



TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 1: Strategic issues that address the challenge of integration, interoperability and harmonization of systems in support of the concept of “One Sky” for international civil aviation

1.1: Global Air Navigation Plan (GANP) – framework for global planning

- a) ASBU methodology and contents
- b) Communications roadmap
- c) Navigation roadmap
- d) Surveillance roadmap
- e) Avionics roadmap
- f) Aeronautical information management (AIM) roadmap

REPORT ON THE RESULTS OF THE INTERNATIONAL TELECOMMUNICATION UNION (ITU) WORLD RADIOCOMMUNICATION CONFERENCE (2012) (WRC-12)

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This paper presents the results of the International Telecommunication Union (ITU) World Radiocommunication Conference (2012) (WRC-12) (23 January to 17 February 2012, Geneva, Switzerland).

In general the conference results conformed to the ICAO position and ICAO preparatory activities for the next WRC in 2015 are under way.

1. INTRODUCTION

1.1 The ITU WRC-12 was held from 23 January to 17 February 2012 in Geneva, Switzerland. The increasing pressure on the frequency spectrum resource is reflected in the continuously increasing size of the World Radiocommunication Conferences (WRCs) and their associated preparation process. In recent years, on average, each WRC has seen about a 15 per cent increase in the number of delegates, representing the various stakeholders. In total, 3 060 delegates from 165 International Telecommunication Union (ITU) Member States and forty-five international organizations participated in the work of WRC-12.

1.2 The ICAO delegation to the conference included CNS Regional Officers from ICAO Western and Central African Office, Dakar (WACAF) Office (first two weeks) and ICAO Eastern and Southern African Office, Nairobi (ESAF) Office (final week) and two Technical Officers from Headquarters (full-time).

1.3 Three aviation coordination meetings were organized by the ICAO delegation during the conference. About seventy-five aviation experts attended those meetings. Support for the ICAO position was coordinated during the meetings taking into account the developments during the conference. Coordination and promotion of the ICAO policy during the conference was also performed on a more bilateral basis, including individuals, various industry groups and representing spectrum administrations.

2. BACKGROUND

2.1 Frequency spectrum is a finite and limited resource, managed by the ITU through its WRCs held every three to four years.

2.2 Availability of the necessary radio frequency spectrum continues to be a prerequisite for the safety of civil aviation and the effective implementation of the communications, navigation, and surveillance/air traffic management (CNS/ATM) systems. However, as demand for radio spectrum from non-aviation users keeps growing, aviation faces an ever-increasing competition for the limited available spectrum, in particular from mobile and broadband wireless access services. It is essential that aviation requirements for radio frequency spectrum be strongly supported by all ICAO Member States in all international fora where spectrum allocations are addressed so as to ensure that aviation requirements for safety of life services are duly presented and understood.

2.3 ICAO policies and practices related to radio frequency spectrum matters are outlined in Assembly Resolution A36-25 (*Support of the ICAO policy on radio frequency spectrum matters*), which urges ICAO Member States to support aviation requirements for spectrum and instructs ICAO to make sufficient resources available to enable increased participation in spectrum management activities.

2.4 Summary of the main significant efforts made during the lead up to WRC-12

2.4.1 Development and distribution of the ICAO position:

- a) initially developed in 2008 by the Aeronautical Communications Panel (ACP), reviewed by the Air Navigation Commission (179-10 and 181-1), approved by Council (187/9) on 22 June 2009 and sent to States (State letter E 3/5-09/61);
- b) subsequent update to reflect the progress of studies within ITU and the ACP, reviewed by the Commission (187-2), approved by Council (193/3) on 15 June 2011 and sent to States (State letter E 3/5-11/59); and
- c) ICAO position submitted to the ITU WRC-12 on 11 August 2011 and placed on the ICAO website for public reference.

2.4.2 ICAO Secretariat preparatory activities (missions) to promote the ICAO position and spectrum policy to secure adequate support in the preparatory work leading up to WRC-12:

- a) support of ITU-Radiocommunication (ITU-R) sector work activities, including ITU-R Study Groups 4 and 5, Working Parties 4C and 5B, CPM-11/2, RA-12; on average nine man-weeks per year;

- b) support of the WRC-12 preparatory activities of regional telecommunication organizations¹; on average five man-weeks per year; and
- c) meetings of ACP-WG/F (frequency) in conjunction with frequency spectrum workshops for aviation professionals in the ICAO regional offices; on average four man-weeks per year.

3. RESULTS OF THE CONFERENCE ON THE AGENDA ITEMS RELATED TO INTERNATIONAL CIVIL AVIATION

3.1 A brief summary of the main results for civil aviation is as follows.

3.2 WRC-12 continued the trend, set by the last conference, towards increased flexibility of aeronautical spectrum allocations. This was mainly achieved under Agenda Items 1.3 and 1.4 of the conference by enabling the sharing of spectrum between aeronautical mobile (route) allocations and aeronautical radionavigation allocations while limiting the use of such shared allocations to systems which operate in accordance with International Standards and Recommended Practices (SARPs).

3.3 WRC-12 Agenda Item 1.3

3.3.1 This agenda item was to consider spectrum requirements to support the safe operation of unmanned aircraft systems (UAS) in non-segregated airspace.

3.3.2 A new allocation to the aeronautical mobile (route) service (AM(R)S) in support of UAS was agreed in the band 5 030 – 5 091 MHz, the core band for the operation of the microwave landing system (MLS). There has been very limited implementation of MLS to date and, therefore, the band had lately been subject to increasing attention and interest by other frequency spectrum users. The new AM(R)S allocation, in addition to serving the needs of the UAS, reinforces the claim of aviation to remain the prime user of this band while preserving the current priority access for the MLS. As a further measure to protect civil aviation access to this band, use of this new AM(R)S allocation is limited to internationally standardized aeronautical systems. An existing allocation to the aeronautical mobile satellite (route) service (AMS(R)S) in the band 5 000 – 5 150 MHz was similarly modified to be limited to internationally standardized aeronautical systems.

3.3.3 The use of fixed satellite service (FSS) spectrum allocations to support the safe integration of UAS in non-segregated airspace received much interest during the conference and several proposals were developed and addressed, some of which were of much concern to the ICAO delegation as they attempted to circumvent the fundamental principle of *safeguarding life and property*, as defined in the ITU Constitution and the Radio Regulations. FSS is not defined as a safety service and, due to lack of effective radio regulatory measures, FSS frequency coordination and interference mitigation relies to a large extent on voluntary, commercially motivated cooperation between the various FSS operators. Finally a compromise was struck whereby the ITU-R was instructed to conduct studies to identify appropriate technical, regulatory and operational recommendations, and an agenda item for WRC-15 was agreed upon. This WRC-15 agenda item will address possible regulatory actions to support use of FSS frequency bands for UAS communication and control links, based on the results of the ITU-R studies and consistent with the requirements of a safety service. To ensure a favourable outcome for civil aviation, ICAO will develop a common civil aviation position and actively support the ITU-R studies.

¹ Asia-Pacific Telecommunity (APT), African Telecommunication Union (ATU), European Conference of Postal and Telecommunications Administrations (CEPT), Inter-American Telecommunication Commission (CITEL).

3.4 **WRC-12 Agenda Item 1.4**

3.4.1 Under this agenda item, the conference sought to finalize new allocations made to the AM(R)S during WRC-07.

3.4.2 Further regulatory measures were made to finalize the provisional allocations introduced at WRC-07 to the AM(R)S in the frequency bands 112 – 117.975 and 960 – 1 164 MHz. These new allocations will be shared with existing allocations to the aeronautical radionavigation service (ARNS) in a manner which does not burden existing and future implementations of ARNS systems. The new allocations pave the way for more efficient and flexible aeronautical use of these frequency bands while adding a layer of protection for civil aviation use by means of the new radio regulatory requirement: that systems using these bands need to be ICAO standardized.

3.4.3 At WRC-07, a 59 MHz wide allocation was made to the new aeronautical air/ground airport surface communications system currently being standardized for use in the 5 GHz band. One of the tasks before this conference was whether this system needed more spectrum and, if so, whether an additional allocation could be made. Due to heavy pressure from potentially affected users of the spectrum under scrutiny, mainly global navigation satellite system (GNSS) interests, the conference could not come to an agreement on this issue, therefore no additional allocation was made in support of the new aeronautical airport surface system.

3.5 **WRC-12 Agenda Item 1.7**

3.5.1 Under Agenda Item 1.7, the conference addressed the long-standing issue of access to the bands 1 545 – 1 555 MHz and 1 646.5 -1 656.5 MHz for AMS(R)S users. In those bands, AMS(R)S users are given priority of access over other satellite users (land mobile and maritime mobile) through appropriate provisions of the radio regulations. However, the practical effectiveness of the procedures for the application of those provisions was questionable. The procedures were not in the public domain (they were based on confidential agreements among satellite operators), nor were the outcomes of the application of the procedures (i.e. the final spectrum assignments to different users). The overall lack of transparency of the process had been challenged by ICAO and others on several occasions, most recently at WRC-07 where it was agreed that the matter should be on the agenda of WRC-12.

3.5.2 The issue remained very controversial throughout the ITU-R study cycle leading up to the conference. However, at the conference a satisfactory consensus was found and several provisions were approved that, taken together, achieve the purpose of strengthening AMS(R)S access, as requested by the ICAO position. Specifically, the conference introduced in the radio regulations a detailed annex describing the procedures for the application of the AMS(R)S priority, and accepted the optional involvement of ICAO in the validation of the AMS(R)S traffic requirements (if requested by an AMS(R)S operator). The former provision effectively addresses the transparency issue while the latter provides additional support for AMS(R)S operators' claims to spectrum and reinforces their position when claiming priority over other users.

3.6 **Agenda items for WRC-15**

3.6.1 WRC-12 agreed on a number of aviation-relevant items to be put on the agenda for WRC-15, including the issues outlined below.

3.6.2 Wireless avionics intra-communications (WAIC) systems have been identified by the aerospace industry as a means to increase cost-efficiency and environmental friendliness, while maintaining required levels of safety, through the reduction of aircraft weight, through the use of wireless

technology and by the introduction of sensors/transducers on parts of the airframe hitherto not easily accessible, potentially making more efficient airframe designs possible. To support this important initiative by the aerospace industry, appropriate frequency spectrum need to be identified and made available for WAIC on a worldwide basis.

3.6.3 In support of additional spectrum requirements to support UAS operations in a safe manner in non-segregated airspace, an agenda item was assigned to WRC-15 to develop regulatory actions to support the use of FSS frequency bands for UAS command and control links, while ensuring the safe operation of UAS in non-segregated airspace, consistent with the provision of a safety service, making reference to No. 4.10 in the radio regulations (see also paragraph 3.3).

3.6.4 A new resolution was approved, addressing the support of civil aviation very small aperture terminal (VSAT) communications in the 3.4 - 4.2 GHz band (C-band) in the Africa-Indian Ocean (AFI) Region. The resolution addresses concerns related to the increasing demand from mobile system operators and other parties for access to the bands used by civil aviation VSAT communications, which could potentially threaten the continued availability of VSAT frequencies for civil aviation use. The resolution calls for ITU-R studies on technical and regulatory measures to support the existing and future aeronautical and meteorological use of VSAT in the C-band. While there is no specific agenda item at WRC-15 for this issue, the resolution calls for a review of the results of the studies and an action by WRC-15 as appropriate. The results of the studies will be reported to the WRC-15 through the report of the Director of the ITU Radiocommunication Bureau.

3.6.5 Finally, what is probably the most critical and far-reaching item on the agenda for WRC-15, is the subject of spectrum requirements for new allocations for the mobile service, including broadband wireless access (BWA) and the international mobile telecommunications (IMT). It is expected that the proponents of many of the WRC-15 agenda items will consider and propose potential sharing or use of aeronautical spectrum in one or more bands.

4. WRC-12 OUTCOME

4.1 In general, the conference results conformed to the ICAO position. A significant element in the ICAO preparatory activities for this conference was the early awareness and involvement of Member States in the development of the ICAO position. Major factors contributing to this achievement included the:

- a) early development and dissemination of the draft ICAO position by the Secretariat and the Air Navigation Commission, assisted by ACP Working Group F and the Navigation Systems Panel (NSP) Spectrum Sub-group;
- b) active participation by ICAO experts in the preparatory work of the ITU, including the relevant meetings of the ITU-R (e.g. Study Groups 4 and 5, including the relevant working parties (WP), and the conference preparatory meeting (CPM));
- c) increased participation by ICAO experts in the meetings of the regional telecommunication organizations (APT, ATU, CEPT, CITELE). The involvement and assistance of the regional offices proved important in supporting the development of proposals by the regional telecommunication organizations to the conference which were in line with the ICAO position;

- d) organization of ACP working group meetings and ICAO radio frequency seminars in the regions;
- e) implementation of Assembly Resolution A36-25; and
- f) active participation of the ICAO delegation at the conference itself, during which the ICAO position was often challenged, allowed ICAO to counter and refute numerous proposals that would adversely impact aeronautical spectrum.

5. WRC-15 PREPARATIONS

5.1 ICAO preparatory activities for the next WRC in 2015 are under way. An initial draft of the ICAO position is being developed, to be subsequently reviewed by the Commission and sent for comments to States by the end of 2012. A final review of the ICAO position and its subsequent approval by the Council is foreseen by mid-2013. In order to continually coordinate the aviation position and to develop input material as necessary to support ITU-R studies, ICAO radio frequency spectrum seminars will be held in conjunction with ACP working group meetings, so as to share information with the regions.

5.2 In order to balance non-aviation interests, States' aviation authorities will need to coordinate the ICAO position closely with the States' frequency spectrum authorities. Furthermore, in order to secure a favourable outcome of WRC-15, active participation in the following activities by ICAO, aviation authorities and other aviation stakeholders is essential:

- a) ITU-R Working Party 5B (WP-5B): Consideration of fixed satellite allocations for UAS command and control (WRC-15 Agenda Item 1.5), WAIC (WRC-15 Agenda Item 1.17) and protection of aeronautical radio altimeters in the 4.2 – 4.4 GHz band. WP-5B also deals with various other aviation and non-aviation issues which could negatively affect availability or protection of existing aviation safety spectrum in the future;
- b) ITU-R Working Party 4A: Fixed satellite spectrum use, including the development of material to support the continued availability of C-band VSAT networks for aviation in Africa and other tropical regions (WRC-15 Agenda Item 9.1.5);
- c) ITU-R Working Party 4C: Mobile satellite spectrum use, including the development of a methodology to calculate AMS(R)S spectrum requirements (finalization of WRC-12 Agenda Item 1.7);
- d) ITU-R Joint Task Group (JTG) 4-5-6-7: The demand for spectrum for mobile and broadband applications is growing at a fast pace. An additional bandwidth requirement of 500 - 1 200 MHz has been identified for future support of these services in the frequency range of 300 MHz - 6 GHz. This frequency range includes a number of existing safety critical aeronautical bands such as instrument landing system (ILS) glide path, distance measuring equipment (DME), primary and secondary radar, airborne collision avoidance system (ACAS), radio altimeters and microwave landing system (MLS);
- e) ITU-R Conference Preparatory Meeting (CPM): The second ITU-R CPM (CPM15-2), scheduled for the first quarter of 2015, will develop various methods for

the solution of the WRC-15 agenda items. The outcome of the CPM will be a consolidated report to be used in support of the work during the WRC. The report will be based on contributions from administrations, ITU-R sector members and study groups. ICAO presence is required to assert the requirements of civil aviation and to assert the ICAO position for WRC-15; and

- f) WRC-15 preparatory meetings of regional telecom organizations (APT, ASMG (Arab Spectrum Management Group), ATU, CEPT, CITEL, Regional Commonwealth in the field of Communications (RCC)).

6. OVERALL AVIATION SPECTRUM POLICY AND STRATEGY

6.1 Spectrum policy updates

6.1.1 A position is developed to address the individual issues detailed in the agenda of an upcoming WRC, as pre-decided at the previous conference. However, ICAO also has a general spectrum policy, applicable to all frequency bands used for aeronautical safety applications. An overall policy and a set of individual policy statements for each aviation frequency band can be found in Chapter 7 of the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies* (Doc 9718). The policy statements, as updated after each WRC, are approved by the ICAO Council, similarly to the ICAO position for the next WRC.

6.2 Development of a high-level spectrum strategy

6.2.1 In order to develop guidance on the future use of aviation spectrum, a new deliverable, *high-level spectrum strategy*, is currently under consideration and early development by the ACP-WG/F, with the assistance of the NSP and the Aeronautical Surveillance Panel (ASP). The objective is to provide a high-level strategy, indicating the foreseen long-term (2035+) future use and evolution of each aviation-related frequency band. Unlike the rapid growth of certain other spectrum users such as mobile and broadband, little growth is foreseen in the overall spectrum requirements for aviation in the longer term. However, it is vital that conditions remain stable to support continued and interference free access to support current aeronautical safety systems for as long as required, and to support the introduction of new technologies when available, mainly in the existing aeronautical safety bands.