
International Telecommunication Union
WORLD
RADIOCOMMUNICATION
CONFERENCE 2015
GENEVA, SWITZERLAND
2 – 27 NOVEMBER 2015
ITU
WRC-15
150 1865 2015
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ITU
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WRC-15 Outcome?

Some decisions related to Space services

WRC-15 key facts

- **Participants: 3300 and 800 observers**
- **Administrations: 162 (out of 193 ITU member states)**
- **Companies** (ITU-R sector members): **101**
- First time Chairman from Africa – Mr. Daudu (NIG)
- **Agenda items (AI): 19AI (+GFT)** at **16** Plenary meetings were successfully addressed *without a vote*
- *13th Plenary meeting started on 25.11.2015 at 19:00 and finished next morning on 26.11.2015 at 06:00 .*
- *Paperless World conference* in **6** Languages
- Booklet with detailed WRC-15 Agenda and its related Resolutions might be downloaded, free of charge, at:

  http://www.itu.int/go/wrc-15

- **WRC-15 Outcomes and Achievements**
  Francois Rancy, Director, ITU Radiocommunication Bureau

  https://youtu.be/8iNrG4QIIiY

Topics on WRC-15 Agenda Items

Mobile Broadband
(IMT < 6GHz, UHF band, PPDR)

Maritime (AIS, UHF On-board Coms)

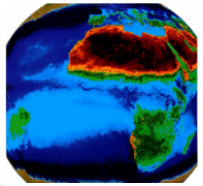
Aeronautical (UAS, WAIC, GFT)

Automotive Radar (RLS@78Ghz)

Amateur radio for emergency @ 5 MHz

UTC leap second

Space Research



Climate monitoring

Weather forecast

Satellite allocations (FSS @ 10-17 GHz FSS&MMSS @ 7/8GHz MSS @ 22-26GHz)

Regulatory (Sat. regulations, harmonization of spectrum use, etc.)

Global flight tracking (GFT) for civil aviation

➢ ***(PP-14) resolves***

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,

- *instructs the Secretary-General*

to bring this resolution to the attention of WRC-15 and ICAO,

- *instructs the Director of the Radiocommunication Bureau*

to prepare a specific report on the matter as referred to in *resolves* above for consideration by WRC-15

WRC-15 AI.GFT Decision

AI.GFT *- 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*

NEW RES **COM4/2** (WRC-15) - Use of the frequency band 1 087.7-1 092.3 MHz by the aeronautical mobile-satellite (R) service (Earth-to-space) to facilitate global flight tracking for civil aviation

ADD No. **5.A25** *The frequency band 1 087.7-1 092.3 MHz is also allocated to the aeronautical mobile satellite (R) service (Earth-to-space) on a PRIMARY basis, limited to the space station reception of Automatic Dependent Surveillance-Broadcast (ADS-B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service.*

- RES COM4/2 will protect essential frequency band for real-time global flight tracking (GFT) and surveillance of aircraft through ADS-B over satellite
- Current ATC can't go beyond the LOS of terrestrial radar or ADS-B stations, leaving the vast majority of the planet without ATC traffic surveillance
- This WRC-15 decision will extend ATC surveillance coverage of ADS-B equipped aircraft from the 30 percent terrestrial coverage available today to 100 percent (global coverage) of the earth's surface

WRC-15 – AI.1.1 - IMT

AI.1.1 *- To consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12).*

Several option how to satisfy this AI

- No change, which may be accompanied by reasons.
- Make an allocation to the MS on a primary basis (either by a new allocation or the upgrade of an existing secondary allocation) with a view to facilitate the development of terrestrial mobile broadband applications.
  - Table of Allocations (ToA) - Make an allocation to the MS on a primary basis in the Table of Frequency Allocations.
  - Footnote (FN) - Make an allocation to the MS on a primary basis in a footnote.
- To identify the frequency band for IMT either in a new or existing footnote

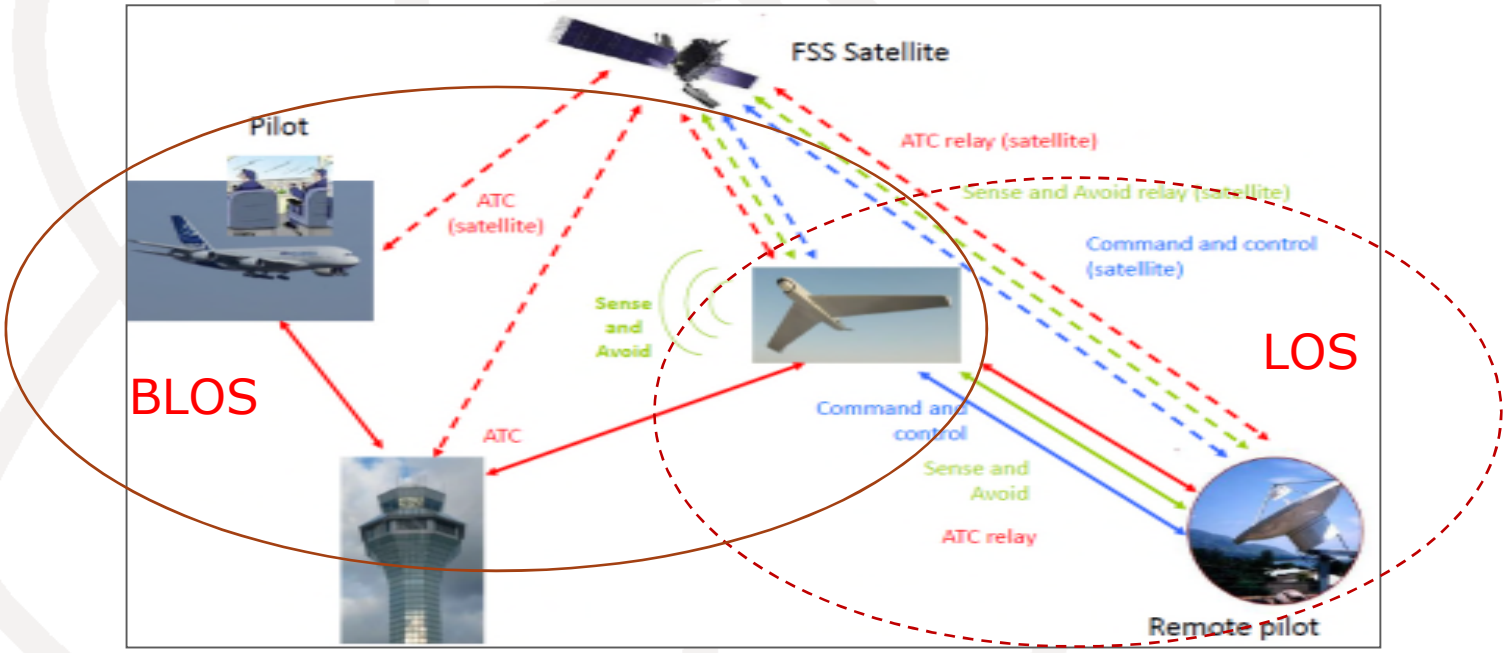
WRC-15 AI.1.1 IMT Decision

AI.1.1 *- To consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12).*

- WRC-15 identified the band 1427-1518 MHz for IMT, requesting the ITU-R to determine the technical measures to ensure compatibility with the mobile-satellite service operations in the adjacent band (1518-1559 MHz).
- C-band: WRC-15 reconfirmed the need to protect critical fixed-satellite service (FSS)
- The lower 200 MHz of the C-band downlink frequencies 3400-3600 MHz were identified for IMT in ITU Regions 1 and 2
- In Region 3 some ADM allowing potential IMT by a footnote
- **NOC** was adopted in the band 3600-4200 MHz
- Only in Region 2 in the band 3600-3700 MHz IMT by a footnote
- **NOC** was adopted for IMT systems in the C-band uplink frequencies (5925-6425 MHz)
- **NOC <u>to the RNSS status</u>**

WRC-15 - AI 1.5 - UAS

AI.1.5 - Unmanned Aircraft Systems (UAS) – Consider use of FSS bands for control and non-payload communications (CNPC) of UAS in *non-segregated* airspaces in accordance with RES 153 (WRC-12)



- To identify conditions under which systems operating in the FSS could provide UA CNPC links
- No change, on the basis of concerns about the ability of FSS to provide a safety service

WRC-15 AI.1.5-UAS Decision

AI.1.5 - Unmanned Aircraft Systems (UAS) – Consider use of FSS bands for control and non-payload communications (CNPC) of UAS in *non-segregated* airspaces in accordance with Resolution 153 (WRC-12)

RES **COM4/5** (WRC-15) Regulatory provisions related to earth stations on board unmanned aircraft which operate with geostationary-satellite networks in the fixed-satellite service in certain frequency bands for the control and non-payload communications of UAS in non-segregated airspaces – *very complex RES with 19 resolves and 2 Annexes…*

- UAS CNPC links will operate in accordance with international standards and recommended practices and procedures established in accordance with the Convention on International Civil Aviation

1. *that assignments to stations of geostationary FSS satellite networks operating in the frequency bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.5 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Regions 1 and 3 and 19.7-20.2 GHz (space-to-Earth), and in the frequency bands 14-14.47 GHz (Earth-to-space) and 29.5-30.0 GHz (Earth-to-space), may be used for UAS CNPC links in non-segregated airspace…*
2. *that earth stations in motion on board UAS may communicate with the space station of a geostationary FSS satellite network operating in the freq bands listed above*

WRC-15 AI.1.14 - UTC

AI.1.14 to consider the feasibility of achieving a continuous reference time-scale, whether by the modification of Coordinated Universal Time (UTC) or some other method, and take appropriate action, in accordance with Resolution 653 (WRC-12) which calls for studies on the feasibility of achieving a continuous reference time-scale for dissemination by radiocommunication systems

- Resolution **653 (WRC-12)** recognizes that that a change in the reference time-scale may have operational and therefore economic consequences on telecommunications networks

WRC-15 AI.1.14 – UTC - Decision

RES **COM5/1** (WRC-15) **Definition of time scale and dissemination of time signals via radiocommunication systems**

resolves

that until **WRC-23**, UTC as described in Recommendation ITU-R **TF.460-6** shall continue to apply, and *for most practical purposes* associated with the Radio Regulations, **UTC** ***is equivalent*** *to mean solar time* (**UT**) *at the prime meridian (0° longitude), formerly expressed in GMT*

- **U**niversal **T**ime (**UT**) is the general designation of *mean solar time* scales based on the *rotation of the Earth*
- The **I**nternational reference scale of **A**tomic **T**ime (**TAI**), based on the second (SI), *as realized on the rotating geoid*, is formed by the BIPM…*UTC corresponds exactly in rate with TAI*
- Mean solar day = 24 hours (86400 SI seconds)
- The time signals should not deviate from UTC by more than 1 ms
- *The departure of UTC from UT should not exceed* ***+/- 0.9 s***

➢ **Leap-seconds**

1. *A positive or negative leap-second should be the last second of a UTC month…*
2. *A positive leap-second begins at 23h 59m 60s and ends at 0h 0m 0s of the first day of the following month. In the case of a negative leap-second, 23h 59m 58s will be followed one second later by 0h 0m 0s of the first day of the following month*

The UTC scale is adjusted by the insertion or deletion of seconds (positive or negative leap seconds) ***to ensure approximate agreement with UT.***

WRC-15 AI.7 – Satellite issues

AI.1.7 To consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the ITU Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution 86 (Rev.WRC-07) to facilitate rational, efficient, and economical use of radio frequencies and any associated orbits, including geostationary-satellite orbit.

- possible cancellation of the advance publication (API) mechanism for satellite networks subject to coordination under section II of Article 9 of the Radio Regulations
- general use of modern electronic means of communications in coordination and notification procedures (RES-907)
- clarification of bringing into use information provided under RR Nos. 11.44/11.44B
- using one space station to bring frequency assignments at different orbital locations into use within a short period of time
- Informing the Bureau of a suspension under RR No. 11.49 beyond six months
- Maintenance of MIFR – RR No.13.6

WRC-15 AI.7 *Satellite issues* Decision

- **Removal of API as of 1.1.2017** – RES **COM5/3** (WRC-15) **Transitional measures for the elimination of advance publication filings by administrations for frequency assignments to satellite networks and systems subject to Section II of Article 9**
- RES **COM5/4** (WRC-15) **Use of one space station to bring frequency assignments to geostationary satellite networks at different orbital locations into use within a short period of time**
- MOD **RES 907/908 –** *applicable to all space services*
- MOD **11.44/11.44B**
- MOD **11.49**
- MOD **13.6**