World Radiocommunication Conference 2012 and Beyond

Radio Frequency Spectrum Management Seminar
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WRC-12

- Purpose: Revise the Radio Regulations, the international treaty governing the radio-frequency spectrum and satellite orbits
- Dates: 23 January-17 February 2012 at ITU
- Scope: 33 agenda items, ranging from spectrum for unmanned aircraft and radars to procedures for registering satellite networks
- Participation: Over 3000 participants from 165 out of 193 ITU Member States
  - U.S. delegation led by Ambassador Decker Anstrom

Allocation/Regulation

18.4-22 GHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
18.4-18.6	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B MOBILE	
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	**18.6-18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	**18.6-18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A

21.5 3) The power delivered by a transmitter to the antenna of a station in the fixed or mobile services shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz, or +10 dBW in frequency bands above 10 GHz, except as cited in No. **21.5A**. (WRC-2000)

A Day in the Life

The real work of the Conference happens outside of the scheduled meetings

Photo by ITU

Radars - New Allocations

- HF oceanographic radars for measurement of coastal sea surface conditions in support of environment, climate monitoring, and forecasting:
  - Radars had been operating on a non-interference, experimental basis for more than 30 years
  - Intent was to provide a degree of harmonization and recognition without impact fixed and mobile services
  - Primary (Region 2) and secondary (Regions 1 and 3) radiolocation service allocations in 4 438-4 488, 5 250-5 275, 16 100-16 200, 24 450-24 650, and 26 200-26 420 kHz, secondary (Regions 1 and 3) 9 305-9 355, secondary (all Regions) 13 450-13 550 kHz, secondary (Region 1) 39-39.5 and 42-42.5 MHz, and primary (Region 3) 39.5-40 MHz

- Military airborne radars to increase range detection/ image resolution for national security and defense:
  - Primary (all Regions) radiolocation in 15.4-15.7 GHz

Maritime – Allocations

- Enhancement of maritime safety systems for ships and ports through allocations and protections
  - Primary (all Regions) maritime mobile service allocations in the frequency band 495-505 kHz and primary (Region 2) maritime mobile service allocation in the frequency band 510-525 kHz.
  - Terrestrial and satellite monitoring of Automatic Identification System (AIS) equipped vessels critical to search and rescue, safety of navigation, and the safe movement and tracking of vessels:
    - Primary (Regions 2 and 3) maritime mobile allocations ,and primary (Region 2) and secondary (Regions 1 and 3) mobile-satellite service (E-to-s) allocations in the frequency bands 161.9625-161.9875 MHz (AIS1) and 162.0125-162.0375 MHz (AIS2)
    - Primary (Region 2) and secondary (Regions 1 and 3) mobile-satellite service (E-to-s) allocations in the frequency bands 156.7625-156.7875 MHz and 156.8125-156.8375 MHz

Aeronautical - New Allocations

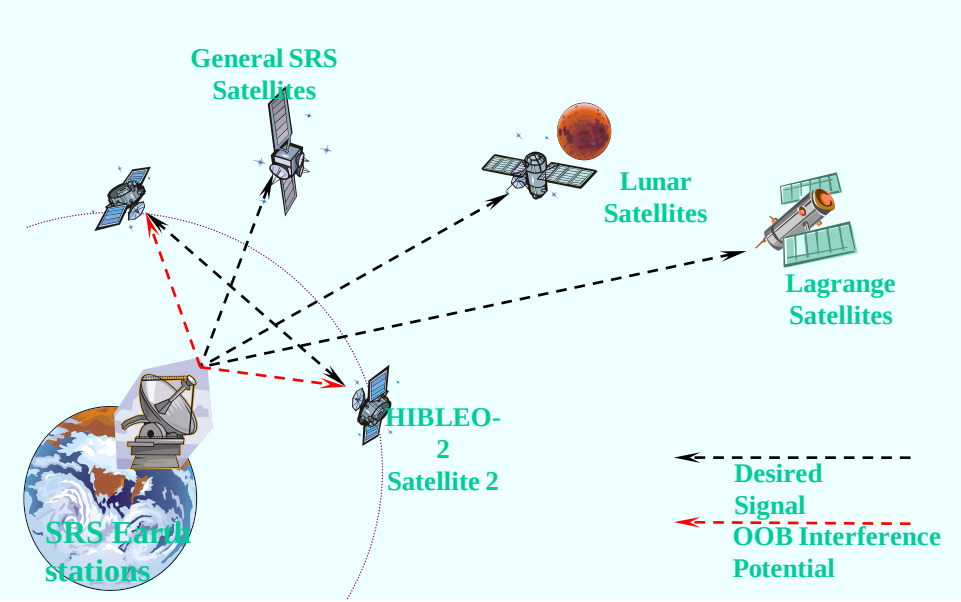
- Enable the remote piloting of aircraft over short range distances within or out-of-sight of the remote pilot (unmanned aircraft systems):
  - Primary (all Regions) aeronautical mobile (route) service allocation in the frequency band 5030-5091 MHz.

Aeronautical - Regulatory

- Enable remote piloting of aircraft for beyond line-of-sight distances by relaxing satellite coordination requirements in the international Radio Regulations:
  - Easier coordination of assignments to the aeronautical mobile-satellite (route) service allocation in the band 5030-5091 MHz (now subject to No. **9.11A** instead of No. **9.21**)

Space Science - New Allocations

- Added a primary allocation to the space research service (Earth-to-space) in the band 22.55-23.15 GHz to support future space missions
- Extended MetSat primary allocation from 7750-7850 MHz to 7750-7900 MHz to support higher data rate weather satellite services



Satellite Registration

U.S. has hundreds of satellite registrations

Concrete measures to address "abuses"

- Defined bringing into use of a geostationary satellite network: minimum 90-day deployment
- Time satellite assignments can be suspended: Increased from 2 to 3 years
- Coordination of newly filed satellite networks: Definitive list of networks requiring coordination will be generated
- Avoided problems for defense

No Change Items

- U.S. succeeded in preventing change to the Radio Regulations on several items
- No Change (NOC) was favorable outcome:
  - 1.2: No need to change service definitions, considering possible unintended consequences
  - 1.19: Software-defined radio and cognitive-radio are technologies; RR already regulates systems adequately
  - 1.22: Management of short-range device characteristics is a domestic regulatory issue

Radio Regulations Board (RRB)

RRB 2011-2014
J Zoller, 2011 chairman
V Strelets, 2012 chairman
PK Garg, 2013 chairman

- The twelve RRB members advise and report to WRC
- WRC is court of "final appeal"
  - Two decisions appealed and upheld
  - Zohreh-1 reinstated anyway
- Additional responsibilities given to Board
  - More Rules of Procedure (ROPs)
  - Decide fate of satellite network filings
- Significance:
  - More confidence in Board (than BR in some cases)
  - Greater power and workload

Rules of Procedure (ROPs)

- ROPs are required to
  - Resolve difficulties in applying the Radio Regulations
  - Explain practices of the Radiocommunication Bureau
- List of proposed ROPs after WRC-12 available at http://www.itu.int/oth/R0F01000004/en
  - Most scheduled for 2012
  - Member State comments due four weeks prior

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brin

5.502

fixed-satellite service in this band with an ant
density produced by this earth station does not

1 As from 5 July 2003, No. **5.502** specifies a minimum antenna diameter of 1.2 and 4.5 m for an earth station of a GSO and non-GSO fixed-satellite service network, respectively, in the frequency band 13.75-14 GHz. Submission of information on antenna diameter became mandatory as from 1 January 2004, with the entry into force of Appendix **4** as modified by WRC-03. To cover the examination of submissions received in the period between these two dates, the Bureau is instructed to use the following maximum earth station antenna gains instead of antenna diameter: maximum antenna gain of 42.3 dBi for $D = 1.2$ m and 53.8 dBi for $D = 4.5$ m (the relation between gain and diameter is derived for the lowest frequency of the band, i.e. $f = 13.75$ GHz, and an antenna efficiency of 57.2%).

Example after WRC-03

Issues in the News

- Jamming of satellite network transmissions, including jamming from Iran and Syria preventing free flow of information
- Difficulties reaching satellite network coordination agreement
- Longstanding harmful interference to the broadcasting services of Cuba
- Longstanding harmful interference caused by the sound and television broadcasting stations of Italy

The ability of nations to resolve differences is being tested as spectrum and the geostationary orbit become more crowded.

Essential Publications

- Edition of 2012 Radio Regulations
- Electronic copy is available free of charge
- http://www.itu.int/pub/R-REG-RR-2012
- Four-volume set around $430

- Edition of 2012 Rules or Procedure
- Baseline – WRC-12 will be added, so order the electronic copy
- http://www.itu.int/pub/R-REG-ROP-2012
- Paper copy around $200

Implementation

- WRC-12 Final Acts are available for CHF 181 at http://www.itu.int/pub/R-ACT-WRC.9-2012/en
- Revised Radio Regulations come into force 1 January 2013
- IRAC Ad Hoc Group 206 proposed changes to the NTIA Manual
- FCC will undertake rulemaking to finalize changes to the non-Federal table
  - WRC-07 NPRM released 19 November 2012
- NTIA and FCC are cooperating to expedite the process

Summary

- All U.S. priority objectives for WRC-12 achieved
- Preparations for WRC-15 initiated
  - Develop Federal proposal in Radio Conference Subcommittee
  - Prepare and review technical work for agenda items in ITU-R study groups and working parties
  - Participate in our regional group – Inter-American Telecommunications Commission (CITEL)
  - Participate in other region's group, and in meetings of other United Nations specialized agencies
- Keep up to date on U.S. WRC preparations - visit our websites: www.ntia.doc.gov (click on Spectrum Management)