



## Dark and Quiet Skies for Science and Society II

Implementing the recommendations

La Palma, Canary Islands, Spain

3 - 7, October, 2021

# Presentation on the International Telecommunication Union (ITU)



Véronique GLAUDE (Ms.)

ITU Expert Engineer

Space Services Department

ITU Radiocommunication Bureau

[veronique.glaude@itu.int](mailto:veronique.glaude@itu.int)



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## The International Telecommunication Union

A forum for ICTs



### *Our members*

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193

MEMBER  
STATES



+700

INDUSTRY &  
INTERNATIONAL  
ORGANIZATIONS



+100

ACADEMIA  
MEMBERS





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## The Radio Regulations

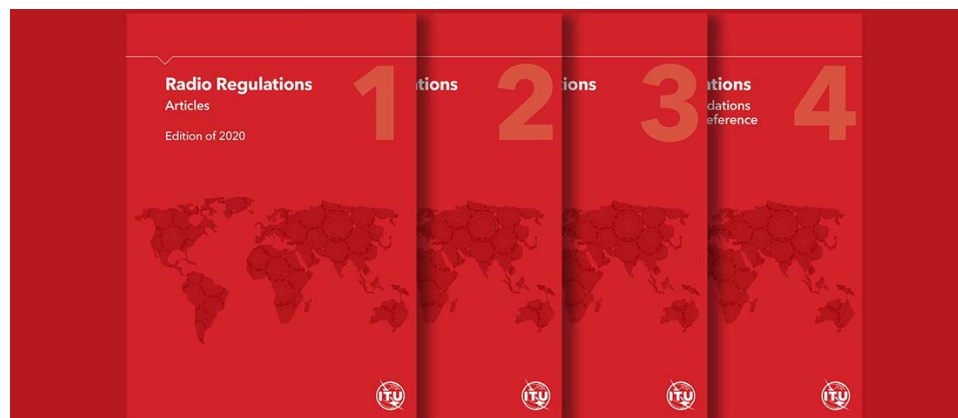
An evolutive intergovernmental treaty

### TODAY

- More than 2000 pages
- 39 Conferences since 1906
- 40 Radio Services Terrestrial, Maritime, Space

2 natural limited resources:

- Spectrum: 8.3kHz to 3'000GHz
- GSO and other associated orbits



## Radio Regulations

Articles

Edition of 2020

1

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2

ions

3

tions

dations  
eference

4

### ACTIVITY: Applying the Rules

Spectrum/orbit right of use  
for satellite networks



Registration in the Master International  
Frequency Register

Compatibility analysis and process  
By the Radiocommunication Bureau



### ACTIVITY: Deciding the Rules

Efficient/equitable regulations in a changing  
environment



“Modification” of  
the Radio Regulations

World Radiocommunication Conferences  
mechanism By the ITU-R Study Groups



sentation





Applying the Rules:

# **The Right to Use Spectrum/Orbits**

## **In accordance with the Radio Regulations**

### **To the Recent Constellations**



# ITU Filling of constellations



CONSTELLATIONS  
WERE  
IN THE RADIO  
REGULATIONS



SEVERAL  
CONSTELLATIONS  
WERE  
REGISTERED IN THE  
MASTER REGISTER  
**BEFORE 2015**



**IN 2015,**  
NEW  
CONSTELLATIONS  
TYPES  
NEW NEEDS OF  
SPECTRUM/ORBIT  
VERY LARGE  
NUMBER OF  
SATELLITES



ITU WORLD  
RADIOCOM-  
MUNICATION  
CONFERENCES  
IN 2015, 2019, 2023  
STUDIES AND  
DECISIONS  
**TO ADAPT**



**3 STEPS PROCESS**  
SUBMISSIONS OF  
ADVANCE  
PUBLICATION  
INFORMATION,  
COORDINATION  
AND NOTIFICATION  
**FOR REGISTRATION  
IN THE MASTER  
REGISTER**

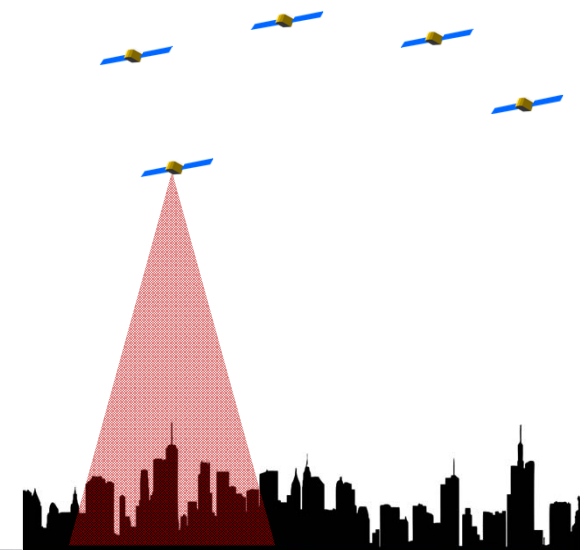


THE “**FIRST COME,  
FIRST SERVED**”  
CONCEPT,  
THE COORDINATION  
PROCESS BETWEEN  
ADMINISTRATIONS/  
OPERATORS,  
**PROTECTION OF  
OTHER SERVICES**



## ITU Radio Regulations for Non-GSO

- ✓ Identification by the Bureau of the list of **Coordination requirement between administrations** to ensure protection of existing services on equitable access basis; between non-GSO and GSO (Radio Regulations Article 9.12A, 9.21/A) and between non-GSO (Radio Regulations Article 9.12, 9.21/B) in limited frequency bands
- ✓ **Hard Limits** on antenna characteristics to respect to protect GSO from non-GSO - Radio Regulations Article 22 on Equivalent Power Flux Density
- ✓ **Ultimate protection of GSO – No. 22.2**  
Non-GSO shall not cause unacceptable interference to and shall not claim protection from GSO in the fixed-satellite service and the broadcasting-satellite service
- ✓ **Coordination** between non-GSO and terrestrial services (Radio Regulations Article 9.14, 9.21/C). Frequency overlap or Power Flux Density limits trigger the need of coordination.



Fixed Satellite Service (FSS) frequency bands		No hard-limits on antenna characteristics for protection of GSO Radio Regulations Article	Coordination need identified between Non-GSO Radio Regulations Article	Coordination need identified between Non-GSO and GSO Radio Regulations Article	Radio Regulations Article 22 Equivalent Power Flux Density hard-limits are applicable
Earth-space	space-Earth				
	3400-4200 MHz	22.2			Yes (3700-4200 MHz)
5725-6700 MHz		22.2			Yes (5925-6700 MHz)
6700-7075 MHz		22.2	9.12		Yes (6700-6725 MHz)
7250-7750 MHz		22.2			
7900-8400 MHz		22.2			
	10.7-12.95 GHz	22.2	9.12		Yes
	11.2-11.45 GHz	22.2	9.12		Yes
	11.7-12.75 GHz	22.2	9.12		Yes
12.75-13.25 GHz		22.2	9.12		Yes
13.75-14.0 GHz		22.2	9.12		Yes
	17.8-18.6 GHz	22.2	9.12		Yes
	18.6-18.8 GHz	22.2			
	18.8-19.3 GHz		9.12	9.12A	
	19.3-19.7 GHz (MSS FL)		9.12	9.12A	
	19.3-19.7 GHz	22.2			
	19.7-20.2 GHz	22.2	9.12		Yes
	20.2-21.2 GHz	22.2			
27.5-28.6 GHz		22.2	9.12		Yes
28.6-29.1 GHz			9.12	9.12A	
29.5-30.0 GHz		22.2	9.12		Yes
V-band FSS	V-band FSS	22.2	9.12		Yes Single/Aggregate





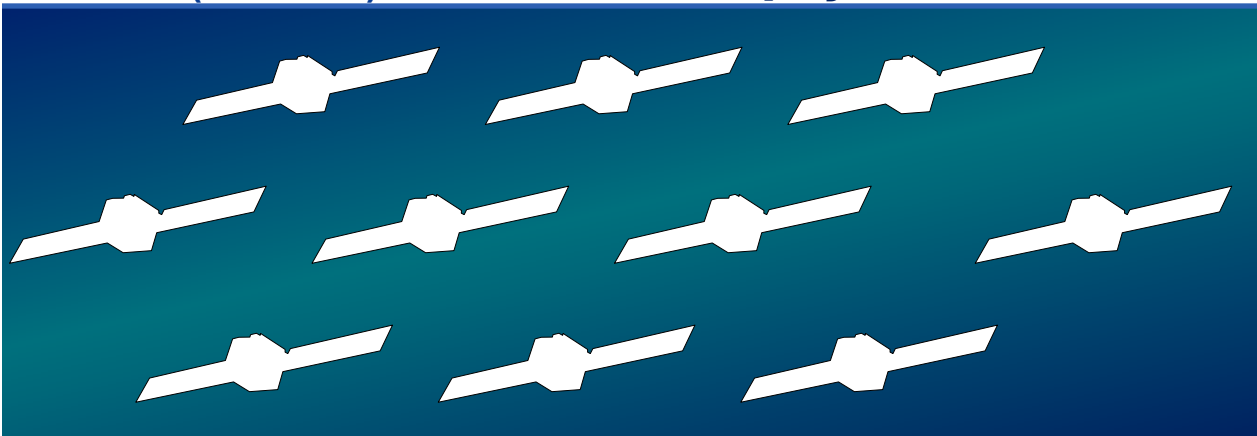
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### ITU Radio Regulations RESOLUTION 35 (WRC-19) – Constellation Deployment Milestones

Orbits and satellites  
submitted for  
registration in the  
International Master  
Frequency Register  
To ITU



Bringing Into Use  
1 Satellite



Radio Regulations  
Article 11.44



+2 years  
10%

+5 years  
50%

+7 years  
100%



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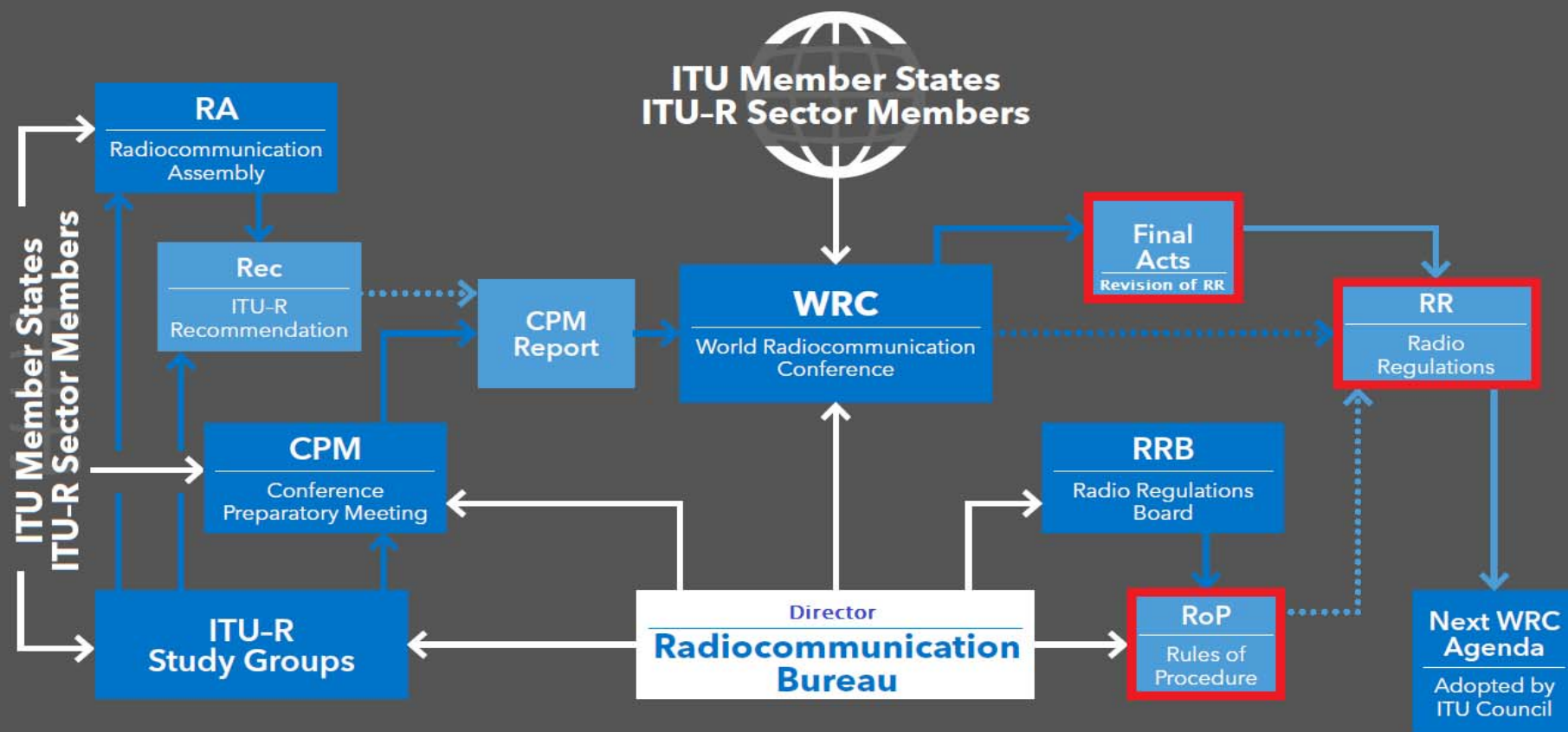


Decide the Rules:

**The “elaborated ” Radio Regulations evolution**  
**To allow new actors/technology**  
**And protect existing**



# The World Radiocommunication Conference process



ITU-R: ITU Radiocommunication Sector



Dark and Q

## Study Groups of the ITU-Radiocommunication sector

A forum to study, share,  
negotiate and draft new  
Regulations and  
Recommendations

For approval by consensus

- The Study Group 4 is dedicated to **Satellite Services**
- The Study Group 7D is dedicated to **Radio Astronomy**

and contribution to other Study Group activity related to Radio Astronomy. For example, the WRC-23 Agenda Item 1.2 which is considering new compatibility with IMT





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**For the constellations**

**Evolution of the Radio Regulations**

**For World Radiocommunication Conference in 2023**

**ITU-Radiocommunication Study Group 4 Satellite Services**

**Bringing into use Non-GSO frequency assignments**

**Regulations are required to prevent warehousing orbit-spectrum and avoid paper satellites:**

*What are the conditions of bringing into use?*

*Regulatory schedule is tight for coordination and bringing into use*

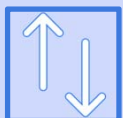
*How modification of orbital parameters should be*

*addressed/evaluated?*

## For Radio Astronomy - Protection of passive bands and the Radio Regulations



Study Groups are active to protect passive frequency bands like Radio Astronomy Services



The Radio Regulations contain provisions that establish operational limits of out of band emissions to protect passive bands



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## Roles Summary



## Who attends Study Groups?



ITU-Radiocommunication 6 Study Groups,

Chair and ITU Counsellors



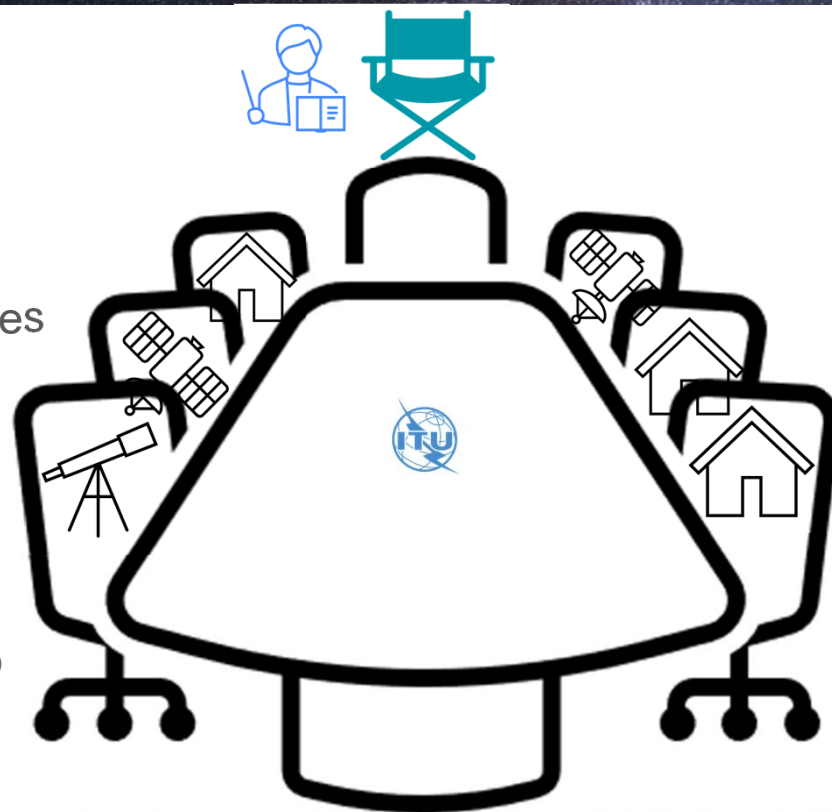
National Administrations in different ministries  
including Regulators



Satellites Operators needing protection of  
operation of spectrum/orbits



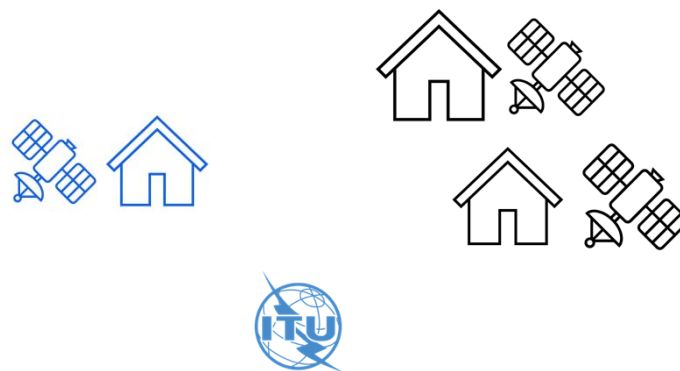
Researchers and Scientists including Radio  
Astronomy Service





## Who notifies Constellations?

1. The Operator submits a notice to its National Administrations/Regulator Authority
2. The Administration submits the notice to the ITU Radiocommunication Bureau
3. If identified, the coordination process is between Operators/Administrations
4. The registration of the Satellite Network in the Master International Frequency Register is done by ITU





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## KEY POINTS TO REMEMBER



1. The Radio Regulations is for the radio spectrum and the orbits.
2. The need of right to use spectrum/orbits of the recent Constellations is included in the Radio Regulations which adapted.



3. The synergy amongst actors from the industry and governments is essential in the ITU-Radiocommunication sector to use and share spectrum/orbits.







# DARK & QUIET SKIES



**Véronique GLAUDE (Ms.)**

ITU Expert Engineer  
Space Services Department  
Radiocommunication Bureau

International Telecommunication Union (ITU)

**Headquarters:**

Place des Nations  
CH-1211 Geneva 20  
Switzerland

**[veronique.glaude@itu.int](mailto:veronique.glaude@itu.int)**

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