# Results and implications of World Radiocommunication Conference, 2015

**Radiocommunication Bureau**

International Telecommunication Union

# Mobile Broadband

**(agenda items 1.1, 1.2)**

# Spectrum for mobile broadband

agenda items 1.1 and 1.2

- **Background**
  - There is a need to satisfy rapidly growing traffic requirements for IMT (estimated IMT additional spectrum by 2020: from 159 to 1075 MHz depending on Region and user density)
  - Bands considered: 470 MHz - 6 425 MHz. Harmonized bands were highly desirable to facilitate global roaming and economies of scale
  - As for 700 MHz band in R1, WRC-15 had to specify conditions for mobile service in 694-790 MHz already allocated by WRC-12
- **WRC-15 results**
  - Allocations to mobile service and/or identifications for IMT in: 470-694/698 MHz, 694 – 790 MHz (Region 1),1427-1518 MHz, 3300-3400 MHz, 3400-3700 MHz, 4800 – 4990 MHz
  - Allocations are subject to various conditions, e.g. non-interference basis, pfd limits, 9.21 -> to secure protection of incumbent services
  - Action “Identification for IMT” was for the first time associated with regulatory/technical conditions imposed on this application in MS

# WRC-15 results for specific bands

agenda items 1.1 and 1.2

- **470–698 MHz**: IMT identification of parts of this band for 14 Regions 2, 3 countries (9.21, non-interference basis). For R1: consideration at WRC-23
- **1 427 – 1 518 MHz**: IMT identification in R2 and 3. Also in R1, except 1452–1492 MHz that identified only in 54 R1 countries (9.21 for R.1, 3)
- **3 300 – 3 400 MHz**: allocation to, or upgrade of MS in 36 countries worldwide. IMT identification in 33 R1, 6 R2 and 6 R3 countries
- **3 400 – 3 600 MHz**: upgrade of MS and identification for entire R.1, 2 and for 11 R3 countries (subject to 9.17, 9.18, 9.21 and pfd limit)
- **3 600 – 3 700 MHz**: IMT identification in 4 Region 2 countries subject to coordination under 9.17, 9.18, 9.21 and a pfd limit
- **4800–4990 MHz** IMT identification in 1 Region 2 and 3 Region 3 countries
- **694 – 790 MHz in Region 1**: allocation to MS and identification for IMT. **In force from 28.11.2015**. Provides harmonized worldwide allocation of this band. Ensures compatibility with broadcasting and ARNS (Res. 224, 760). Accommodates applications ancillary to broadcasting in 470 – 694 MHz

# Importance of WRC-15 decisions

agenda items 1.1 and 1.2

- Satisfy growing IMT broadband spectrum requirements:
  - 60% increase in IMT bands after WRC-15
  - total IMT spectrum of 1886 MHz
- Provide harmonization of IMT bands:
  - 39% increase in globally harmonized spectrum after WRC-15
    318 MHz of harmonized bands in more than 80% of countries:
- Secures future of other services through coordination procedures, technical restrictions, in some cases operation on a non-interference basis

# Public Protection and Disaster Relief (PPDR)

**(agenda items 1.3, 9.1.1 and 9.1.7)**

# Public protection and disaster relief (1)

agenda items 1.3, 9.1.1 and 9.1.7

- **Background:** there were requirements to
  - identify harmonized PPDR bands to benefit from economies of scale, interoperability, cross-border equipment circulation
  - review Res. 647 on emergency and disaster relief communication
  - ensure better protection of 406 – 406.1 MHz (Cospas-Sarsat)
- **WRC-15 results**
  - **Revision of Resolution 646** -> resulted in harmonization of PPDR bands and at the same time providing flexibility for administrations
  - encouragement to use harmonized bands, especially for broadband:
    - 694 – 894 MHz – on a global basis
    - 380-470 MHz – in Region 1
    - 406.1-430 MHz, 440-470 MHz and 4 940-4 990 MHz – in Region 3
  - administrations to use Rec. ITU-R M.2015 for national planning
  - PPDR applications must not cause unacceptable interference to services to which these ranges are already allocated

# Public protection and disaster relief (2)

agenda items 9.1.1 and 9.1.7

- **Revision of Resolution 647** on emergency and disaster relief radio communications. Reinforcement of main ideas of this Resolution:
  - reiterates the importance of available emergency frequencies
  - BR to continue to maintain database on contact information of administrations and frequency bands (optional) relevant to disaster relief www.itu.int/ITU-R/go/res647
  - administrations encouraged to submit information to the database
- **Protection of 406-406.1 MHz** (MSS reception of Cospas-Sarsat) via review Res. **205** to reinforce protection from out-of-band emissions:
  - request not to assign frequencies to FS and MS in adjacent bands
  - BR to organize monitoring programs on impact from systems in 405.9-406 MHz, 406.1-406.2 MHz (in addition to the current program in the band)
  - administrations to take into account frequency drift of radiosondes above 405 MHz to avoid transmitting in the 406-406.1 MHz.

# Amateur and maritime mobile service

## (agenda items 1.4, 1.15 and 1.16)

# Allocation to the amateur service

agenda item 1.4

- **Background**
  - there was a  need for spectrum around 5 MHz in addition to existing allocations at 3.5 MHz and 7 MHz to provide flexibility of HF operations in varying propagation conditions
- **WRC-15 results**
  - secondary allocation to amateur service in 5 351.5-5 366.5 kHz subject to power limitations in No.5.133B:
    - maximum e.i.r.p. ≤ 15W on a global basis
    - maximum e.i.r.p. ≤ 20W and ≤ 25W in some Region 2 countries listed in  No.5.133B
- **Implications**
  - contributes to flexibility and reliability of amateur communications in HF band -> facilitating emergency and disaster relief operations

# Spectrum for on-board communications

agenda item 1.15

- **Background**
  - There was a problem of congestion in on-board UHF communications since only 6 frequencies around 460 MHz were available for this purpose
- **WRC-15 results**
  - no new spectrum was allocated, but measures were adopted for more efficient usage of existing frequencies (in modified No. **5.287**):
    - Introduction of new channeling arrangements of 6.25 kHz and 12.5 kHz through Rec. ITU-R M. 1174-3, while retaining 25 kHz channeling for analogue systems
    - Recommendation to use new digital technologies, e.g. digital coded squelch
- **Implications**
  - provides more channels for on-board communications with the same amount of spectrum available, removes congestion

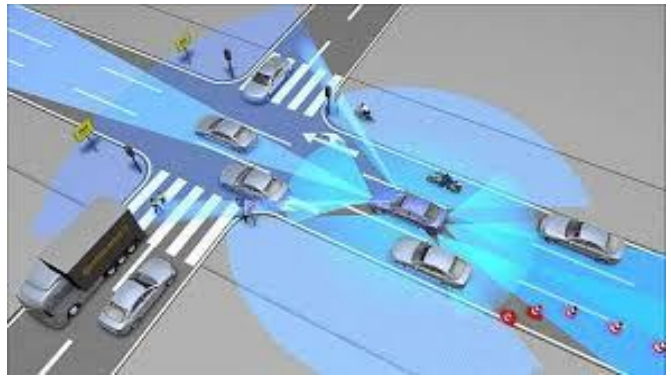
# Automatic Identification Systems (AIS) in maritime communications

agenda item 1.16

- **Background**
  - Development of new Automatic Identification System (AIS) applications, aimed at improving maritime communications and safety of navigation, required additional frequency resource
- **WRC-15 results**
  - Enabling application-specific messages in AP18 chan. 2027, 2028; protection AIS by prohibiting chan. 2078, 2019, 2079, 2020 for ships
  - Identification of bands for terrestrial VHF Data Exchange System (VDES): 157.200–157.325/161.800–161.925 MHz in R1, 3 and 157.200–157.275 MHz /161.800 – 161.875 in some R 2 countries
  - secondary allocation to uplink maritime mobile-satellite service in 161.9375–161.9625 MHz/161.9875–162.0125 MHz for satellite component of VDES; downlink will be considered at WRC-19
  - VDES regional solution: identification of AP18 channels 80, 21, 81, 22, 82, 23 and 83 for digital systems in Regions 1 and 3

# Aeronautical services and automotive applications

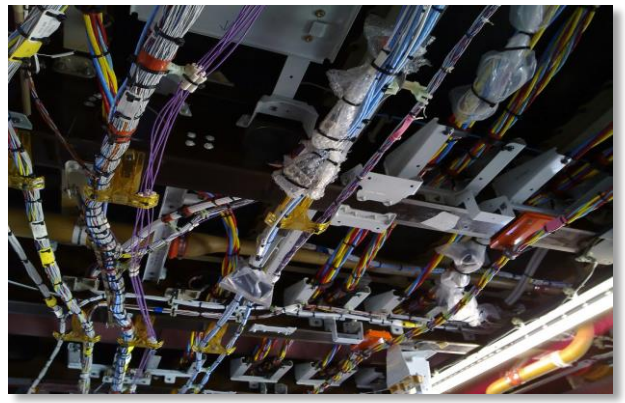
## (agenda items 1.17 and 1.18)



# Spectrum for wireless avionics intra-communications (WAIC)

agenda item 1.17

- **Background**
  - about 30% of electrical wires are candidates for wireless substitute
  - example A380: wire count 100 000; length 470 km; weight 5 700 kg
  - need for spectrum for WAIC to replace cables. WAIC provides safety-related data in single aircraft (e.g. from sensors to cockpit)
- **WRC-15 results**
  - allocation of 4 200-4 400 MHz to AM(R)S reserved for WAIC
  - approval of Res. 424 [COM4/1]: conditions for WAIC, including a non-interference basis vs. aeronautical radio altimeters, obligation to comply with ICAO SARPs

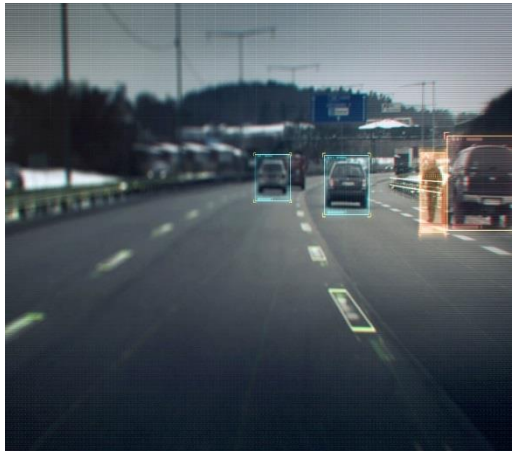


- **Implications**
  - this technology would make new generation of aircraft more reliable, light, less fuel consuming and environmentally friendly

# Spectrum for automotive applications

agenda item 1.18

- **Background**
  - significant growth in the use of automotive radar systems that are critical for improving global road safety
  - increasing variety of applications e.g. adaptive cruise control, collision avoidance, blind spot detection, lane change assist, etc.
  - requirements for additional spectrum for such applications
- **WRC-15 results**
  - worldwide primary allocation to the radiolocation service in the band 77.5-78 GHz
  - allocation is limited to short-range ground-based radar, including automotive radars. Parameters are in Recommendation ITU-R M.2057-0



- **Implications**:
  - provides harmonized and contiguous band 76 – 81 GHz for radio location service including automotive applications. Allows radars to move from the 24 GHz band, which had some compatibility problems