

Orbit/Spectrum International Regulatory Framework

Challenges in the 21st century

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Legal Framework

■ **United Nations Outer Space Treaty (1967)**



Outer space free for exploitation and use by all states in conformity with international regulations



States retain jurisdiction and control over objects they have launched into outer space



States shall be liable for damage caused by their space objects

United Nations Outer Space Treaties

- 1. Principles** Governing the Activities of States in the **Exploration and Use of Outer Space**, including the Moon and Other Celestial Bodies – 1967
- 2. The Agreement** Governing the **Activities of States on the Moon and Other Celestial Bodies** – 1984
- 3. The Agreement on the Rescue of Astronauts** -1968
- 4. The Convention** on **International Liability for Damage Caused by Space Objects** (States retain jurisdiction and control over objects they launch into outer space) - 1972
- 5. The Convention** on **Registration of Objects Launched into Outer Space** - 1976

ITU – CS/CV of 1992 is listed under other agreements and ITU is recognized as the specialized agency responsible for telecommunication issues

Legal Framework

- **United Nations Outer Space Treaty (1967)**

- **International Telecommunication Union**

- Principles of use of orbit/spectrum
- Allocation of frequency bands
- Procedures, Plans, operational measures
- Instruments (CS, CV, RR, RoPs, Recs)

ITU Constitution

Article 44

↓

Radio frequencies & satellite orbits
are limited natural resources

↓

Rational, Efficient, Economical Use

↓

Equitable Access

Purposes of the Union

- “The Union shall effect allocation of bands of the radio-frequency spectrum, the allotment of radio frequencies and the registration of radio frequency assignments and, for space services, of any associated orbital position in the geostationary-satellite orbit or any associated characteristics of satellite in other orbits, in order to avoid harmful interference between radio stations of different countries.”
- This is the purpose of the Radiocommunication Sector (ITU-R)



Objectives of ITU-R

- To avoid harmful interference
- To establish global standards and associated material to assure the necessary required performance, interoperability and quality
- To ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum and satellite-orbit resources

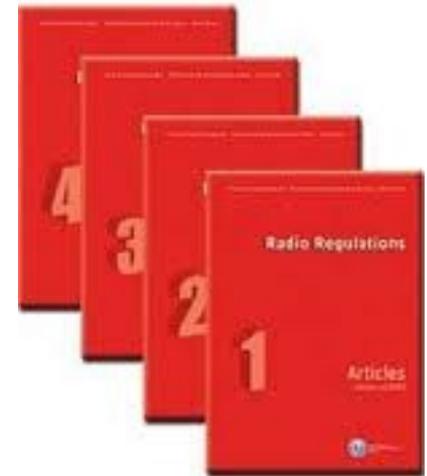


Radio Regulations

Committed to Connecting the World



- Intergovernmental Treaty 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
- Updated every 3-4 years by World Radiocommunication Conferences, WRCs



Committed to Connecting the World



International
Telecommunication
Union

GSO
SATELLITES

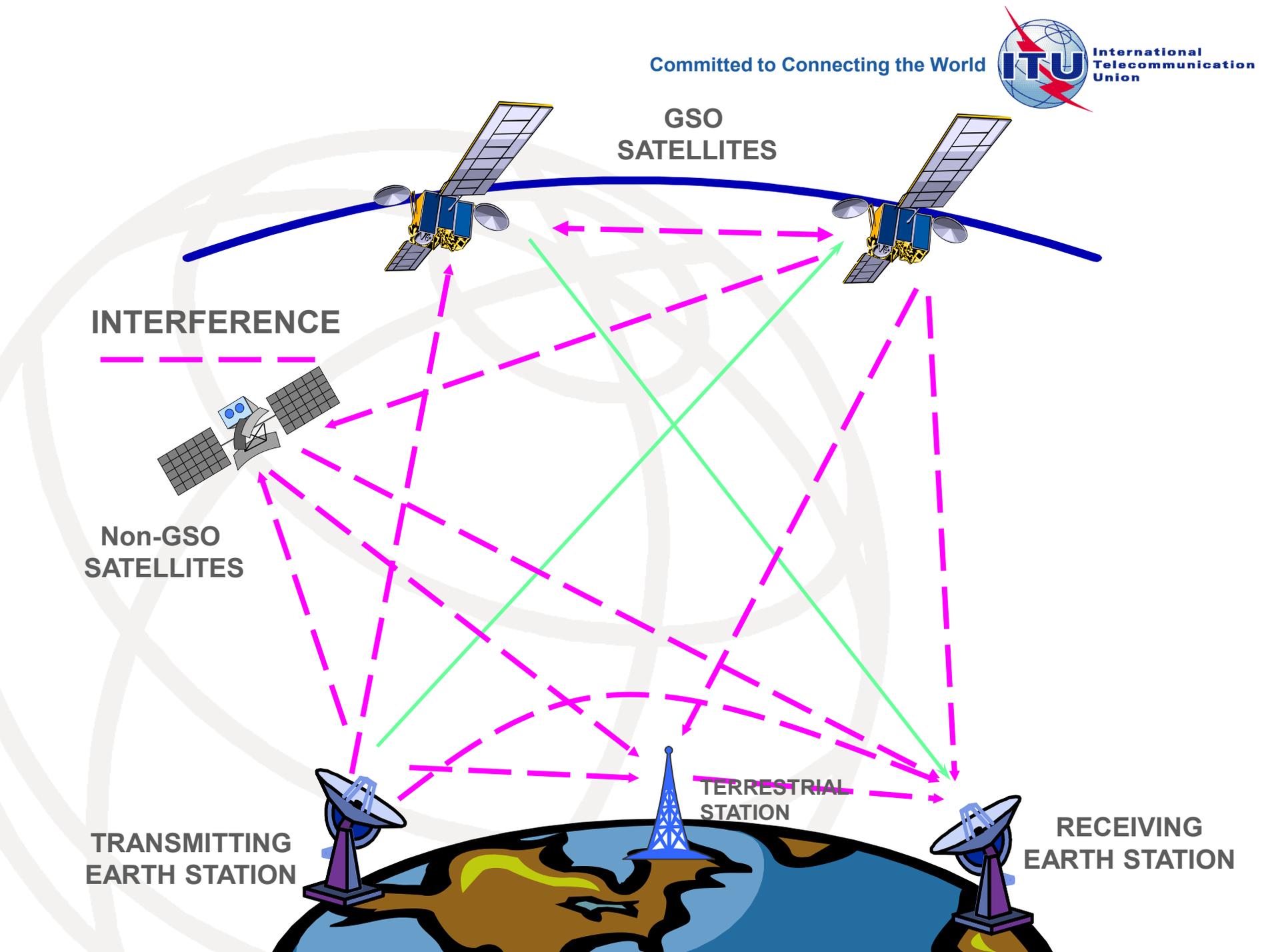
INTERFERENCE

Non-GSO
SATELLITES

TRANSMITTING
EARTH STATION

TERRESTRIAL
STATION

RECEIVING
EARTH STATION



Propagation of Radio waves



- Laws of physics
- Radio waves do not stop at national borders

Interference



- possible between radio stations of different countries
- This risk is high in Space Radiocommunications

Radio Regulations (RR)

- One of its main purposes - **Interference-free operation of Radiocommunications**

Radio Regulations

- Procedure

- + Efficient use of spectrum
- + Equitable access
- + Opportunity to resolve interference before operation
- + Prevents loss of investment, customers & revenue by minimizing unusable capacity due to interference

Radio Regulations Mechanisms

Control of Interference

ALLOCATION

Frequency separation of stations of different services

POWER LIMITS

PFD to protect TERR services / EIRP to protect SPACE services / EPFD to protect GSO from Non-GSO

MONITORING

International monitoring system

COORDINATION

between Administrations to ensure interference-free operations conditions

RECORDING

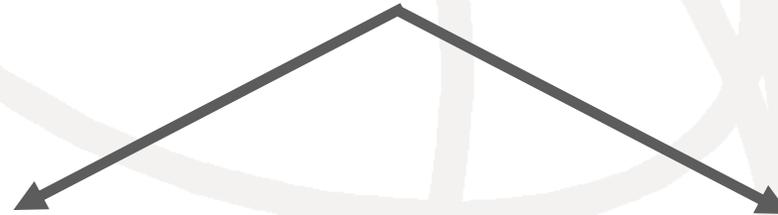
In the Master International Frequency Register (MIFR)
International recognition

In case of interference into an assignment recorded in the MIFR

- The station which is causing harmful interference must immediately cease it
- This assumes a legal link between the transmit station and the administration under the jurisdiction of which it is placed:
- This is the purpose of the licence: “No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject”

Radio Regulations

- Rights & obligations + applicable procedures
- Two mechanisms of sharing orbit / spectrum:



Coordination Approach

First come, first served for actual requirements

Planning Approach

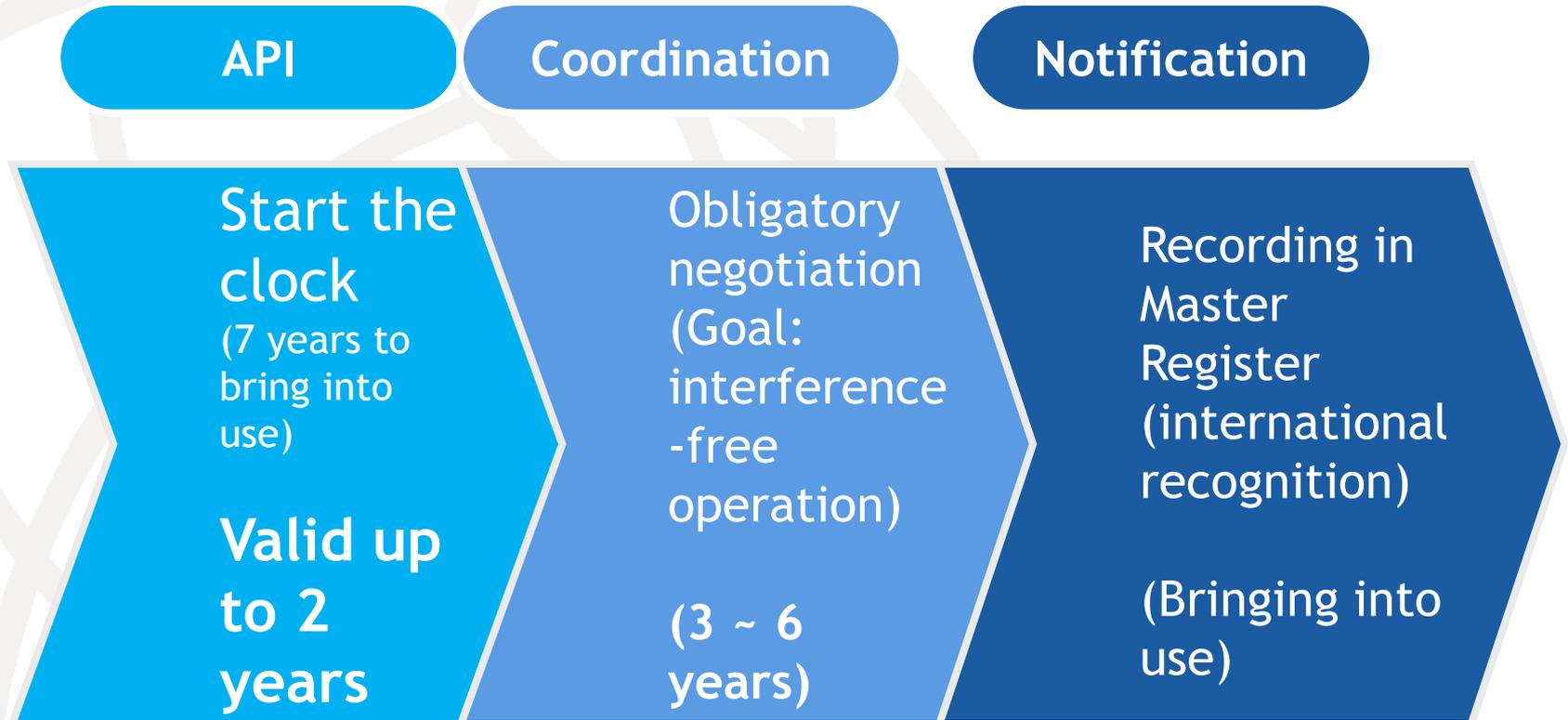
Equitable access \Leftrightarrow Plan for future use

Efficient & Rational Utilization

“First Come, First Served” Procedure

- Rights acquired through coordination with administrations concerning actual usage
- Efficient spectrum / orbit management
- Dense/irregular orbital distribution of space stations

Summary for non-planned services ...



Equitable Access

Plan Procedure

- Congestion of the GSO
- Frequency / orbital position plans
- Guarantee for equitable access to the spectrum / orbital resources
 - Spectrum set aside for future use by all countries
 - Predetermined orbital position & frequency spectrum

Consequences:

- Difficulty to complete coordination
- Multiple filing submissions
- Operation without prior coordination
- Fait-accompli approach
- Fictitious recorded assignments ...

Spectrum /orbit resource
scarcity



International regulatory framework:

- Lengthy & complex procedures
- Lack of incentive to review underused spectrum/orbital position

Question

What mechanisms & practical strategies can be employed to **ensure efficient use** of the spectrum/orbit resource and **improve** the existing international satellite spectrum management systems ?

Goal:

- To ensure rational, equitable efficient and economical use radio frequency spectrum
- To ensure compliance of orbit/spectrum use with RR
- To develop procedures that facilitate access to the resources
- To guarantee interference-free satellite network operation...

What to do?

- To introduce new milestones in Res 49
- To notify more realistic parameters at the notification/recording stage
- To charge fees for data in the MIFR
- To review satellite service/application definitions
- to introduce more deterrent enforcement mechanisms (...monitoring)
- to improve procedures?





Main WRC-12 Results on **Satellite Regulations:** *Rights of access to the spectrum/orbit resources, Interference*



Satellite regulations



Nos. 9.36.2, 9.41, 9.42, 9.42.1

- Identification of the ***specific satellite networks*** or Earth stations with which coordination needs to be effected

Nos 11.41, 11.41.2, 11.41B, 11.42, 11.42.1, 11.42A

- Suppression of provisional/definitive entry status, indication of coordination efforts, treatment of harmful interference actually caused by a No. 11.41 recorded assignment
- Commitment by administration to comply with No. 11.42



Satellite regulations



Nos 11.44, 11.44.1, 11.44.2, 11.44B

- GSO Space station with transmitting/receiving capability deployed and maintained at the notified orbital position for a ***continuous period of 90 days***

Request Administrations to respond to BR enquiries on:

- Last orbital location/frequency brought into use with a satellite, in case of use of an already in-orbit satellite
- Actual use of notified characteristics of commercial satellite networks

WRC-12 : Definition of DBIU and ...



- **ADD**
- **11.44B** A frequency assignment to a space station in the geostationary-satellite orbit shall be considered as having been brought into use when a space station in the geostationary-satellite orbit with **the capability of transmitting or receiving** that frequency assignment has been deployed and maintained at the notified orbital position **for a continuous period of ninety days**. The notifying administration shall so **inform the Bureau within thirty days from the end of the ninety-day period**.
- **ADD**
- **11.44.2** The notified date of bringing into use of a frequency assignment to a space station in the geostationary-satellite orbit shall be **the date of the commencement of the ninety-day period** defined in No. **11.44B**.

WRC-12 : ... and Suspension



- **MOD**

- **11.49** Wherever the use of a recorded frequency assignment to a space station is suspended for a period ~~not exceeding eighteen~~ **six months**, the notifying administration shall, as soon as possible, but no later than six months from the date on which the use was suspended, inform the Bureau of the date on which such use was suspended and the date on which the assignment is to be brought back into regular use. When the recorded assignment is brought back into use, the notifying administration shall, subject to the provisions of No. **11.49.1** when applicable, so inform the Bureau, as soon as possible. ~~This latter~~ The date on which the recorded assignment is brought back into use^{ADD11.49.1} shall ~~be not exceed two~~ later than three years from the date of suspension.

- **ADD**

- **11.49.1** The date of bringing back into use of a frequency assignment to a space station in the geostationary-satellite orbit shall be **the date of the commencement of the ninety-day period** defined below. A frequency assignment to a space station in the geostationary-satellite orbit shall be considered as having been brought back into use when a space station in the geostationary-satellite orbit with **the capability of transmitting or receiving** that frequency assignment has been deployed and maintained at the notified orbital position **for a continuous period of ninety days**. The notifying administration shall so inform the Bureau within thirty days from the end of the ninety-day period.



Satellite regulations



No 11.49, 11.49.1

- Suspension of operation for any period ***exceeding six months*** and for ***a maximum period of three years***

No. 13.6

- Clarification on Bureau's action in case of response/non response, reminder, RRB actions, administrations' obligation to provide information



Interferences

No. 15.21

- WRC-12 reaffirmed that recent and repeated cases of intended harmful interference represent infringements and that Member States under the jurisdiction of which the signals causing this harmful interference are transmitted have the ***obligation to take the necessary actions***

15.21 § 13 If an administration has information of an infringement of the Constitution, the Convention or the Radio Regulations (in particular Article 45 of the Constitution and No. **15.1** of the Radio Regulations) committed by a station under its jurisdiction, the administration shall ascertain the facts and take the necessary actions.



Satellite broadcasting in 22 GHz band

WRC-12 decisions on this issue can be considered **as pioneering a paradigm in satellite regulations** as innovative concepts and regulatory mechanism were introduced to meet the challenge of equitable :

- procedures for coordination,
- notification and recording of assignments, which contains: **improved due diligence provisions**, preferential treatment of special submissions, **harmonized technical parameters**,
- measures to invite administrations to review their number of submissions and harmonize the technical parameters contained in them.



Efforts continue

- Further application of No. **13.6** (Rev.WRC-12) by administrations and the Bureau
- Experience on Res.552 (WRC-12) - New type of Due Diligence Information
- WRC-15 Agenda items – Permanent agenda item for the Conferences, Agenda items 7 and 9.2



.... And beyond!

- Administrative due diligence
- Economic consideration of Frequency management
 - Cost recovery for processing satellite filings (coordination and notification)
 - Cost recovery for maintainance in the MIFR
 - others
- Monitoring

Report ITU-R SM.2012-3
(09/2010)

**Economic aspects of spectrum
management**

SM Series
Spectrum management





International Monitoring System

- ITU has sent out a letter on 6 July 2011 to Germany, China, USA, Korea, Japan, Ukraine and Kazakhstan;
- Asking information on the costs for a number of basic measurements to determine whether there are deviations from the ITU published, coordinated and/or notified space station data in the MIFR

**“With a concerted effort, we can
reduce, and to the extent
possible *remove*, all *obstacles*
impeding the development and
bringing into operation of new
satellite networks”**

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Challenges in the 21st century

Большое спасибо

Almaty, Kazakhstan
5- 7 September 2012