



INTERNATIONAL CIVIL AVIATION ORGANIZATION

WESTERN AND CENTRAL AFRICAN OFFICE

SIXTEENTH MEETING OF AFISNET SATELLITE MANAGEMENT COMMITTEE (SNMC/16)

(Dakar, Senegal, 17-19 December 2007)

Agenda Item 9: Any other business**ITU - WORLD RADIOCOMMUNICATION CONFERENCE (WRC) 2007
22 October – 16 November 2007; Geneva, Switzerland***(Presented by the Secretariat)*

SUMMARY

This paper provides SNMC16 with the outcome of the ITU WRC-2007 (Geneva, 22 October-16 November 2007)..

1. Introduction

- 1.1. The ITU World Radiocommunication Conference (2007) (WRC-07) was held from 22 October to 16 November in Geneva, Switzerland.
- 1.2. In total, over 2800 delegates from 164 ITU Member States and 104 international organizations participated in the work of the conference.
- 1.3. Three aviation coordination meetings were organized by the ICAO delegation. About 60 aviation experts attended those meetings. The meetings addressed all the aviation-related issues, in particular in relation to specific proposals submitted to the Conference. These meetings proved to be an invaluable tool in coordinating support for the ICAO policy.
- 1.4. Coordination and promotion of the ICAO policy was also performed on a more bilateral basis with individuals from aviation administrations. The assistance of RO/CNS during the conference proved to be invaluable in obtaining strong support from the AFI region on some critical issues.

2. Results of the Conference on the agenda items related to International Civil Aviation.

- 2.1 Details of the results of the conference on all agenda items relevant to aviation are contained in **Appendix A**. A brief overview of the results, in tabular form, is contained in **Appendix B**. In summary, the main results for civil aviation are as follows.
 - 2.1.1 The conference agreed to upgrade the radiolocation service (RLS) and the earth exploration satellite service (EESS) in the 9 GHz bands to a primary allocation, with the condition that aeronautical ground based radars and airborne weather radars operating in these bands should remain protected from those new primary allocations.
 - 2.1.2 On the issue of non-safety related aeronautical mobile telemetry (AMT) for flight testing, the conference agreed to a global allocation in the 5091 – 5150 MHz band (MLS extension band). Aviation has two concerns with this allocation:
 - a) that the WRC did not recognize the level of protection which may be required for MLS in this band, in particular in core Europe;

- b) a previous provision which ensured the protection of MLS in the whole MLS band (5030-5150 MHz) has now been limited to the MLS core band (5030-5091 MHz). More about this issue in paragraphs 2.1.3 and 2.1.4 below.

Frequency bands in the 4 and 6 GHz range were also allocated for AMT on a regional and sub-regional basis. These bands do not have allocations for aeronautical safety purposes.

- 2.1.3 AM(R)S allocations were made in the bands 112 – 117.975 MHz, 960 – 1164 MHz and 5091 – 5150 MHz. This satisfies the bandwidth requirements identified in the Future Communications Study conducted by the Aeronautical Communications Panel, with the exception of the 5 GHz band where more bandwidth may be needed. An agenda item for the next world radio conference was agreed to in this regard. All the new AM(R)S allocations are in bands which are also allocated to the aeronautical radio navigation service (ARNS), and the allocations are conditional to the successful conclusion of compatibility studies to ensure protection of the ARNS. Compatibility studies including non-ICAO systems (in particular those operating in the band 960-1164 MHz) need to be conducted within the ITU-R. The AM(R)S allocation in the 5 GHz band is limited to airport surface operations and is shared with allocations to AMT and AS. AS is a service which provides a wide bandwidth link from an aircraft to the ground, i.e. a video feed, in case of an unlawful intervention.
- 2.1.4 A sunset date for assignments for the fixed satellite service (FSS) in the MLS extension band was extended from 2012 to 2016. ICAO supported this extension, in the light of the removed priority of the MLS over other users in this band. This extension provides for stable sharing conditions with the MLS and AM(R)S in the band.
- 2.1.5 An allocation for AM(R)S in the band 5000-5030 MHz was explored and potential compatibility issues with the radionavigation-satellite service (RNSS) (mainly Galileo) were identified. It was agreed to study this band within the ITU-R, in time for WRC-2011, with a possible new allocation for the AM(R)S in mind.
- 2.1.6 A Recommendation on the *Use by civil aviation of frequency allocations on a primary basis to the fixed-satellite service* was developed. In this Recommendation it is recognized that VSAT networks operating in the fixed satellite service can also be used for aeronautical safety applications. Administrations, in particular in developing countries are urged to recognize the importance of VSAT operations to the modernization of civil aviation telecommunications systems and to encourage the implementation of VSAT systems to support aeronautical communication requirements. Administrations in developing countries are encouraged, to the maximum extent possible, to expedite the authorization process to enable aeronautical communications using VSAT technology.
- 2.1.7 The conference agreed to conduct, in time for consideration by WRC-11, the appropriate technical, operational and regulatory studies to ensure long-term spectrum availability for the aeronautical mobile-satellite (R) service (AMS(R)S) including the existing and future spectrum requirements.
- 2.1.8 The conference agreed to conduct, in time for consideration by WRC-11, the spectrum requirements and possible regulatory actions, including additional allocations, to support remote piloting of unmanned aircraft systems (UAS).

3. Conclusions

- 3.1. In general, the conference results fully satisfied the ICAO position. A significant element in the ICAO preparatory activities for this conference was the early awareness and involvement of Contracting States on the development of the ICAO position. Major factors contributing to this achievement included.
- a) the early development and dissemination of the draft ICAO position by the Air Navigation Commission, assisted by ACP Working group F and the NSP.

- b) the active participation by ICAO experts in the preparatory work of the ITU, including the relevant meetings of the ITU-R (e.g. Working Parties 8B and 8D, Study Group 8; Conference Preparatory Meeting (CPM));
 - c) the increased participation by ICAO experts in the meetings of the regional telecommunication organizations (APT, CEPT, CITELE, ATU). The involvement of the regional offices, with the assistance from Headquarters when required, proved important in supporting the development of regional proposals to the conference that were satisfactory for civil aviation;
 - d) the implementation of the recently updated Assembly Resolution A36-25 (Support of the ICAO policy on radio frequency spectrum matters).
- 3.2. A full analysis of the impact of the WRC-2007 decisions and an expeditious start of the ICAO preparatory activities for the next conference are now essential. Working group F of the Aeronautical Communications Panel (ACP) will develop an initial draft of the ICAO position in May 2008, for review by the ANC.

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Appendix A

Results of the Conference on the Agenda Items related to International Civil Aviation

1. Agenda Item 1.1 - Requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, in accordance with Resolution 26 (Rev. WRC-97)

- 1.1. Under this agenda item, the ICAO position supported the deletion of footnotes Nos. **5.181**, **5.197** and **5.259**. These footnotes were introduced in about 20 countries in 1987 in view of the global transition from ILS to MLS, which, at that time, was expected to be completed by 1998. They were intended to enable the introduction of the mobile service in the ILS bands as and when these would no longer be required for ILS. However, it has now become apparent that ILS will continue to be used by aviation for the foreseeable future, and therefore the existence of these footnotes is no longer justified. Most Administrations have removed their name from these footnotes prior to this conference; however, the following Administrations are still listed in these footnotes:

5.181 Egypt, Israel and the Syrian Arab Republic.
 5.197 Pakistan and the Syrian Arab Republic.
 5.259 Egypt, Israel and the Syrian Arab Republic

Further efforts are required to convince all the countries still listed to remove their name and allow for suppression of the footnotes, since they do not represent a realistic expectation for an introduction of the mobile service in these bands and the use of this allocation may cause harmful interference to ILS/VOR/GBAS.

- 1.2. Through Nos. **5.203**, **5.203A** and **5.203B** the band 136–137 MHz was allocated in some countries to the fixed and mobile, except aeronautical mobile services, on a secondary basis until 1 January 2005. In addition, this band was also allocated to the meteorological satellite service until 1 January 2002 (No. **5.203** refers). The conference reviewed these provisions and agreed to their suppression for safety and efficiency reasons:
- 1.3. The ICAO position also supported the deletion of footnotes **5.362B**, **5.362C** and **5.363**, which allocate the GNSS band 1 559 - 1 610 MHz to the (terrestrial) fixed service in certain countries. The use by the fixed service constitutes a severe and unacceptable constraint on the safe and effective use of GNSS in some areas of the world, as coordination distances of up to 400 km between the stations of the fixed service and the aircraft would be required.
- 1.3.1. The conference agreed to a modification of No. **5.362B** such that the band 1 559-1 610 MHz is now allocated to the fixed service on a primary basis until 1 January 2010 in Algeria, Saudi Arabia, Cameroon, Libyan Arab Jamahiriya, Jordan, Mali, Mauritania, Syrian Arab Republic and Tunisia.
- 1.3.2. In footnotes **5.362B** and **5.362C** there is a provision for a secondary allocation to the fixed service in the band 1 559 - 1 610 MHz. A large number of countries in Africa, Europe and parts of Asia are still listed under this provision. After 1 January 2015, this provision will no longer be valid.
- 1.3.3.** Interference-free operation of GNSS would require coordination with the radio regulators and/or operators in the fixed service to ensure that operation of the fixed stations in the band 1 559 - 1 610 MHz ceases. The secondary status of the fixed service until 1 January 2015 would require the fixed service to not cause harmful interference to, nor claim protection from, GNSS, and would give GNSS priority over the fixed service.
- 1.3.4. The conference agreed to delete No. **5.363**.
- 1.4. The band 4200 – 4400 MHz is reserved for use by airborne radio altimeters, No. **5.439** allows the operation of the fixed service in this band on a secondary basis. Radio altimeters are a critical element in aircraft automatic landing systems and serve as a sensor in ground proximity warning systems. The ICAO position asked for deletion of this footnote. Two countries, Iran (Islamic Republic of), and the Libyan Arab Jamahiriya remain in this footnote.

2. **Agenda Item 1.3 - In accordance with Resolution 747 (WRC-03) consider the upgrading of the radiolocation service to primary allocation status in the bands 9 000 - 9 200 MHz and 9 300 – 9 500 MHz and extending by up to 200 MHz the existing primary allocations to the Earth exploration-satellite service (active) and the space research service (active) in the band 9 500 – 9 800 MHz without placing undue constraints to the services to which the bands are allocated.**
 - 2.1. The ICAO position on this agenda item was to support the primary allocations proposed for the radio location service (RLS) and the earth exploration satellite service (EESS) in the bands 9000 – 9200 MHz and 9300 – 9500 MHz, provided that adequate protection be given to the aeronautical radio navigation services (ARNS) operating in these bands.
 - 2.2. During the preparatory work in ITU-R, it was demonstrated that a primary allocation to the RLS would not cause harmful interference to the ARNS. However, due to certain inadequacies in these studies, ICAO requested that a regulatory provision be introduced in the Radio Regulations giving protection to the ARNS from the RLS. The conference agreed to a provision which gives protection to radar systems and their associated transponders. This was satisfactory for aviation, since no other radionavigation systems are known to operate in these bands.
3. **Agenda Item 1.4 - To consider frequency related matters for the future development of IMT-2000 and systems beyond IMT-2000 taking into account the results of ITU-R studies in accordance with Resolution 228 (Rev. WRC-03).**
 - 3.1. Proponents of IMT-2000 are seeking additional allocations for the future development of mobile communication and are especially looking at bands below 3 GHz.
 - 3.2. In general, ICAO does not support the shared use of spectrum between aeronautical safety services (ARNS, AM(R)S and AMS(R)S) and other (non aeronautical) services, without relevant studies having been completed (either in ITU or in ICAO) that support shared use. All frequency bands used for aeronautical safety services are already heavily loaded or have already been forecast for full utilization and do not allow for sharing with non-aeronautical mobile services.
 - 3.3. Under this agenda item, the conference did briefly consider the band 2 700 – 2 900 MHz which is used for primary (medium range) radar systems. This proposal was not agreed to.
4. **Agenda Item 1.5 - To consider spectrum requirements and possible additional spectrum allocations for aeronautical telecommand and high-bit rate aeronautical telemetry, in accordance with Resolution 230 (WRC-03).**
 - 4.1. The ICAO position under this agenda item was as follows
 - a) To support the allocation of suitable spectrum for non-safety related aeronautical telemetry and associated telecommand systems and applications, in the bands between 3 – 30 GHz. These allocations, to be made to the mobile or aeronautical mobile service, should, in principle, not be made in bands currently allocated to the aeronautical mobile (R) service (AM(R)S), the aeronautical radionavigation service (ARNS) or their satellite equivalents. If allocations are made to such bands, and in particular in the frequency band 5 091 – 5 150 MHz, regulatory priority shall be given to these aeronautical safety services.
 - b) No change to the current allocation in the band 5 030 – 5 091 MHz since this band is required to satisfy the requirements of the aeronautical radionavigation service (MLS).
 - c) To support the continued use and protection of frequency bands currently allocated and used for aeronautical telemetry applications.

- 4.2. A proposal was introduced to the conference to make an allocation for aeronautical mobile telemetry (AMT) in the MLS core band (5030-5091 MHz). This proposal was strongly opposed by ICAO and was dropped.
- 4.3. A global allocation was agreed by the conference for AMT in the MLS extension band (5091-5150 MHz). Of concern to aviation is the fact that the WRC did not recognize the level of protection which may be required for MLS in this band, in particular in core Europe. The protection level set by the WRC is 10 dB higher than the one ICAO had proposed. Also of concern is the fact that a previous provision which ensured the protection of MLS in the whole MLS band (5030-5150 MHz) has now been limited to the MLS core band. More about this issue under agenda item 1.6 below.
- 4.4. A number of frequency bands in the 4 and 6 GHz range, which are currently not used for aeronautical safety purposes, were allocated by the WRC for AMT on a regional and sub-regional basis.
- 5. Agenda Item 1.6 - To consider allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz to 6 GHz, in accordance with Resolution 414 (WRC-03) and to study current satellite frequency allocations that will support the modernization of civil aviation telecommunication systems, taking into account Resolution 415 (WRC-03).**
- 5.1. Under this agenda item the conference considered broadening existing allocations for aeronautical radio navigation service (ARNS) to include aeronautical mobile (route) service (AM(R)S) as well. This agenda item also addressed support to an appropriate regulatory measure, preferably in the format of an ITU Recommendation in the Radio Regulations which recognizes that VSAT networks operating in the Fixed Satellite Service (FSS) can also be used for aeronautical safety applications.
- 5.2. Allocations for the aeronautical mobile (route) service (AM(R)S).
- 5.2.1. 112 – 117.975 MHz. ICAO studies have identified that this band may be needed in Europe for the AM(R)S.
- 5.2.1.1. The conference agreed to lift certain restrictions which were placed by WRC-03 on the use of this band by AM(R)S. The modified allocation to the AM(R)S would now allow the introduction of air-ground communication links. This is in line with the ICAO position. The conditions, under which the ICAO GBAS system operates in the 108 – 112 MHz band remain unchanged. However, in order to avoid compatibility problems with FM broadcasting, airborne transmissions in the band 108-112 MHz are no longer permitted. As a consequence, an amendment to one Recommendation contained in the VDL Mode 4 SARPs will be required, but this will not impact any operational aspects of VDL Mode-4. The ITU-R is invited to study any compatibility issues that may arise between the new AM(R)S allocation and the FM broadcasting services in the 87 -108 MHz band.
- 5.2.2. 960 – 1164 MHz. ICAO studies have identified the need for up to 60 MHz of spectrum for the AM(R)S service in this band.
- 5.2.2.1. An allocation to the AM(R)S in the band 960-1164 MHz was agreed by the conference. This allocation is conditional to studies being successfully completed within the ITU-R to resolve potential compatibility issues with non-ICAO standardized ARNS systems which also operate in this band. An exception to this is the Universal Access Transceiver (UAT) system, an ICAO standardized system for ADS-B, which can be used immediately within this allocation.
- 5.2.3. 5000 – 5150 MHz. ICAO studies have identified that 60 – 100 MHz will be needed in this band for airport surface applications.
- 5.2.3.1. An allocation to the AM(R)S in the band 5091 – 5150 MHz (MLS extension band), limited to airport surface operations has been agreed to. This is a shared allocation with the AMT (see agenda item 1.5 above) and an Aeronautical Security (AS) application intended for the provision *radiocommunication used in response to unlawful interruption of aircraft operations*. AS, a service introduced and supported by EUROCONTROL, is intended to provide a wide bandwidth link from an aircraft to the ground, i.e. a video feed, in case of an unlawful intervention. Note that the precedence that was given to MLS in this band over other uses has been removed (see agenda item 1.5 above). For the use of the band by the AM(R)S, AMT and AS, provisions to protect the Fixed Satellite Service (FSS) (feederlink), which operates in the same band, were introduced.

- 5.2.3.2. A sunset date for assignments to the fixed satellite service (FSS) was extended from 2012 to 2016. ICAO supported this extension, in light of the removed priority of the MLS over other users in this band. This extension provides for stable sharing conditions with the MLS and AM(R)S in the band.
- 5.2.3.3. The band 5 091-5 150 MHz may not provide sufficient spectrum capacity to satisfy the requirement identified above, and therefore additional spectrum may be required. A potential allocation for the AM(R)S in the band 5000-5030 MHz was therefore introduced to the conference. An allocation was opposed at this time, because of potential incompatibility with the radionavigation-satellite service (RNSS) (mainly Galileo). It was agreed to study this band within the ITU-R, in time for WRC-2011, with a possible new allocation for the AM(R)S in mind.
- 5.3. VSAT networks operate under an allocation to the Fixed Satellite Service (FSS) which in the ITU is not recognized as a safety service. A Recommendation on the *Use by civil aviation of frequency allocations on a primary basis to the fixed-satellite service* was developed by the conference. In this Recommendation it is recognized that VSAT networks operating in the fixed satellite service can also be used for aeronautical safety applications, especially in remote and rural areas which often lack a terrestrial communication infrastructure that meets the evolving requirements of modern civil aviation. Administrations, particularly in developing countries are urged to recognize the importance of VSAT operations to the modernization of civil aviation telecommunications systems and to encourage the implementation of VSAT systems to support aeronautical communication requirements. Administrations in developing countries are encouraged, to the maximum extent possible, to expedite the authorization process to enable aeronautical communications using VSAT technology. ICAO is invited to continue its assistance to developing countries to improve their aeronautical telecommunications, including interoperability of VSAT networks, and provide guidance to developing countries on how they could best make use of VSAT technology for this purpose.
- 6. Agenda Item 1.13 - Taking into account Resolutions 729 (WRC-97), 351 (WRC-03) and 544 (WRC-03) to review the allocations to all services in the HF bands between 4 and 10 MHz, excluding those allocations to services in the frequency range 7 000 - 7 200 kHz and those bands whose allotment plans are in Appendices 25, 26 and 27 and whose channeling arrangements are in Appendix 17, taking into account the impact of new modulation techniques, adaptive control techniques and spectrum requirements for HF broadcasting**
- 6.1. The ICAO position for this agenda item was to ensure that new allocations and techniques considered for introduction in the bands between 4 and 10 MHz will not cause harmful interference in the aeronautical HF bands.
- 6.2. Under this agenda item, the conference developed criteria for the use of frequency adaptive systems and digital modulation techniques for broadcast services, while ensuring that no harmful interference would be caused by existing maritime and aeronautical moiled services. A future agenda item concerning the use of digital modulation techniques in the maritime mobile service was developed.
- 7. Agenda Item 1.16 - To consider the regulatory and operational provisions for maritime mobile service identities (MMSIs) for equipment other than shipborne mobile equipment, taking into account Resolutions 344 (Rev. WRC-03) and 353 (WRC-03).**
- 7.1. MMSIs are unique identifiers for individual stations and provide a rapid method of identifications. Several ITU-R recommendations cover the assignment and use of these MMSIs for ship and land stations. A need had been identified to assign MMSIs for automatic identification systems (AIS) on search and rescue (SAR) aircraft in order to communicate efficiently in the maritime mobile service, when engaged in SAR operations. Modifications were made to Article 19 of the Radio Regulations, making it possible to allocate MMSIs to SAR aircraft. This satisfies the ICAO position on this agenda item.

8. **Agenda Item 1.17 - To consider the results of ITU-R studies on compatibility between the fixed-satellite service and other services around 1.4 GHz, in accordance with Resolution 745 (WRC-03).**
 - 8.1. Under this agenda item, the conference suppressed two secondary allocations to the fixed satellite service. No new allocations were considered. This satisfies the ICAO position.

9. **Agenda Item 1.20 - To consider the results of studies and proposals for regulatory measures, if appropriate, regarding the Earth exploration-satellite service (passive) from unwanted emissions of active services in accordance with Resolution 738 (WRC-03).**
 - 9.1. Under this agenda item the conference reviewed the results of studies and proposals for regulatory measures regarding the protection of the Earth exploration-satellite service (EESS) receiving in the band 1400 – 1427 MHz from unwanted emissions of active services transmitting in adjacent frequency bands. Studies in the ITU-R have shown that primary radar systems currently operating in the band 1215 – 1400 MHz and conforming to relevant ITU-R recommendations will most likely not be able to meet the suggested power levels for unwanted emissions. WRC-07 therefore agreed to only recommend a maximum level of unwanted emission power of –29 dBW/27 MHz from radiolocation service stations operating in the 1 350-1 400 MHz band. It should be noted that primary radar systems used for civil aviation purposes are operating under the aeronautical radionavigation service allocation in the 1300-1350 MHz band and are therefore not affected by this decision.

10. **Agenda Item 1.21 - To consider the results of studies regarding the compatibility between the radio astronomy service and the active space services in accordance with Resolution 740 (Rev. WRC-03), in order to review and update, if appropriate, the tables of threshold levels used for consultation that appear in the Annex to Resolution 739 (WRC-03).**
 - 10.1. The radio astronomy service uses frequencies in the band 1610 – 1613.8 MHz and is seeking protection from active services in the adjacent bands. Of concern to aviation is that the near adjacent band 1559-1610 MHz is used by the radionavigation satellite service for GNSS (GPS, GLONASS and the future Galileo system) and their operation should not be unduly constrained.
 - 10.2. The conference developed a recommended limit of unwanted emissions from the GNSS service into the 1610-1613.8 MHz band, resolving that administrations take all reasonable steps to ensure that any satellite system being designed and constructed to operate in the GNSS band meet that limit. In case those systems cannot meet these limits, then the administrations which operate the affected radio astronomy stations shall be notified. The recommended limit is not believed to affect the currently operating and planned GNSS networks. (According to Mike Biggs)

11. **Agenda Item 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 to Resolution 27 (Rev. WRC-03).**
 - 11.1. The ICAO position on this agenda item was to make no change to current references in the Radio Regulations relevant to aeronautical services, as no new or amended ITU-R Recommendations referring to the aeronautical service have been identified.
 - 11.2. The conference identified a number of ITU-R Recommendations referenced in the Radio Regulations, including:
 - a) ITU-R Rec. S.1340 referenced in No. 5.511C and S.1341 referenced in No. 5.511A, which address sharing between feederlinks for the mobile-satellite service and the aeronautical radionavigation service in the 15.4-15.7 GHz band;

- b) ITU-R Rec. M.1643 referenced in Nos. 5.504B, 5.504C, 5.508A and 5.509A, 14-14.5 GHz which is, *inter alia*, allocated to radionavigation, including aeronautical radionavigation;
- c) ITU-R Rec. M.1642-2 referenced in Resolution 609 resolves 10, 1164-1215 MHz which is, *inter alia*, allocated to aeronautical radionavigation;

11.3. The referenced ITU-R Recommendations are not being amended, however they will be included in Volume 4 of the Radio Regulations. This does not modify the status of the relevant material, and therefore satisfies the ICAO position.

12. Agenda Item 4 - 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.

12.1. The following Resolutions and Recommendations were addressed in a manner different from the ICAO Position:

- a) Resolution 18 relates to the procedure for identifying and announcing the position of ships and aircraft of States which are not party to an armed conflict. A minor update was made to this resolution, amending a reference for maritime use which previously pointed to Appendix 13 of the RR which addresses non-GMDSS distress and safety communications. This reference now points to Article 33 of the RR which addresses GMDSS urgency and safety communications. This change does not affect aviation.
- b) Resolution 26 relates to Footnotes to the Table of Frequency Allocations in Article 5 of the RR. A reference has been changed on how new footnotes or modifications of footnotes to the RR may be proposed to a WRC, in case of corrections of obvious errors. This reference now points to No. 40 of the General Rules of Conferences, Assemblies and meetings of the Union (Antalya, 2006). This change does not affect aviation. (Need to look this up)
- c) Resolution 27 addresses the application of incorporation by reference in the RR. Minor updates were made to this resolution, mainly to clarify its application. This does not affect aviation.
- d) Resolution 63 addresses the protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment. Minor updates were made to this resolution, mainly to clarify its application. This does not affect aviation.
- e) Resolution 95 addresses the general review of resolutions and recommendations of the world administrative radio conferences and the world radiocommunication conferences. An update was made to this resolution, inviting administrations to submit contributions relevant to this resolution to the ITU conference preparatory meeting (CPM).
- f) Resolution 222 addresses the use of the 1.5/1.6 GHz band and long-term spectrum availability for AMS(R)S. This Resolution was updated by the conference in line with the ICAO position, calling for further studies to be conducted in time for WRC-11, to ensure long-term spectrum availability to the AMS(R)S. Agenda Item 7.2 refers.
- g) Resolution 225 addresses the study of additional frequency bands for the satellite component of International Mobile Telecommunications (IMT). This resolution was modified to include the frequency bands 1518-1525 and 1668-1675 MHz, which are not used by aviation.
- h) Resolution 228, (there is ambiguity here, the last paper to plenary (contribution 426) is draft new Res 228, there was also discussion in plenary to limit the Resolution further to the 450 MHz band? Monitor the ITU web-site for the final text) which addresses future IMT systems, has now been limited to an invitation for the ITU-R to study as necessary the technical, operational and spectrum related issues to meet the objectives of future IMT systems. This is in line with the ICAO position which called for suppression of this Resolution.

- i) Resolution 339, Coordination of NAVTEX services, was amended slightly, mainly in the form of an updated reference. This does not affect aviation in any way
- j) Resolution 353, which dealt with Maritime mobile service identities (MMSI) for equipment other than shipborne equipment was suppressed in line with the amendments made under agenda item 1.16. This satisfies the ICAO position.
- k) Resolution 413 addresses the use of the band 108 – 117.975 MHz and has been amended in line with the outcome of agenda item 1.6 for this band. It invites the ITU-R to study any compatibility issues between the broadcasting and the aeronautical mobile (route) service in the band, and to develop new or revised ITU-R Recommendations as appropriate. This is in line with the ICAO position.
- l) Resolution 608 addresses the use of the frequency band 1215-1300 MHz and provides protection to the radionavigation satellite service. The ICAO position is to recommend this resolution for deletion, once studies of the band are completed. This resolution is retained unchanged. This is not in disagreement with the ICAO position.
- m) Resolution 609 provides protection to the aeronautical radionavigation systems from the equivalent power flux-density produced by the radionavigation satellite service networks and systems in the 1164-1215 MHz bands. The resolution, which provides for equitable share of the band between the different GNSS providers and other users, has now been updated, based on sharing studies since WRC-2003. This is not believed to affect any systems or services used by aviation. I am waiting for verification from Mike Biggs / Bob Frazier
- n) Resolution 644 addresses Telecommunication resources for disaster mitigation and relief operations. This resolution was modified, mainly to include a request that the ITU-R study the application of sensors and early warning systems as a means of disaster mitigation. This is in line with the ICAO position.
- o) Resolution 729. Adaptive systems at MF/HF were addressed under agenda item 1.13. This Resolution is intended to provide protection to existing maritime and aviation services as well as broadcasting services from frequency agile systems. The Resolution which had some minor modifications does still provide protection to those services. This is in line with the ICAO position.
- p) Resolution 951, calls for study to addresses options to improve the international spectrum regulatory framework. This resolution was expanded by the conference to include several potential options for a more flexible framework for the Radio Regulations. ICAO will need to monitor the continuation of this work closely, as it may ultimately affect the current protected status of aviation safety related allocations.
- q) Recommendation 608 gives guidelines for consultation meetings established in Resolution 609. This Recommendation was updated, based on sharing studies since WRC-2003. While it gives more stringent sharing criteria for the radionavigation satellite services than previously, this is not believed to affect aviation. I am waiting for verification from Mike Biggs / Bob Frazier
- r) Recommendation 800 which provided the principles for establishing agendas for world radio conferences, was upgraded to the conference to a Resolution. This is in line with the ICAO position.

13. Agenda Item 7.2 - 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 802 (WRC-03).

- 13.1. In 1997, the exclusive allocations to the aeronautical, land and maritime satellite services in the L-band (1.5/1.6 GHz) were replaced by a generic type allocation to the mobile-satellite service, in spite of the serious reservations of the international civil aviation community on the compatibility between the aeronautical mobile satellite (route) service (AMS(R)S) with other mobile services. In 1997, and then further in 2000, a footnote was developed which stipulates priority and preemption by the AMS(R)S over other services in this band. In

2005, an ITU approved report concluded, *inter alia*, that ‘prioritization and intersystem real-time pre-emption’ is not practical and, without significant advance in technology, is unlikely to be feasible for technical, operational and economic reasons. This means that the method approved by WRC-1997 and WRC-2000 is insufficient to ensure long-term spectrum availability and protection to AMS(R)S communications in the L-band. During this conference, it was agreed to conduct, in time for consideration by WRC-11, the appropriate technical, operational and regulatory studies to ensure long-term spectrum availability for the aeronautical mobile-satellite (R) service (AMS(R)S). This includes the existing and future spectrum requirements. WRC-2011 agenda item 1.7 refers (Resolution 222 (Rev. WRC-07)).

13.2. The conference agreed to include the following items of interest to aviation on the draft agenda for the WRC-2011:

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);

1.3 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 [COM6/8] (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), [COM4/5] (WRC-07) and [COM4/9] (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;

1.12 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 [COM6/12] (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 [COM6/18] (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 [COM6/19] (WRC-07);

1.23 to consider allocations 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;

1.25 to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution [COM6/21] (WRC-07);

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;

7.2 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 [COM6/22] (WRC-07),

Appendix B
Overview of the WRC-2007 Results

Agenda item		ICAO position	Results	Conclusion
1.1	Suppression of national footnotes	Suppress 5.181, 5.197 and 5.259 (ILS bands)	The number of countries in those footnotes keeps reducing. Only Egypt, Israel, the Syrian Arab Republic and Pakistan remain.	In line with ICAO position.
“	“	Suppress 5.203, 5.203A and 5.203B (136 – 137 MHz)	These footnotes have been deleted	Satisfies ICAO position.
“	“	Suppress 5.362B, 5.362C and 5.363 (GNSS bands)	A number of countries have been removed from 5.362B and 5.362C. Secondary allocation for a few countries in 5.362B has been pushed back to 2010. A large number of countries still with a secondary allocation to the FS until 2015. 5.363 has been deleted.	In line with ICAO position.
“	“	Suppress 5.439 (radio altimeters)	5.439 provides for a secondary allocation to the FS. Two countries remain in this footnote: Iran (Islamic Republic of), and the Libyan Arab Jamahiriya.	In line with ICAO position.
1.3	Upgrading the RLS to primary status in the band 9000 – 9200 MHz and 9300 – 9500 MHz.	Include a footnote to protect the primary status of the RNS in these bands.	The RLS was upgraded to primary status, with the inclusion of appropriate footnotes to protect radars and their associated transponders.	Satisfies ICAO position
1.4	Spectrum for IMT-2000	No sharing of aeronautical frequencies with the mobile service	No allocations were made for the IMT service in bands used by aviation	Satisfies ICAO position
1.5	Spectrum for non-safety related Aeronautical Mobile Telemetry (AMT).	Support the allocation of suitable spectrum, while ensuring that priority is given to AM(R)S in bands shared between the two services. Ensure priority of MLS over all	A shared allocation was made in the MLS extension band, while also reducing the protection for MLS in this band. Regional allocations for AMT	Partially satisfies ICAO position

Agenda item		ICAO position	Results	Conclusion
		other services.	were also made in non aviation bands.	
1.6	Consider allocations for the AM(R)S service in accordance to Resolution 414.	Support allocation for AM(R)S in the VHF and DME ARNS bands and in the MLS extension band	Allocations were made for AM(R)S in 112 – 117.975 MHz, 960 – 1164 MHz and 5091 – 5150 MHz. Appropriate provisions were developed to protect the ARNS service	Satisfies ICAO position. More spectrum may be needed in the 5 GHz band.
“	Study current satellite frequency allocations that will support infrastructure in underdeveloped regions, in accordance to Resolution 415.	Support development of an ITU Rec in the RR, recognizing that VSAT can be used for aeronautical safety applications.	An ITU Recommendation was developed for inclusion in the Radio Regulations, which recognizes that VSAT networks can be used to carry aeronautical safety related traffic.	Satisfies ICAO position
1.13	Review allocations in the HF bands between 4 and 10 MHz	Ensure that new allocations and techniques in the HF bands will not cause harmful interference to aviation.	Protection to the existing aeronautical mobile allocations ensured	Satisfies ICAO position
1.16	Consider provisions for MMSIs for equipment other than shipborne	Support measures improving the use of MMSIs onboard SAR aircraft	MMSIs can be allocated to SAR aircraft	Satisfies ICAO position
1.17	Consider results of ITU-R studies on compatibility between FSS and other services in the 1.4 GHz band	Use of the band around 1.4 GHz by the FSS should not be introduced in any of the aeronautical bands in this frequency range.	Secondary allocations to the FSS were suppressed. No new allocations were made	Satisfies ICAO position
1.20	Consider proposals for regulatory measures to protect the EESS (passive) from unwanted emissions of active services	Protection of EESS in the 1.4 GHz band should not impose undue constraints on adjacent bands for aviation.	No constraints given to operation in the ARNS band, 1300 – 1350 MHz	Satisfies ICAO position
1.21	Compatibility between the radio astronomy service and the active space services.	Protection of radio astronomy in the band 1610.6 – 1613.8 MHz band should not impose undue constraints on adjacent bands for aviation.	A guiding limit for unwanted emissions was developed by the conference. This limit is not believed to affect current or foreseen GNSS networks	In line with ICAO position
2	Examine and update revised ITU-R Recommendations incorporated by reference in the RR	No change to the current references in the RR, to ITU-R recommendations related to aeronautical services.	Some ITU-R recommendations which reference aviation spectrum are to be included in Volume 4 of the RR. the referenced recommendations are not	Satisfies ICAO position

Agenda item		ICAO position	Results	Conclusion
			being modified	
4	Review Resolutions/ Recommendations of previous conferences	Itemized list in ICAO position	A number of Resolutions and Recommendations were updated in line with the ICAO position	Satisfies ICAO position
7.2	Agenda for WRC-2011 and 2015.	Support inclusion for WRC-11 addressing the MSS 1.5/1.6 GHz bands to ensure AMS(R)S availability and protection	Agenda item 1.7, WRC-2011 Refers. Many other items on the agenda for WRC-2011, which affect civil aviation	Satisfies ICAO position. Preparation for WRC-2011 to start immediately