Orbit/Spectrum
ITU International
Regulatory Framework

Attila MATAS
Head, Space Publication & Registration division, ITU-BR
matas@itu.int
@AttilaMatas

16 December 2015, UN VIC, Vienna, Austria
ITU in brief

Founded on 17 May 1865

Leading United Nations agency for Information and Communication Technologies (ICTs)

5 Elected Officials

- 193 Member States,
- > 700 Sector Members, Associates & Academia
- 750 staff & 100 nationalities
- Annual budget = US$180,000,000

4 regional offices, 8 area offices
HQ in Geneva, Switzerland

http://www.itu.int
ITU-R structure & activities

RoP: Rule of Procedure
RR: Radio Regulations (treaty status)
RRB: Radio Regulations Board
SG: Study Group
WRC: World Radiocommunication Conference
CPM: Conference Preparatory Meeting
MIFR: Master International Frequency Register
RA: Radiocommunication Assembly
RAG: Radiocommunication Advisory Group
Rec: Recommendations (international voluntary standards)
IFIC: International Frequency Information Circular

Radiocommunication Bureau
SGD SSD TSD IAP
SPACE & TERRESTRIAL services
Reg. & Tech. examinations
Draft RoP
Harm. Interf.

Director

Notices

Findings

MIFR

BR IFIC

RoP

Draft RoP

Harm. Interf.

Reg. & Tech. examinations

SPACE & TERRESTRIAL services

ITU-R structure & activities

RoP: Rule of Procedure
RR: Radio Regulations (treaty status)
RRB: Radio Regulations Board
SG: Study Group
WRC: World Radiocommunication Conference
CPM: Conference Preparatory Meeting
MIFR: Master International Frequency Register
RA: Radiocommunication Assembly
RAG: Radiocommunication Advisory Group
Rec: Recommendations (international voluntary standards)
IFIC: International Frequency Information Circular

Radiocommunication Bureau
SGD SSD TSD IAP
SPACE & TERRESTRIAL services
Reg. & Tech. examinations
Draft RoP
Harm. Interf.

Director

Notices

Findings

MIFR

BR IFIC

RoP

Draft RoP

Harm. Interf.

Reg. & Tech. examinations

SPACE & TERRESTRIAL services

ITU-R structure & activities

RoP: Rule of Procedure
RR: Radio Regulations (treaty status)
RRB: Radio Regulations Board
SG: Study Group
WRC: World Radiocommunication Conference
CPM: Conference Preparatory Meeting
MIFR: Master International Frequency Register
RA: Radiocommunication Assembly
RAG: Radiocommunication Advisory Group
Rec: Recommendations (international voluntary standards)
IFIC: International Frequency Information Circular

Radiocommunication Bureau
SGD SSD TSD IAP
SPACE & TERRESTRIAL services
Reg. & Tech. examinations
Draft RoP
Harm. Interf.

Director

Notices

Findings

MIFR

BR IFIC

RoP

Draft RoP

Harm. Interf.

Reg. & Tech. examinations

SPACE & TERRESTRIAL services

ITU-R structure & activities
ITU Key priorities

- radio spectrum
- international standards
- emergency communications
- digital dividend
- cyber security
Summarizing ...

The ITU-T produces interoperable technical ICT standards

The ITU-R coordinates global wireless communication and technical standards

The ITU-D provides technical assistance to the un-connected, emergency communication, ICT

The ITU GS provides inter-sectorial coordination, management, promotion for the whole organization
Where do satellites operate...

- **Geostationary Orbit**: 35,786 km above the Earth's equator
- **Highly Elliptical Orbit** – 40,000 km in apogee
- **Medium Earth Orbit**: 8,000 - 20,000 km
- **Low Earth Orbit**: 400 - 2,000 km
- **International Space Station**
- **Molniya**
- **Sub-orbital**

Sub-orbital flight — 7
ITU Legal Framework

Extraordinary Administrative Radio Conference EARC-63
to allocate frequency bands
for space radiocommunication purposes

*FIRST Space* Radiocommunication Conference
(Geneva, 1963)

- Principles of use of orbit/spectrum
- Allocation of frequency bands to services
- Procedures, Plans, operational measures
- Instruments (CS, CV, RR, RoPs, Recs)
Article 44
Use of the Radio-Frequency Spectrum and of the GSO-Satellite and other Satellite Orbits

Radio frequencies & satellite orbits are limited natural resources

Rational, Efficient, Economical Use

Equitable Access
Article 45
Harmful Interference

• *Shall not cause harmful interference* to radio services of other member states *(CS 197)*

• Each Member State *is responsible* to ensure that the stations licensed by them *(CS 198)*
Why is ITU important for Satellite communication?

International Legal Framework for Space Services

**UN**

Outer Space instruments *(on space objects)*

- free “exploration and use”
- *under international law*
- States
  - “responsibility” & “licensing”
  - “jurisdiction & control”
- States
  - “liable” for damage

**ITU**

Instruments *(on radio frequencies)*

- Equitable access and rational use of spectrum
- *under international law*
- State
  - must license transmitting radio stations
  - shall not cause harmful interference
- No liability clauses
ITU Radio Regulations - 1

- Intergovernmental Treaty – *legal bindings* on all Member states, governing the use of *spectrum/orbit* resources by administrations
- Define the *rights* and *obligations* of Member States in respect of the use of these resources
- The ITU Radio Regulations incorporates the decisions of WRCs, including all Articles, Appendices, Resolutions, Recommendations and ITU-R Recommendations incorporated by reference.

- Two main concepts:
  - Frequency block *allocations* to defined *radio services* (FA Table - Article 5)
  - Mandatory or voluntary *regulatory procedures* (Coordination, Plan, Notification) and Recording in the Master International Frequency Register (*MIFR*) that are adapted to the frequency allocation structure
OBJECTIVES:

- to facilitate *equitable access to* and *rational use* of the natural resources of the *radio-frequency spectrum* and *any associated orbits*;
- to ensure the *availability and protection* from harmful interference of the frequencies provided for *distress and safety purposes*;
- to assist in the *prevention and resolution of cases of harmful interference* between the radio services of different administrations;
- to facilitate the *efficient and effective operation of all radiocommunication services*;
- to provide for and, where necessary, *regulate new applications* of radiocommunication technology.
**ITU Radio Regulations - 3**

**Status**
- RIGHT for international recognition
- OBLIGATION to eliminate harmful interference
- Art 7-8

**Frequency TABLE**
- (9kHz-275GHz)
- Art 4-6

**Interference & Monitoring**
- Art 15-16
- Aps 9-10

**Procedures Coordination, Notification & Recording**
- Art 9, 11
- AP 4-8

**Limits technical/operational**
- Arts 21, 22
- APs 1-3

**Definitions**
- Art 1-3, AP 14, 42
- Administrative
- Secrecy/Licences/
- Interception/Identification of stations/
- call signs/Service Publications
- Art 17-20
- Bureau & RRB – Art 13-14

**Services**
- Aeronautical – Art 35-45
- Maritime – Art 46-58
- Amateur, broadcasting,
- fixed, radiodetermination,
- standard freq. & time – Art 12, 23-29
- AP 11-13, 16, 19

**GMDSS**
- Art 30-34
- AP 15

**Plans**
- Maritime HF, VHF (AP 17-18)
- Maritime coast stations (AP 25)
- Aeronautical (OR) (AP 26)
- Aeronautical (R) (AP 27)
- Broadcasting-satellite(AP30-30A)
- Fixed-satellite (AP 30B)
RR classifies services that use radio communications, according to several parameters, namely:

1. **Link type**: Terrestrial (earth to earth) or satellite (earth-space, space-earth, space-space)
2. **Type of coverage**: land, global, maritime, aeronautical
3. **Station type**: fixed, mobile, ESV, ESinMotion, ESoMP
4. **Type of use**: communications, broadcasting, navigation, meteorological, scientific, earth observation (act/pass), time-standard, radio-astronomy, amateur-satellite, etc.
RR is technically and technologically neutral, it

- does allocate frequency bands to radiocommunication services
  - for example allocation for mobile (terrestrial) service

- Does not allocate to specific applications

- Does not allocate to particular technologies
  - not for application or technology (GSM, LTE, Wimax, etc.)
RR REGIONS
Global Harmonization

- ultimate goal (as far as possible)
- should, wherever possible, allocate frequency bands on a worldwide basis (aligned services, categories of service and frequency band limits) taking into account safety, technical, operational, economic and other relevant factors;
- should, wherever possible, keep the number of footnotes in Article 5 to a minimum when allocating frequency bands through footnotes.
WHAT NEEDS TO BE NOTIFIED?

*Any* frequency assignments of transmitting and receiving *earth and space stations* shall be notified to the Bureau under ART11, No.11.2 if:

- Capable of causing harmful interference; or
- Used for international radiocommunication; or
- Subject to coordination procedure of ART9; or
- Seeking to obtain international recognition; or
- Non conforming assignment under No. 8.4 seeking to be recorded into MIFR for information purposes only
Space statistics

ITU BR *Annual Space Report* to the Scientific and Technical Subcommittee (STS) of the COPUOS on the use of the geostationary-satellite orbit (GSO) and other orbits


- Total count – **80** ADM in the *space MIFR*
- Count of all *satellite filings submitted to the Bureau and Notified (recorded) in the space MIFR*

<table>
<thead>
<tr>
<th>Year</th>
<th>All GSO/N</th>
<th>All Non-GSO/N</th>
<th>TOTAL/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOV. 2015</td>
<td>5606/1101</td>
<td>703/382</td>
<td>6309/1483</td>
</tr>
<tr>
<td>2014</td>
<td>4641/1085</td>
<td>611/379</td>
<td>5252/1464</td>
</tr>
<tr>
<td>2013</td>
<td>4017/1079</td>
<td>566/368</td>
<td>4583/1447</td>
</tr>
<tr>
<td>2012</td>
<td>3993/1041</td>
<td>545/353</td>
<td>4538/1394</td>
</tr>
<tr>
<td>2011</td>
<td>3371/1021</td>
<td>509/340</td>
<td>3880/1361</td>
</tr>
<tr>
<td>2010</td>
<td>3133/1052</td>
<td>495/320</td>
<td>3628/1372</td>
</tr>
</tbody>
</table>
Key ITU documents *free* on-line

- **The ITU Constitution:**

- **ITU Radio Regulations @ 2012:**

- **ITU-R Recommendations:**
  [http://www.itu.int/publ/R-REC/en](http://www.itu.int/publ/R-REC/en)

- **WRC-15:**
Thank you!