1 and 3, in accordance with Resolution **749 (WRC-07)**, to ensure the adequate protection of services to which this frequency band is allocated, and take appropriate action;

1.18 to consider extending the existing primary and secondary radiodetermination-satellite service (space-to-Earth) allocations in the band 2 483.5-2 500 MHz in order to make a global primary allocation, and to determine the necessary regulatory provisions based upon the results of ITU-R studies, in accordance with Resolution **613 (WRC-07)**;

1.19 to consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution **956 (WRC-07)**;

1.20 to consider the results of ITU-R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution **734 (Rev. WRC-07)**;

1.21 to consider a primary allocation to the radiolocation service in the band 15.4-15.7 GHz, taking into account the results of ITU-R studies, in accordance with Resolution **614 (WRC-07)**;

1.22 to examine the effect of emissions from short-range devices on radiocommunication services, in accordance with Resolution **953 (WRC-07)**;

1.23 to consider an allocation of about 15 kHz in parts of the band 415-526.5 kHz to the amateur service on a secondary basis, taking into account the need to protect existing services;

1.24 to consider the existing allocation to the meteorological-satellite service in the band 7 750-7 850 MHz with a view to extending this allocation to the band 7 850-7 900 MHz, limited to non-geostationary meteorological satellites in the space-to-Earth direction, in accordance with Resolution **672 (WRC-07)**;

1.25 to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution **231 (WRC-07)**;

2. to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev. WRC-03)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with principles contained in the Annex 1 to Resolution **27 (Rev. WRC-07)**;

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-07)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

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: "Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks", in accordance with Resolution **86 (Rev. WRC-07)**;

8. in accordance with Article 7 of the Convention:

a) to consider and approve the Report of the Director of the Radiocommunication Bureau:

b) on the activities of the Radiocommunication Sector since **WRC-07**;

c) on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

d) on action in response to Resolution **80 (Rev. WRC-07).**

8.1 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **806 (WRC-07)**,

resolves further

to activate the Conference Preparatory Meeting and the Special Committee on Regulatory/Procedural Matters,

invites the Council

to finalize the agenda and arrange for the convening of **WRC-11**, and to initiate as soon as possible the necessary consultations with Member States,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to **WRC-11**,

instructs the Secretary-General

to communicate this resolution to international and regional organizations concerned.

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