



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**  
**TENTH MEETING OF THE NAFISAT SUPERVISORY COMMITTEE**  
**(SHARM EL-SHEIKH, EGYPT, 21-24 APRIL 2015)**

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**Agenda item 9(e): Preparation for the ITU WRC-15**

*(Presented by ICAO)*

**SUMMARY**

This paper summarizes the Preparation for the ITU WRC-15.

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## Global Flight Tracking

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The International Telecommunications Union (ITU) 2014 Plenipotentiary Conference (PP-14) adopted Resolution 185 (Busan, 2014) on global flight tracking (GFT) for civil aviation. The Resolution resolved: “to instruct WRC-15, pursuant to No. 119 of the ITU Convention, and to include in its agenda, as a matter of urgency, the consideration of global flight tracking, including, if appropriate, and consistent with ITU practices, various aspects of the matter, taking into account ITU-R studies”. PP-14 further instructed the Director of the Radiocommunication Bureau to complete a Report on GFT for consideration by WRC-15. Studies within the ITU-R related to GFT are to be conducted as a matter of urgency in order to support that Report.

The International Civil Aviation Organization (ICAO), upon the completion of a Special Meeting on Global Flight Tracking of Aircraft in Montreal May 2014, forged consensus among its Member States and the international air transport industry sector on the near-term priority to track airline flights, no matter their global location or destination. The meeting concluded that global flight tracking should be pursued as a matter of urgency and as a result, two groups were formed, an ICAO ad hoc Working Group which developed a concept of operations to support future development of a Global Aeronautical Distress and Safety System (GADSS) and an industry led group under the ICAO framework called the Aircraft Tracking Task Force (ATTF) that identified near term capabilities for normal flight tracking using existing technologies.

With regards to the flight tracking technology, the ICAO 2015 High Level Safety Conference (HLSC 2015) noted the ATTF Report which detailed existing technologies such as automatic dependent surveillance-contract (ADS-C) which are already installed on aircraft and which could be used to perform global aircraft tracking. This range of technologies and related services will enable operators to take a performance-based approach when implementing aircraft tracking capabilities. The ATTF report contained a set of performance-based criteria that could be used to establish a baseline level of aircraft tracking capability. Additionally, the report also identified future technologies that could support flight tracking in oceanic and remote airspace such as satellite-based ADS – broadcast (ADS-B). In this regard, the conference supported that ICAO should encourage States and the International Telecommunication Union (ITU) to discuss allocation requirements at the World Radiocommunication Conference in 2015 (WRC-15) to provide the necessary frequency spectrum allocations to enable global air traffic services (ATS) surveillance.

Elements of the final GFT configuration will not likely be available by WRC-15. Given the recent trend toward performance-based communications/navigation/surveillance, that final configuration may be a “system of systems” composed of both current and evolving capabilities, taking into account it must consider GFT for commercial/transport, as well as general aviation and business, aircraft. As a result, the ICAO WRC-15 position on GFT supports consideration by the Conference of all possible options as supported by studies. That could include addition of an allocation around 1090 MHz to the aeronautical mobile satellite (R) service (AMS(R)S) to support satellite reception of ADS-B, and support of a future Conference (WRC-19) agenda item to address evolving GFT applications. Consideration should be given to ensuring new allocations do not constrain the existing aeronautical safety systems.

### ICAO Position:

Support consideration of all possible options for support of ICAO global flight tracking as supported by studies. This should include:

- a new provision in the Earth-to-space direction only for an AMS(R)S allocation at 1090 MHz for the satellite reception of existing aircraft ADS-B signals that operate in accordance with recognised international aeronautical standards under the condition that it not constrain existing aeronautical safety systems
- a future Conference (WRC-19) agenda item to address evolving GFT requirements.

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**Agenda Item 10 – Future Conference Agenda Items**

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**GLOBAL AERONAUTICAL DISTRESS AND SAFETY SYSTEM**

The International Civil Aviation Organization (ICAO), upon the completion of a Special Meeting on Global Flight Tracking of Aircraft in Montreal May 2014, forged consensus among its Member States and the international air transport industry sector on the near-term priority to track airline flights, no matter their global location or destination. The meeting concluded that global flight tracking should be pursued as a matter of urgency and as a result, two groups were formed, an ICAO ad hoc Working Group which developed a concept of operations to support future development of a Global Aeronautical Distress and Safety System (GADSS) and an industry led group under the ICAO framework called the Aircraft Tracking Task Force (ATTF) that identified near term capabilities for normal flight tracking using existing technologies. While not yet complete, in combination, those efforts will address issues such as:

- Aircraft tracking under normal and abnormal conditions
- Autonomous distress tracking
- Automatic deployable flight recorder
- Procedures and information management

The collective urgency of the situation is highlighted by the decision of the ITU Plenipotentiary Conference, through Resolution 185, to instruct WRC-15, pursuant to No. 119 of the ITU Convention, to include in its agenda, as a matter of urgency, the consideration of global flight tracking, including, if appropriate, and consistent with ITU practices, various aspects of the matter, taking into account ITU-R studies. As a result, the ICAO WRC-15 position regarding Global Flight Tracking is contained above.

With respect to the GADSS however, while the systems needed have yet to be fully defined it is anticipated that there will be a need to change the Radio Regulations in order to facilitate the introduction of such a system. It is therefore proposed that an agenda item be established for WRC-2019 that is flexible enough to address any required changes to the Radio Regulations necessary to allow the implementation of the GADSS.

**ICAO Position:**

Support the inclusion of an item on the agenda of a future World Radiocommunication Conference to address the need of the global aeronautical distress and safety system.

PLENARY MEETING

Document CPM15-2/207-E  
30 March 2015  
Original: English

Source: Document CPM15-2/TEMP/[17](#)

## Working Group 5

### PROPOSED MODIFICATIONS TO THE DRAFT CPM REPORT

#### CHAPTER 5, AGENDA ITEM 9.1, ISSUE 9.1.5

##### AGENDA ITEM 9.1

9 *to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:*

9.1 *on the activities of the Radiocommunication Sector since WRC-12;*

NOTE: Eight issues have been identified by CPM15-1 under this agenda item.

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##### **5/9.1.5 Resolution 154 (WRC-12)**

*Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1*

(**WP 4A** (technical and regulatory aspects), **SC** (regulatory and procedural aspects) / -)

##### **5/9.1.5/1 Executive summary**

Resolution **154 (WRC-12)** invites the ITU-R to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz frequency band used for satellite communications related to safe operations of aircraft and reliable distribution of meteorological information, considering that where an adequate terrestrial communication infrastructure is not available, FSS earth stations are the only viable option to augment the communication infrastructure in order to satisfy the overall communications infrastructure requirement of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO).

### **5/9.1.5/2 Background**

The efficient provision of air navigation services requires the implementation and operation of ground communications infrastructure with high availability, reliability and integrity. In some countries in Africa, the difficulty of fulfilling these requirements, given the extent of the airspace and weakness in terrestrial communication infrastructure, has led to the extensive deployment of an aeronautical communication infrastructure based on very small aperture terminal (VSAT) systems operating in the FSS. The frequency band of operation is 3 400-4 200 MHz (with the standard C-band frequency range being 3 700-4 200 MHz and the extended C-band frequency range being 3 400-3 700 MHz), which, due to more pronounced rain attenuation at higher frequency bands, is the most viable option for satellite links with high availability in tropical regions. This infrastructure currently spans the entire region and is crucial to ensure the continued growth of traffic while maintaining safe operation of aircraft. The same frequency band is also used for the distribution of meteorological data via satellites under the auspices of the WMO.

WRC-07 allocated the frequency band 3 400-3 600 MHz to the MS, except aeronautical mobile, on a primary basis in 81 countries in Region 1, subject to regulatory and technical restrictions (see RR No. **5.430A**). The deployment of MS systems in the vicinity of airports has led to an increased number of cases of interference into FSS (VSAT) receivers. Consequently, some additional measures are needed to improve the protection of the FSS links supporting aeronautical and meteorological communications. Depending on whether the interference cases are between two stations in the same country (domestic case) or between two stations in neighbouring countries (cross-border case), the consideration of such measures is either a national spectrum-regulatory matter, or an issue of international spectrum regulation between countries.

WRC-12 adopted Resolution **154 (WRC-12)**, and invited the ITU-R to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz frequency band used for satellite communications related to safe operations of aircraft and reliable distribution of meteorological information referred to in *considering c*).

Regional coordination was carried out between African Civil Aviation Authorities, air navigation service providers (ANSPs) and the African Telecommunication Union (ATU) in preparation for WRC-15. As a result, the first ATU preparatory meeting to ITU WRC-15 held in Dakar (Senegal), from 18 to 20 March 2013 recommended ATU Member States to “reinforce their support to the existing and future FSS earth stations in the 3 400-4 200 MHz frequency band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information by participating in the studies for possible technical and regulatory measures called upon by ITU Resolution 154 (WRC-12).”

### **5/9.1.5/3 Summary of technical and operational studies, including a list of relevant ITU-R Recommendations**

Report ITU-R [M.2109](#) contains sharing studies between IMT-Advanced systems and geostationary-satellite orbit (GSO) networks in the FSS in the 3 400-4 200 and 4 500-4 800 MHz frequency bands.

Report ITU-R [S.2199](#) contains studies on compatibility of broadband wireless access systems and FSS networks in the 3 400-4 200 MHz frequency band.

Recommendation ITU-R [SF.1486](#) contains a sharing methodology between fixed wireless access systems in the FS and VSATs in the FSS in the 3 400-3 700 MHz frequency band.

Recommendation ITU-R [S.1856](#) contains methodologies for determining whether an IMT station at a given location operating in the frequency band 3 400-3 600 MHz would transmit without exceeding the power flux-density limits in RR Nos. **5.430A**, **5.432A**, **5.432B** and **5.433A**.

These studies show a potential for interference from IMT and broadband wireless access stations into FSS earth stations at distances of up to several hundred kilometers. Such large separation distances would impose substantial constraints on deployments of both mobile and earth stations. The studies also show that interference can occur when IMT systems are operated in the adjacent frequency band.

#### **5/9.1.5/4 Regulatory and procedural considerations**

Resolution **154 (WRC-12)** could be modified, calling for relevant administrations in Region 1 to use special care in the coordination, assignment, and management of frequencies taking into consideration the potential impact on the FSS earth stations used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information in the frequency band 3 400-4 200 MHz.

In parallel to the modification of Resolution **154 (WRC-12)**, consideration may be given to modifying RR No. **5.430A** to include a reference to the modified Resolution.

An example of modification of Resolution **154 (WRC-12)** follows.

#### **MOD**

### **RESOLUTION 154 (REV.WRC-15)**

#### **Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1**

The World Radiocommunication Conference (Geneva, 2015),

*considering*

- a) that the band 3 400-4 200 MHz is allocated worldwide to the fixed-satellite service (FSS) in the space-to-Earth direction and to the fixed service on a primary basis;
- b) that the band 3 400-3 600 MHz is allocated on a primary basis to the mobile, except aeronautical mobile, service in the countries in Region 1 specified in No. **5.430A** and identified for International Mobile Telecommunications (IMT) in those countries;
- c) that in Region 1 the allocation to the mobile, except aeronautical mobile, service in the band 3 400-3 600 MHz is subject to the technical and regulatory conditions listed in No. **5.430A**, aimed at ensuring compatibility with co-primary services of neighbouring countries;
- d) that a number of developing countries rely, to a great extent, on FSS systems using very small aperture terminals (VSAT) in the band 3 400-4 200 MHz for provision of communications as an aid to safe operation of aircraft and reliable distribution of meteorological information;
- e) that, in some cases where an adequate terrestrial communication infrastructure is not available, VSAT networks referred to in *considering d)* above are the only viable option to augment

the communication infrastructure in order to satisfy the overall communications infrastructure requirements of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO);

f) that the relevant ITU-R studies showed a potential for interference from fixed wireless access and IMT stations into FSS receiving earth stations at distances from less than one kilometre up to hundreds of kilometres, depending on the parameters and deployment of stations of these services;

g) that WRC-12, taking into account the studies mentioned in *considering f)* above decided to study technical and regulatory measures to support the FSS earth stations referred to in *considering e)* above,

*noting*

a) that by the date of WRC-15 several cases of harmful interference to the FSS VSATs used for aeronautical safety communications from fixed wireless access or IMT stations of the same administration were reported;

b) that these reported cases of interference revealed some national difficulties in the coordination of frequencies between the respective national telecommunication regulators responsible for licensing fixed wireless access or IMT systems and national aviation authorities responsible for the management of frequencies for aeronautical purposes, including assignments for VSATs;

c) that in many countries FSS VSAT earth stations are not subject to individual licencing and not registered as specific stations in national frequency databases and in the ITU Master International Frequency Register (MIFR) due to considerable administrative work;

d) that the knowledge of the location and operational frequencies of VSAT stations used for communications to aid the safe operation of aircraft and/or distribution of meteorological information is critically important for ensuring compatibility with applications of other services,

*recognizing*

a) that ITU-R conducted comprehensive studies of compatibility between the FSS on the one hand and the fixed wireless access systems and IMT applications on the other hand in the band 3 400-4 200 MHz and summarized the results of the studies in Recommendation ITU-R SF.1486 as well as Reports ITU-R S.2199, ITU-R M.2109 and draft new Report ITU-R [FSS-IMT C-BAND DOWNLINK];

*Editor's note: Report number to be inserted by the BR after approval of the Report at the SG 4 meeting on 26 June 2015.*

b) that the Recommendation and Reports identified in *recognizing a)* offer a set of mitigation techniques that could be employed for international coordination and at a national level and to facilitate coexistence of FSS, fixed service and mobile service systems;

c) that Recommendation ITU-R S.1856 contains methodologies for verification of the power flux-density (pfd) limit set forth in No. **5.430A**,

*resolves*

1 that administrations listed in No. **5.430A** shall ensure the compliance of the IMT stations with the pfd limit set forth therein and apply the relevant coordination procedures before bringing these applications into use;

2 to urge administrations, when planning and licensing fixed point-to-point, fixed wireless access, and IMT systems in bands referred to in *considering b)* above, to take into account the protection needs of existing and planned FSS VSAT earth stations by coordinating the deployment of the systems mentioned above with the respective aviation and meteorological authorities at a national level;

3 to invite administrations, taking into account the number of earth stations involved for this particular type of usage, to consider the possibility of licensing the FSS VSAT earth stations used for communications as an aid to the safe operation of aircraft and/or distribution of meteorological information on an individual basis and registering them in the MIFR as specific earth stations;

4 to encourage administrations to employ the appropriate mitigation techniques described in the ITU-R publications referred to in *recognizing a)* above;

5 to invite administrations to ensure that the application of these technical and regulatory measures to the FSS and mobile service does not limit the use of the band 3 400-4 200 MHz by other existing and planned systems and services in other countries,

*instructs the Secretary-General*

to bring this Resolution to the attention of ICAO and WMO.

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