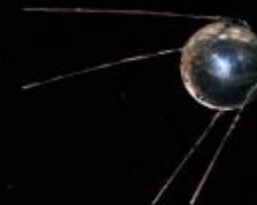




International Committee on  
Global Navigation Satellite Systems

# The ITU & Spectrum Management



Hon Fai Ng (ng@itu.int)  
International Telecommunication Union  
(Online) United Nations/Mongolia Workshop on the applications of GNSS, 25 - 29 October 2021

**1957**



First satellite Sputnik 1

# 1959

Administrative Radio Conference  
defined space service

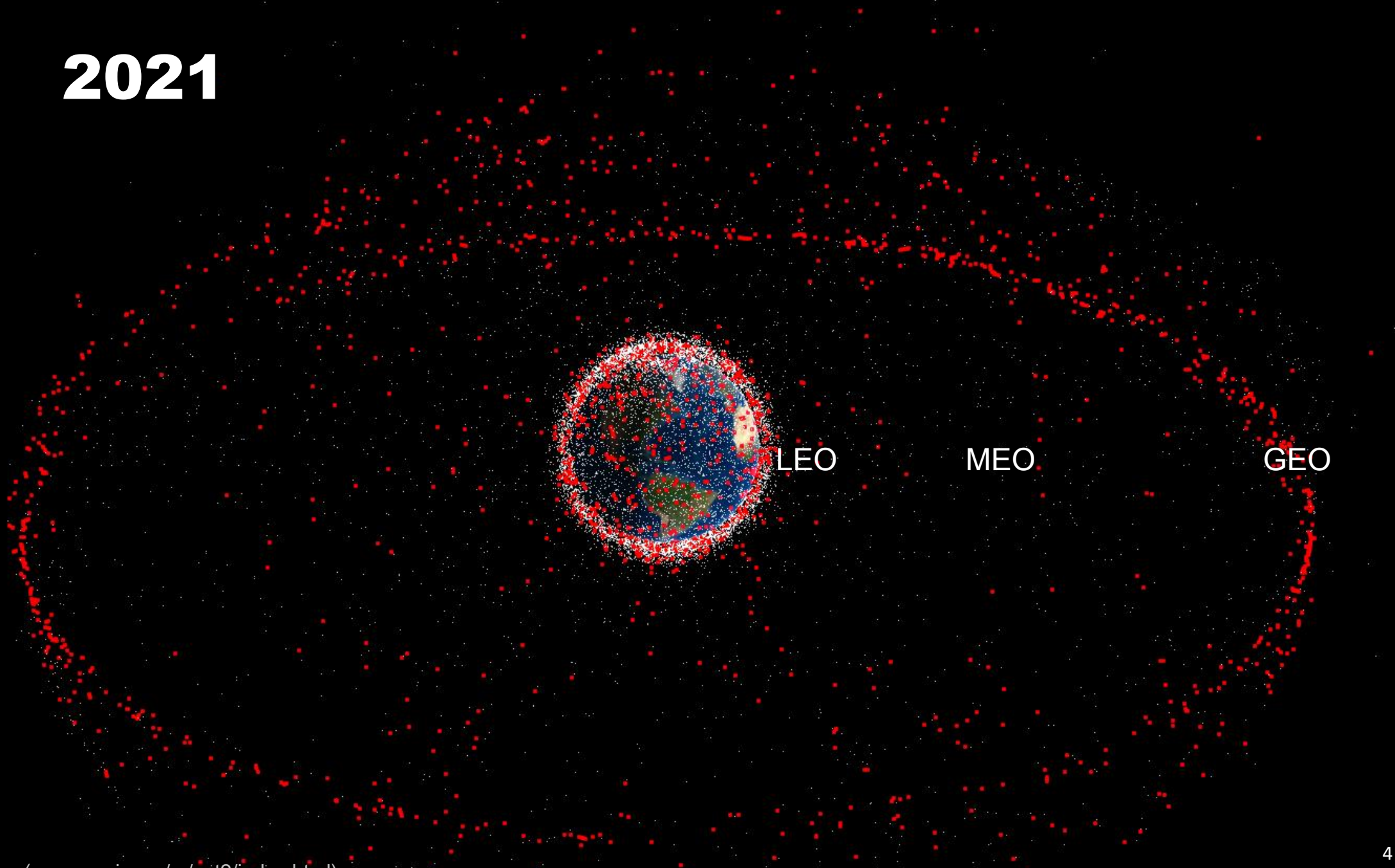
# 1963

Extraordinary Administrative  
Radio Conference allocated  
frequency bands for space

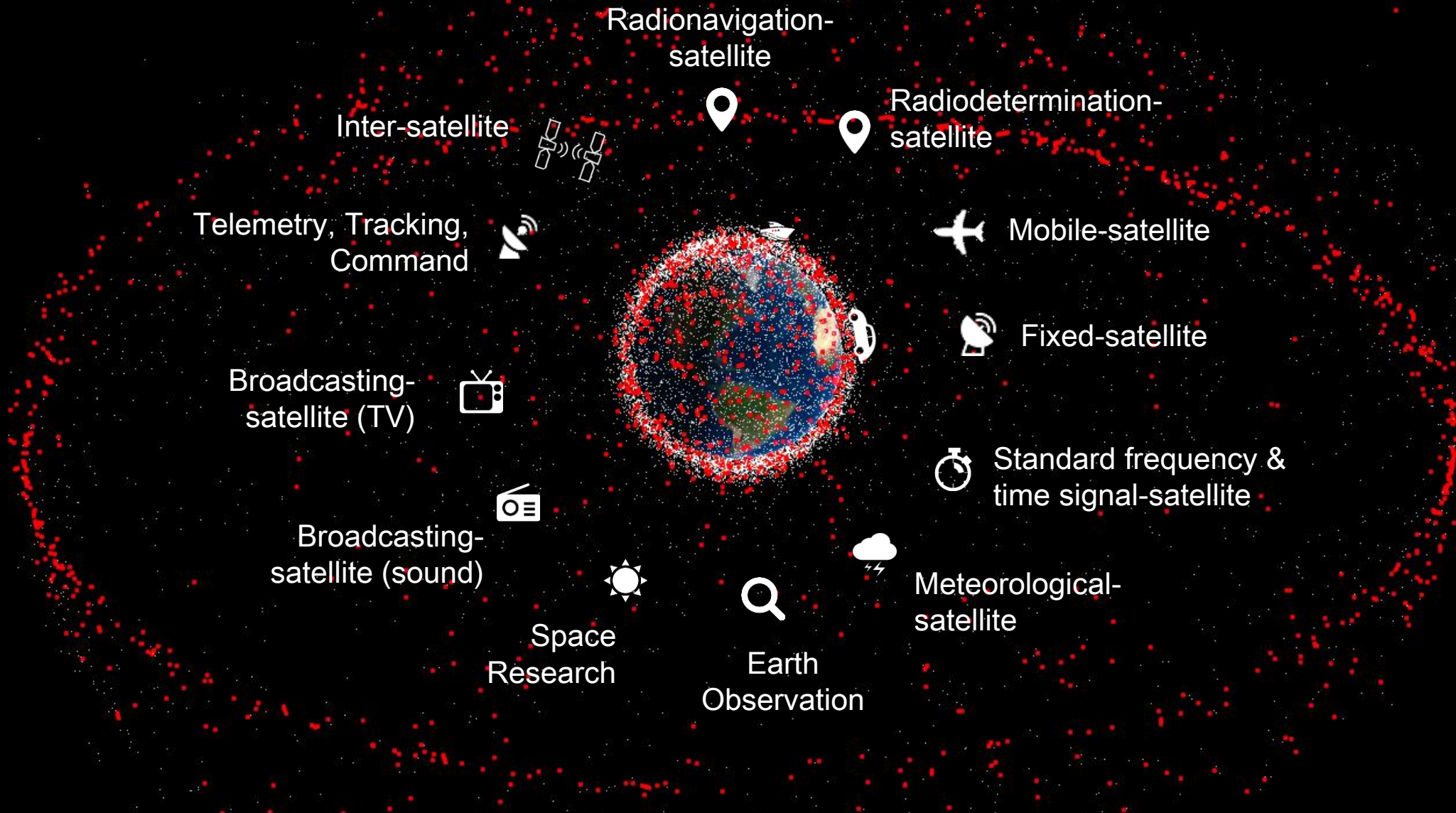




# 2021



# 2021





2021

Degrades, obstructs, or interrupts  
radiocommunication services

# **HARMFUL INTERFERENCE**

Endangers function of safety services  
including radionavigation





**ITU**



**RR**



**RNSS**



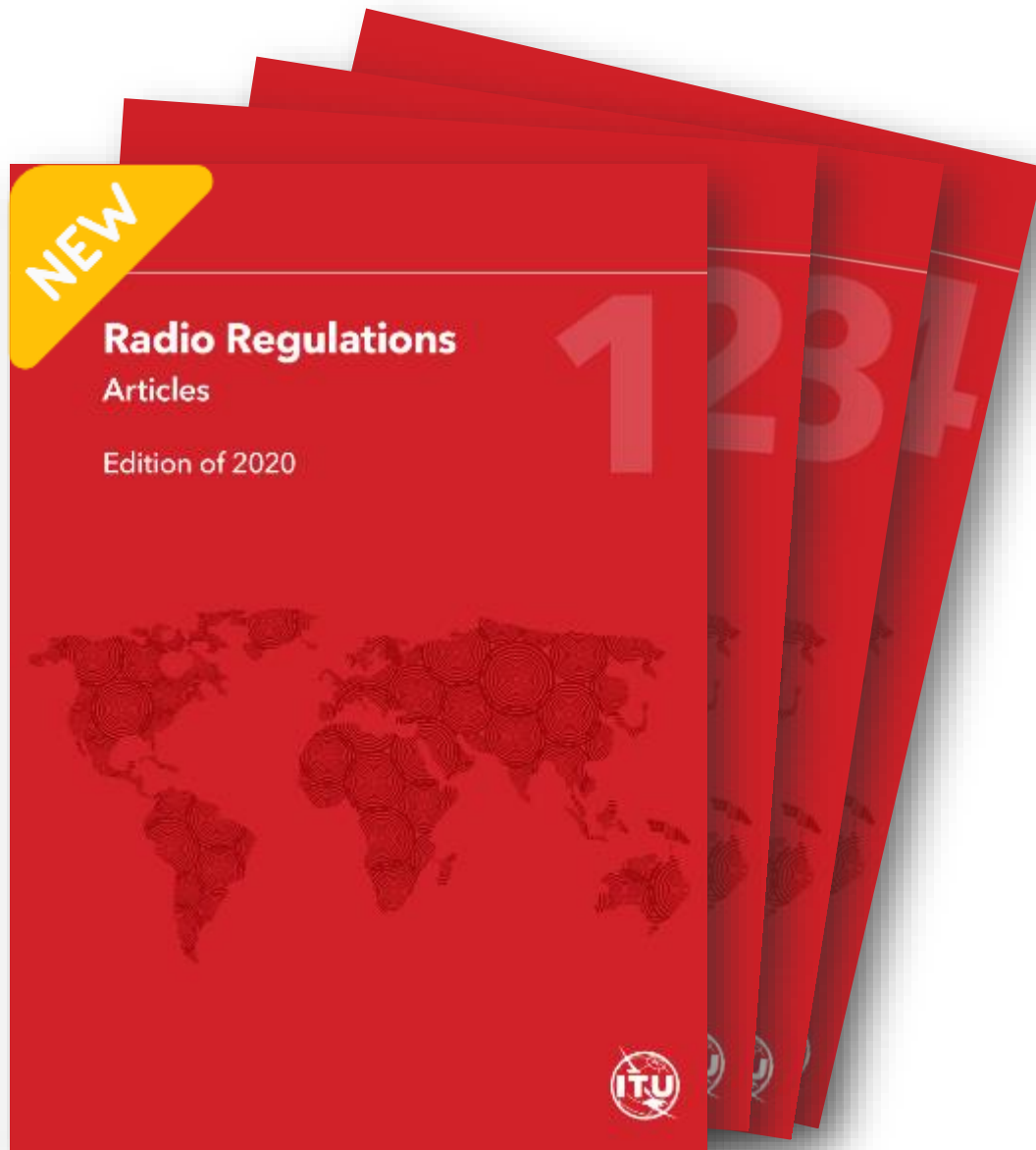
**WRC**



## International Telecommunication Union

- Since 1865
- UN Agency for ICTs
- 193 Member States
- HQ in Geneva, Switzerland
- 3 Bureaus/Sectors - **ITU-R**, ITU-T, ITU-D
- ITU Constitution, Convention, **Radio Regulations**
- Manages global allocation of radio-frequency spectrum & satellite orbits

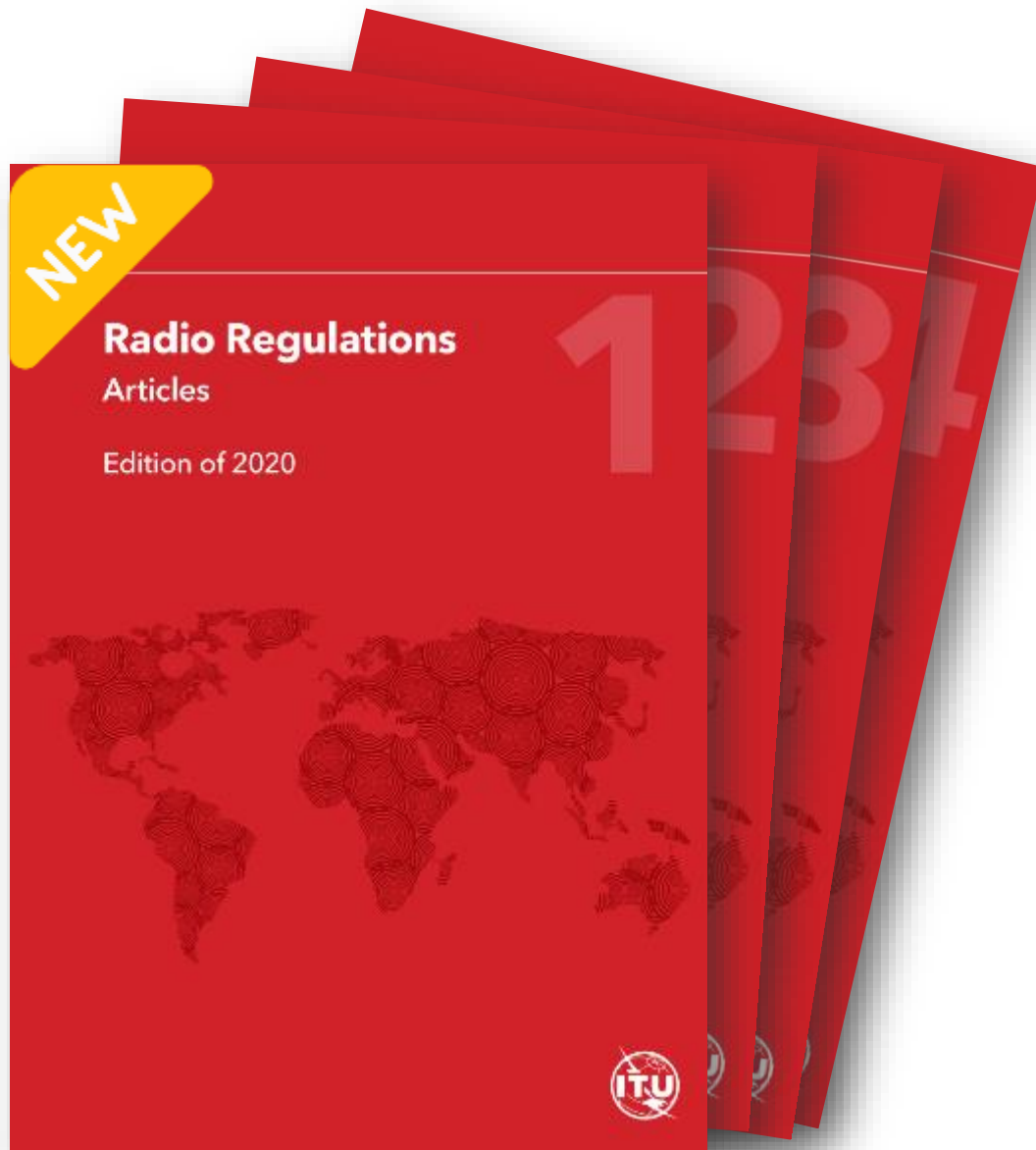




# RADIO REGULATIONS

- To facilitate access/use of spectrum & orbit
- To ensures rational, equitable, efficient and economical use of spectrum
- To not cause harmful interference
- To exercise the utmost goodwill and mutual cooperation

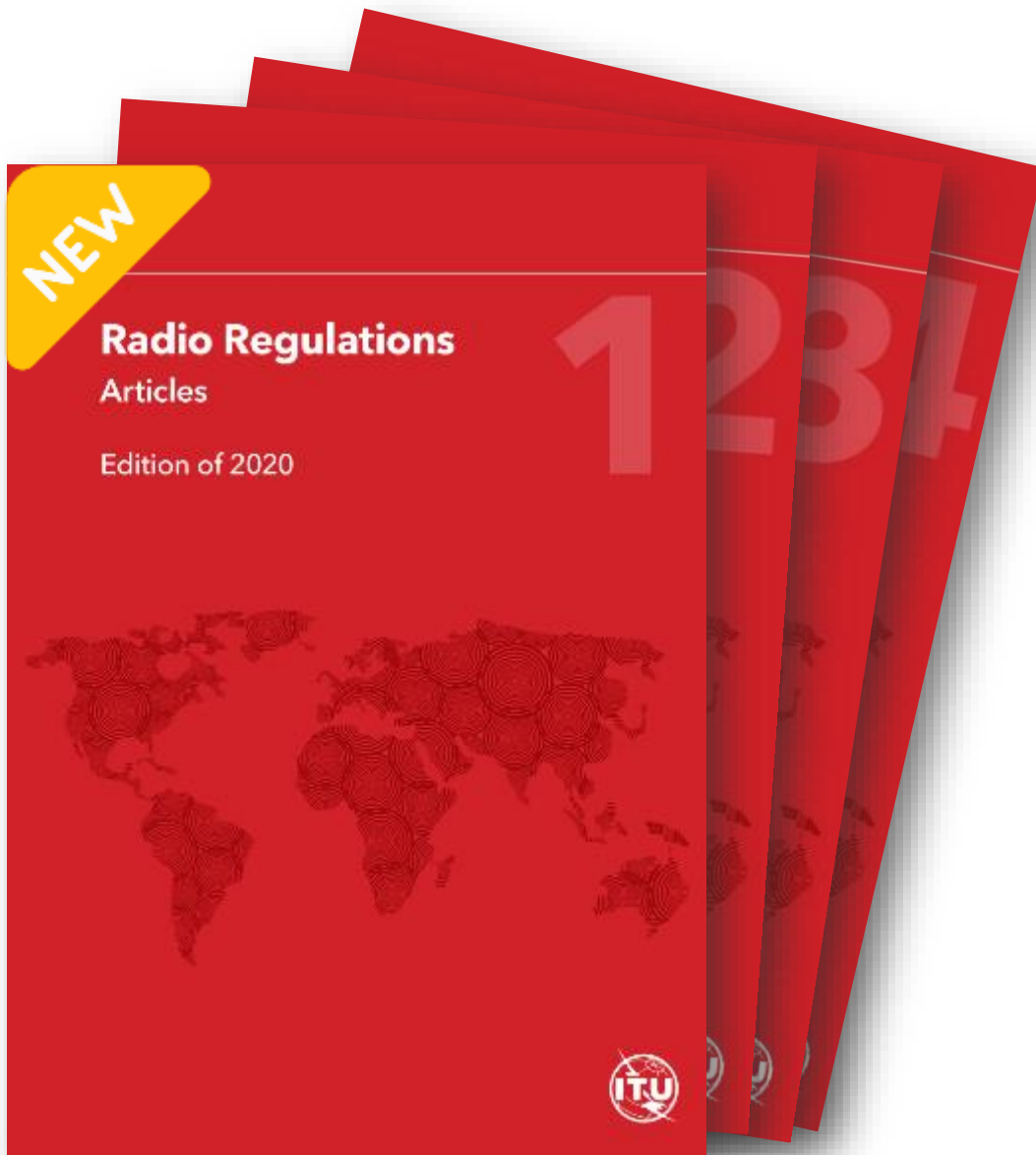
RR Nos. 0.3, 0.4, 0.6, 7.8, 15.22



# RADIO REGULATIONS

- Since 1906
- International treaty
- Define rights & obligations
- Updated every 4 years by WRC
- Balance between stability vs innovation





**ALLOCATION**

**POWER LIMITS**

**COORDINATION**

**HARMFUL INTF**

Frequency & services

Article 5



# Radionavigation-Satellite Service (RNSS)

... to determine the position, velocity and/or other characteristics by radio waves propagation properties involving the use of one or more space stations for the purpose of radionavigation

Nos. 1.9, 1.41, 1.43 of Article 1 of Radio Regulations

Member States recognize that the safety aspects of radionavigation ... require special measures to ensure their freedom from harmful interference ...

No. 4.10 of Article 4 of Radio Regulations



## Frequency &amp; services

Article 5

Table of Frequency Allocation (RR Art.5)

Allocation to services		
Region 1	Region 2	Region 3
<b>1 164-1 215</b>	AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A	
<b>1 215-1 240</b>	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332	
<b>1 240-1 300</b>	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A	
<b>1 559-1 610</b>	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341	

Secondary  
(No interference to &  
no protection from PRIMARY)

Services & direction  
of transmission

Footnotes

Footnotes with  
conditions

**5.328A** Stations in the radionavigation-satellite service in the band 1 164-1 215 MHz shall operate in accordance with the provisions of Resolution **609 (Rev.WRC-07)** and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1 215 MHz. No. **5.43A** does not apply. The provisions of No. **21.18** shall apply. (WRC-07)

**ALLOCATION**

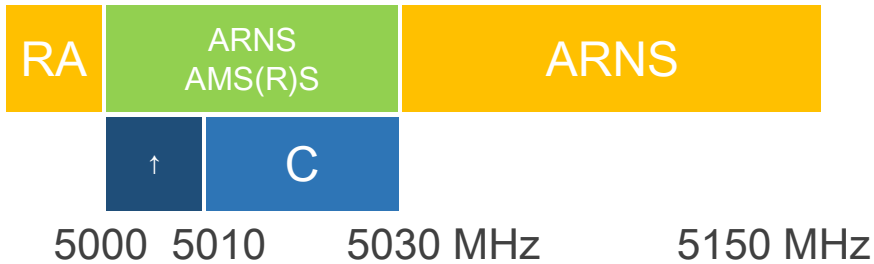
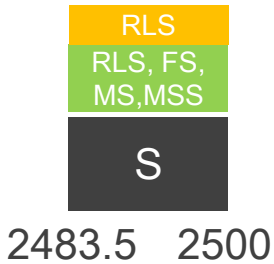
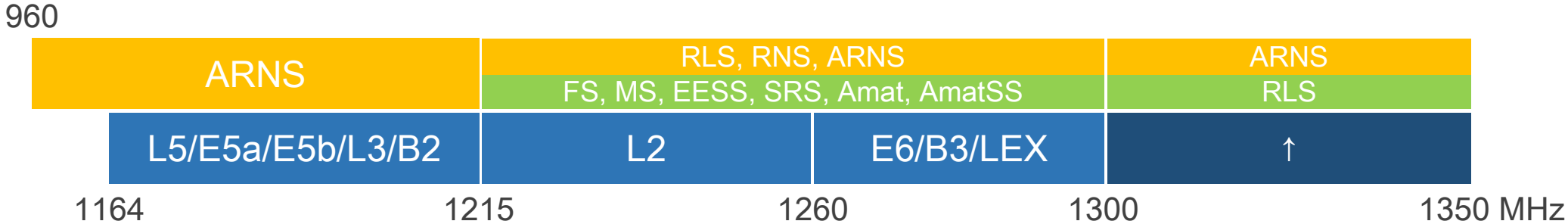
POWER LIMITS

COORDINATION

HARMFUL INTF

Frequency & services

Article 5



- RNSS Radionavigation-Satellite Service
- RDSS Radiodetermination-Satellite Service
- AmatS Amateur Service
- AmatSS Amateur-Satellite Service
- AMS(R)S Aeronautical Mobile-Satellite (Route) Service
- ARNS Aeronautical Radionavigation Service
- EESS Earth-Exploration Satellite Service
- FS Fixed Service
- MS Mobile Service
- MSS Mobile-Satellite Service
- MMSS Maritime Mobile-Satellite Service
- RLS Radiolocation Service
- RNS Radionavigation Service
- RA Radioastronomy Service
- SRS Space Research Service

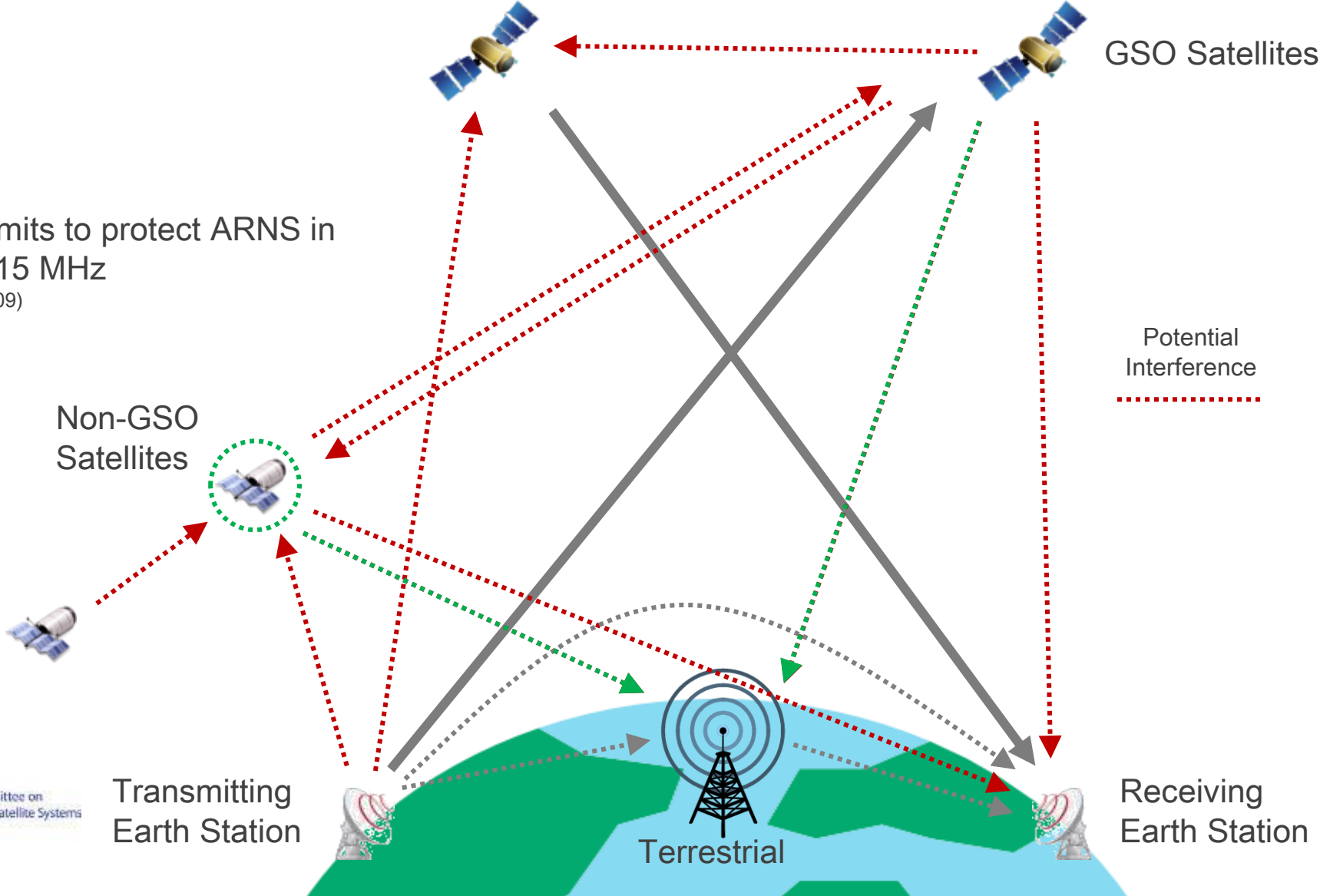


PFD, EIRP, EIRP density, off-axis

EIRP, EPFD, min. antenna sizes

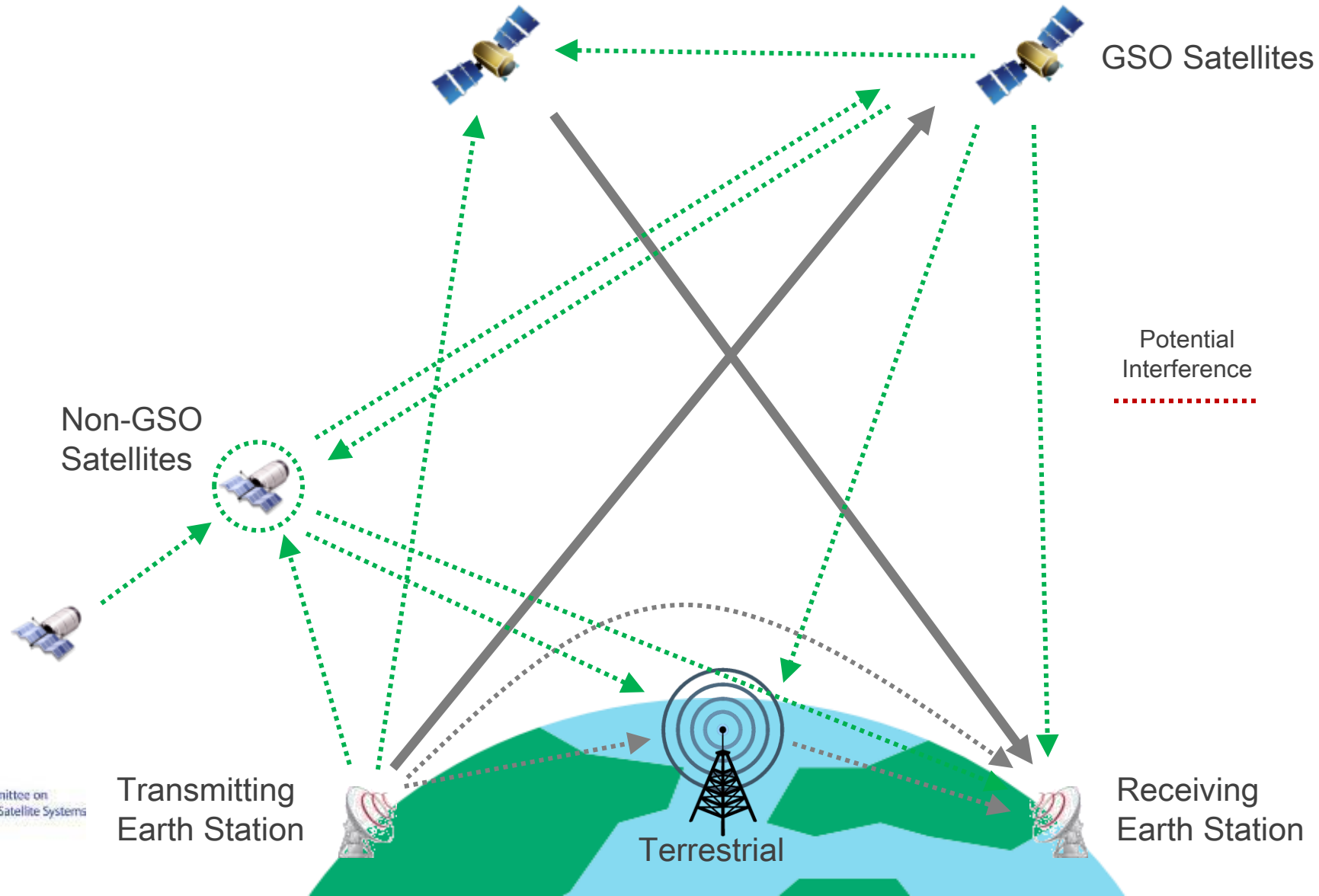
Articles 5 footnotes, 21, 22 , Resolutions etc.

EPFD Limits to protect ARNS in 1164-1215 MHz (Resolution 609)



Negotiations for interference-free operations,  
notification & recording in Master Register (MIFR)

Articles 9, 11





## Reporting harmful interference

Article 15, Appendix 10

The image shows two overlapping screenshots of the Satellite Interference Reporting and Resolution System (SIRRS) web interface. The top screenshot displays the 'Create New Interference Report' form, which includes a 'Report information' section with fields for 'Title' and 'Ref. Administration' (set to 'ITU'), and a 'Stations Causing Interference' section with an 'Add Station' button. The bottom screenshot shows a 'Report' form with sections for 'Document ref.', 'Stations Causing Interference', and 'Stations Interfered With'. A red arrow points from the text on the right towards the 'Report' form.

**Document ref.**

**Stations Causing Interference**

Stationid	
Station type	
Location	
Administration	
Measured frequency	
Bandwidth	
Field Strength or Power Flux Density of Interfering Carrier	
Polarization	
Facility which made the above measurements	
Date of interference	
Type of carrier	
Source	

**Stations Interfered With**

Station type	
Direction	
Name	
Administration	
Associated ITU name	

Report harmful interference to ITU/BR (RR Art. 15):

- for info, or
- for assistance (RR No. 13.2), or
- to exchange info with up to 193 Administrations

[www.itu.int/ITU-R/space/sirrs](http://www.itu.int/ITU-R/space/sirrs)

# WRC-23

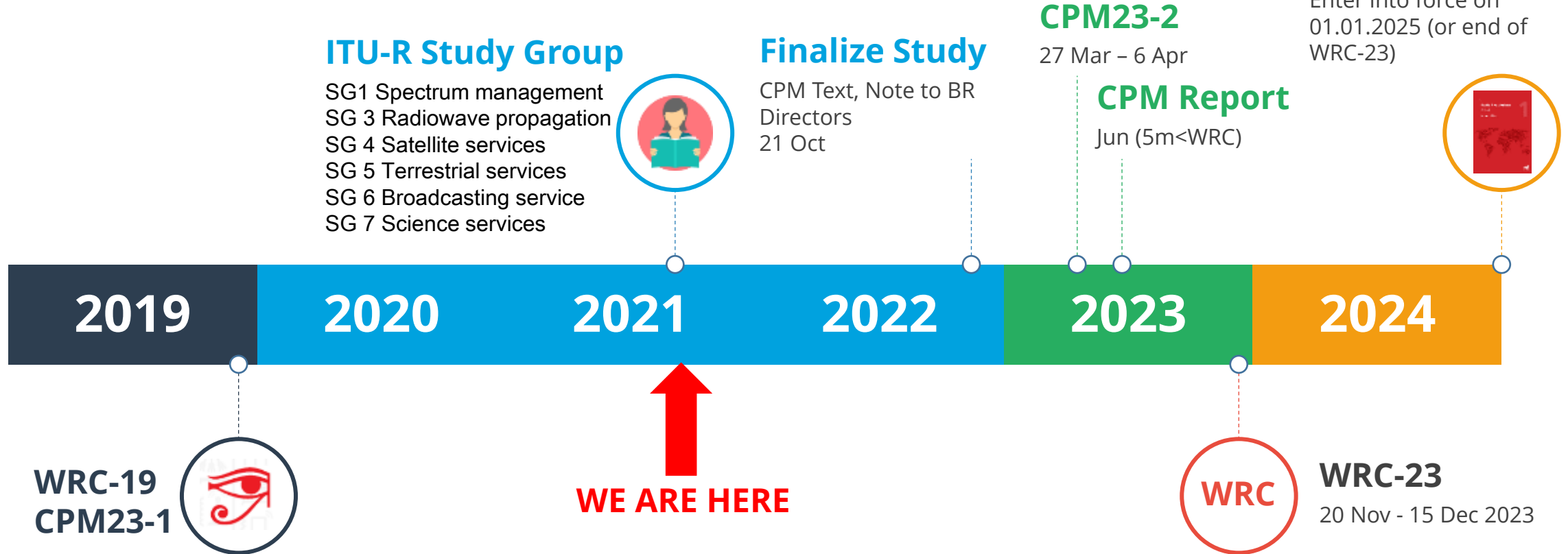
- World Radiocommunication Conference
- Updates Radio Regulations
- Agreement by consensus
- 4 weeks every 4 years
- 20 Nov – 15 Dec 2023 in UAE



# WRC-23 CYCLE

## Updated Radio Regulations

Enter into force on 01.01.2025 (or end of WRC-23)





# KEY TAKEAWAYS



## ITU

Manages global allocation of spectrum/orbits



## RR

Contains rights & obligations in using spectrum/orbits



## RNSS

Needs measures to ensure freedom from harmful interference



## WRC

Updates the RR

# International Telecommunication Union



[www.itu.int](http://www.itu.int)

