Space Sustainability, Monitoring and Interference Reporting (SIRRS)

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Space Services Department

2-6 December 2024, Geneva, Switzerland

Our Agenda

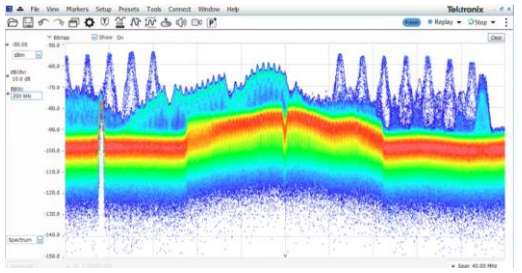
1. Sustainability of Space Radiocommunications Systems
2. Why Space Radio Monitoring ?
3. Overview of the current situation and interference cases reported to BR
4. Procedure in case of Harmful Interference.
5. Use of SIRRS online application and ITU-R Recommendation for reporting

Space Sustainability – Why ?

- Global Communications and Modern Infrastructure relies on Space Based Systems : GPS, Time Synchronization, Satellite Broadcasting, Mobile Devices, Monitoring of the Planet, Rural Communications

- Higher Demand, Acceleration in the Space Sector: Satellite Frequency Coordination Requests and Launches are growing exponentially

- Higher Risk of Interference and Physical Collisions in Space can degrade the efficiency and ultimately access to spectrum orbit resources



Space Sustainability – Why at ITU ?

- ITU Member States instructed SG, BR Director and ITU-R Sector to take a series of actions: Resolution 219 (PP-2022), Resolution 74 (RA-2023)

- 61 years of experience in regulating Spectrum-Orbit Resources

  (since 1st Space Conference in Geneva in 1963)

- Interrelation between the Space Environment and Efficient Use / Access to Spectrum-Orbit Resources (core responsibility from ITU)

- ITU provides the right balance across all regions and space sectors, giving a voice to governments as well as to the industry in a moment when the private sector is boosting space activities.

Space Sustainability – What's Done ?

2000+ Attendees (online + in person)

90 Countries

53 C and Expert Level Speakers

Governments | UN Agencies| Industry | Civil Society | Academia

Space Policy and Law, Strategies, Spectrum, Deorbiting of Spacecrafts, Space Situational Awareness, Space Programs

Summary Report

Outcome and Next Steps

Online Access to Resources about :

- Latest Space Strategies for Post Mission Deorbiting/Disposal
- Satellite Radio Monitoring
- Regulations, ITU-R Study Group Ongoing Work
- Space Environment Reports
- Satellite Catalogs and MIFR

ITU Circular Letter

CA/272

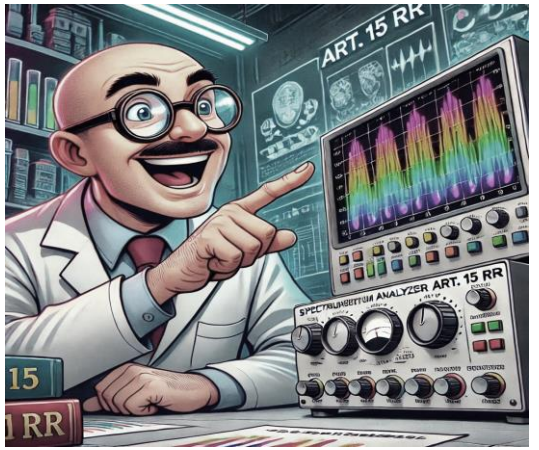
Space Sustainability – What's Next ?

- **Exchange of information and Data Sharing**
  - Online directory with direct Points of Contact for flight operations
  - Access to ephemeris data
  - Facilitate communication between satellite operators worldwide
- **Capacity building**
  - To leverage worldwide knowledge about space radiocommunications systems while raising awareness of basic safety rules in outer space
- **Handbook – Recommendation on:**
  - Best Practices for the sustainable use of frequencies and associated non-GSO orbits by space radiocommunication services,
  - Guidance on safe and efficient deorbit/disposal strategies and methodologies for non-GSO space stations involved in radiocommunication services after the end of their life
- **2nd. ITU Space Sustainability Forum:** Planned for October 2025 !

Why Space Radio Monitoring at ITU ?

To identify, geolocate and eliminate harmful interference to space services when Administrations request assistance from BR under No 13.2

" if we cannot measure it, we cannot manage it "



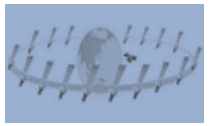
ITU Space Radio Monitoring Website

- **Map with Technical Characteristics and PoCs for Monitoring Stations**
- **Recommendations, Reports**
- **Regulatory and Administrative Information**
- **Report ITU-R SM. 2182-1**
- **LIST VIII Article 16 → International Monitoring System**
- **Memoranda of Understanding signed with Germany, Pakistan, Korea, China, Vietnam, Belarus , Brazil, Oman and more joining soon**

ITU and Space Services

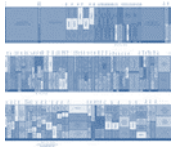
194 Member States

61 years of Space Regulation

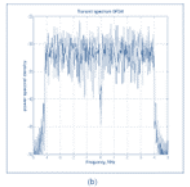


72 Members States with access to Space Resources

2600 Satellite Networks Operating



6.2 THz of Spectrum Coordinated and Recorded

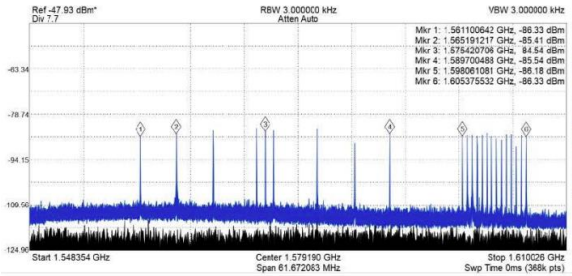


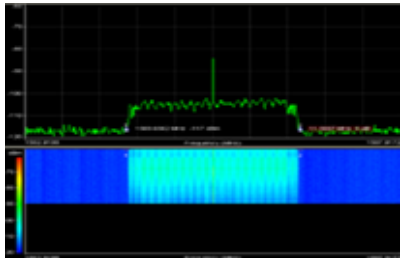
99.86% Spectrum Free of Harmful Interference

< 0.1 % Interference Variation per year

Harmful Interference Reported to ITU

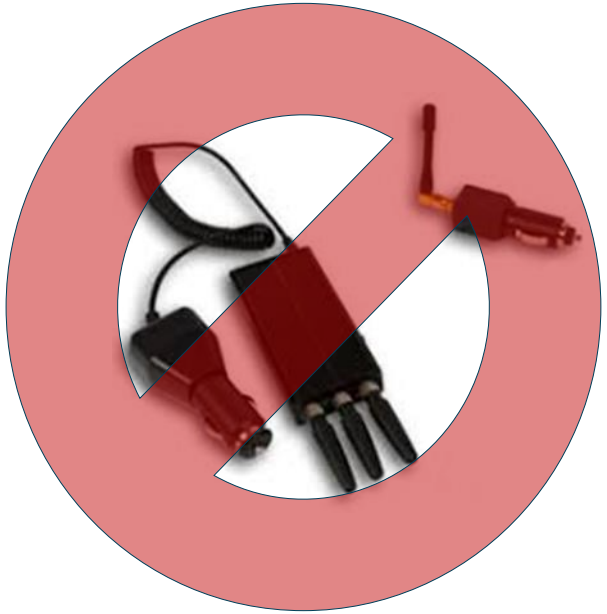
- ❑ **Fixed Satellite Service, Broadcasting Satellite Service and associated Space Operations Functions in the frequency bands 6/4 GHz and 14-17-18/10-12 GHz**
- ❑ **Earth Exploration Satellite Service (passive) in 1400-1427 MHz band**
- ❑ **Mobile-Satellite-Service in the frequency bands 1 626.5-1 660.5 MHz, 1 980-2 010 MHz and 2 670-2 690 MHz**
- ❑ **Radio Astronomy Service in the frequency band 1610.6-1613.8 MHz**
- ❑ **Radio Navigation Satellite Service (RNSS) in the 1164-1215 MHz and 1559-1610 MHz frequency bands**





WRC-23 Outcome to Protect RNSS

Adopted by consensus the Resolution 676 on Prevention and mitigation of harmful interference to the radionavigation satellite service in the 1 164-1 215 MHz and 1 559-1 610 MHz frequency bands and Resolved to:



Urge Administrations

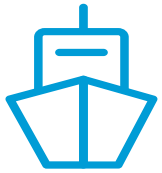
1. **To apply necessary measures to avoid the proliferation, circulation and operation of unauthorized transmitters that cause, or have the potential to cause, harmful interference to RNSS**

WRC-23 Outcome to Protect RNSS

Urge Administrations:

2. To take the following actions to prevent and mitigate harmful interference affecting RNSS without prejudice to the right of administrations to deny access to the RNSS, for security or defence purposes:

2.1 To encourage **collaboration** between **spectrum regulators, enforcement authorities and RNSS stakeholders**, in particular in the **aeronautical and maritime** domains;



2.2 To encourage **cooperation** between **aeronautical, maritime and security authorities**, as well as **spectrum regulators**, as appropriate, **to address interference risks** to RNSS systems that may stem from the **activities of these security authorities;**

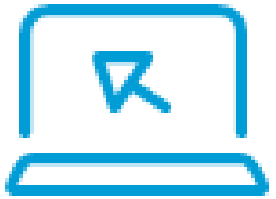
WRC-23 Outcome to Protect RNSS

Urge Administrations:

3. To report to the Bureau cases of harmful interference affecting RNSS, in accordance with Article 15.

How to submit it ? :

by using ITU-BR SIRRS Online application →



www.itu.int/en/ITU-R/space/SIRRS

4. Bureau to provide assistance to Administrations under No. 13.2 of Radio Regulations

ITU-BR Actions for RNSS protection and Harmful Interference mitigation

Circular Letter CR/488

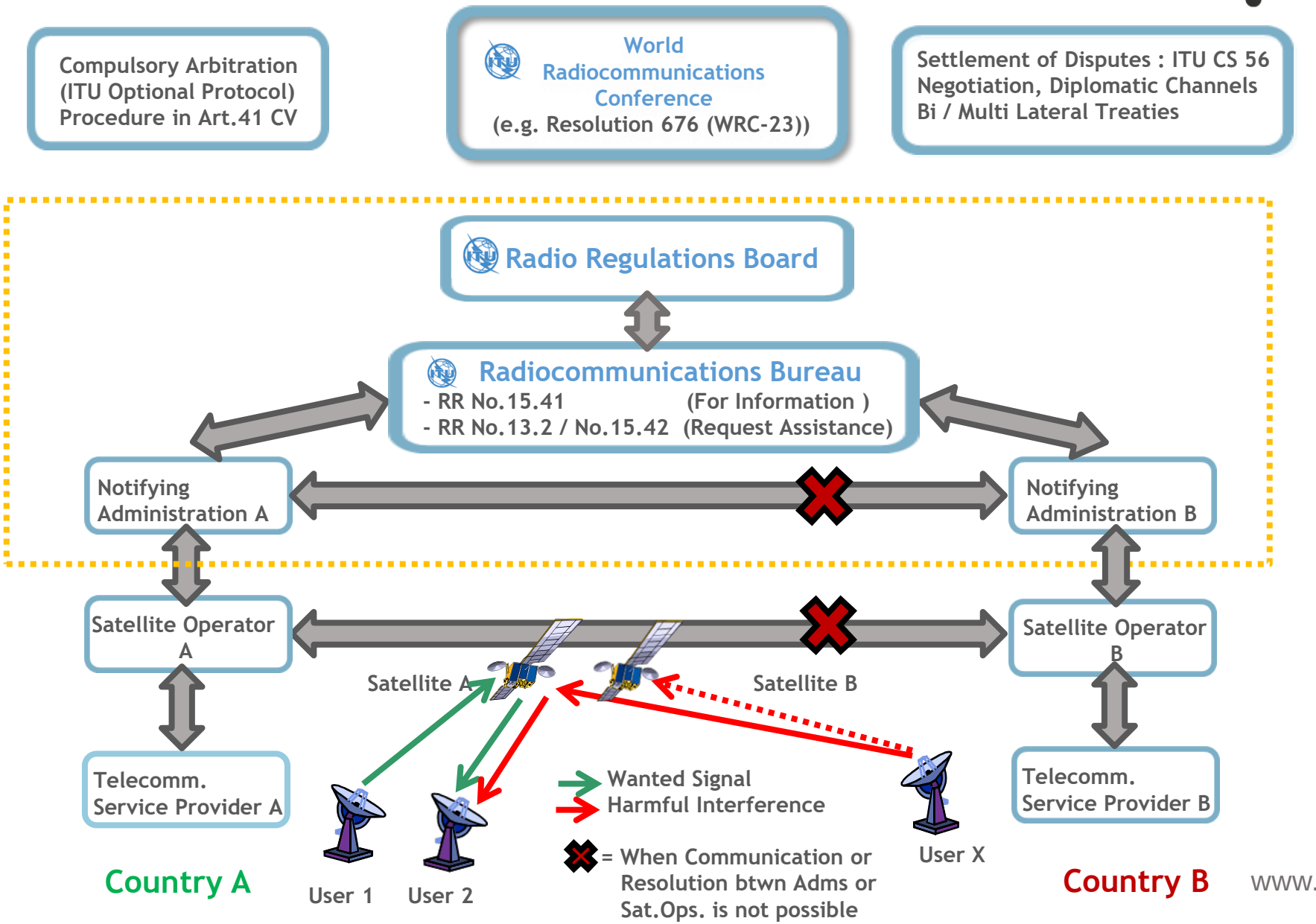
- Raised awareness of the increasing number of incidents around the world
- Recalled Member States of their obligation to abide the Constitution and Radio Regulations (CS Art 45, Art 47; RR No 4.10, 15.1, 15.28, Res 676 (WRC-23))
- Provided recommendations to prevent and mitigate the interference:

  a) reinforcing systems **resilience** to interference;

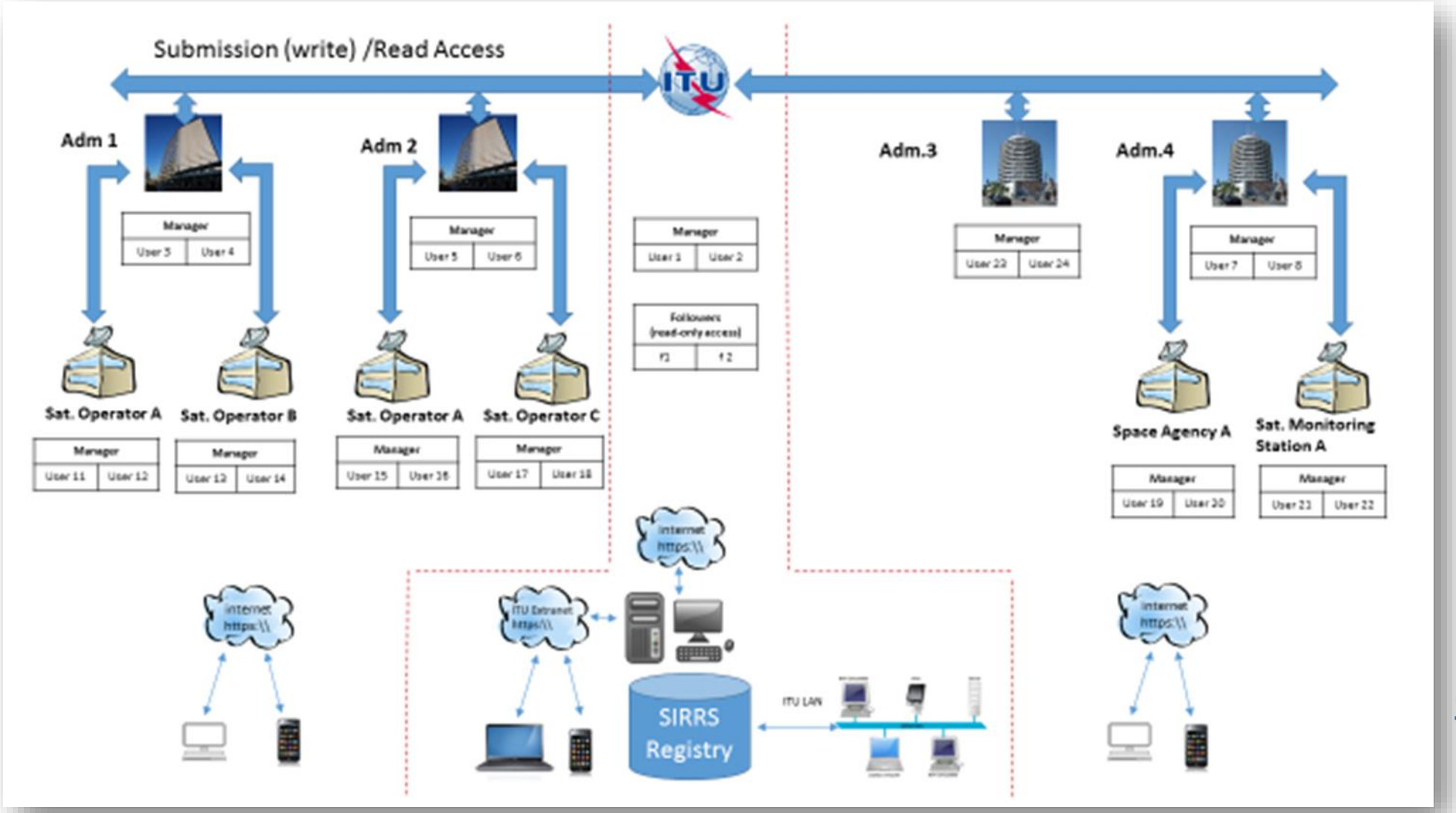
  b) increasing **collaboration** between spectrum regulators, aviation, maritime, civil-military and enforcement authorities;

  c) **retaining essential terrestrial navigation** infrastructure for contingency support in case of RNSS outages, and developing mitigation techniques for loss of services

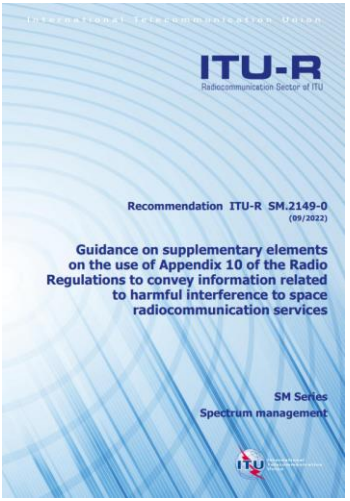
Process in case of Harmful Interference



Satellite Interference Reporting and Resolution System – SIRRS



[Play Video to learn How to Use SIRRS]



[Guidelines for Reporting REC ITU-R SM.2149]

Administrations shall use SIRRS: Res 55 (WRC-23) to report a case, reply and exchange information

To Open an Account:

1

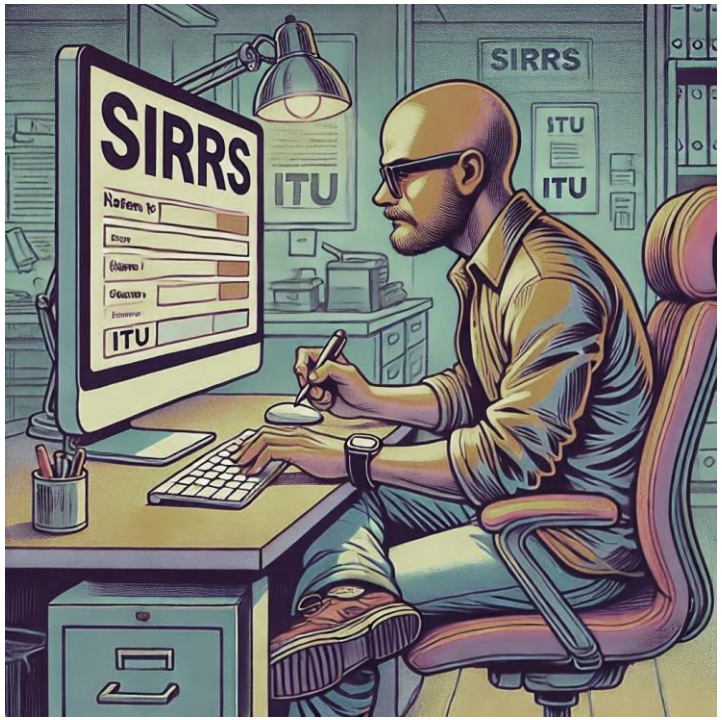
- Administration send letter to BR by
- E-communications, or
- BRMail@itu.int , or
- FAX: +41 22 730 5785

2

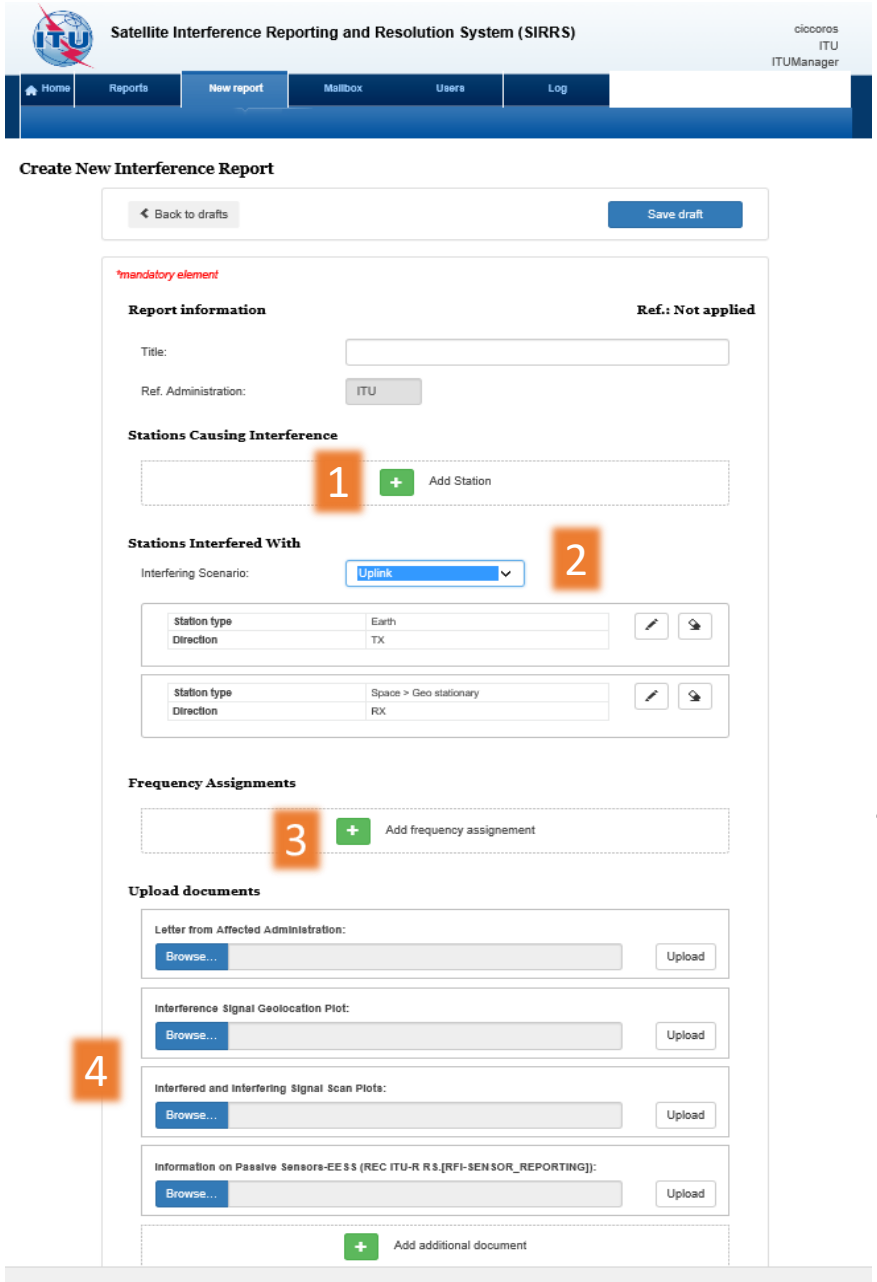
- Requests to assign Role of Administration Manager for:
- Full Name
- TIES USER
- Email address

3

- Administration Manager signs in and add other users through SIRRS



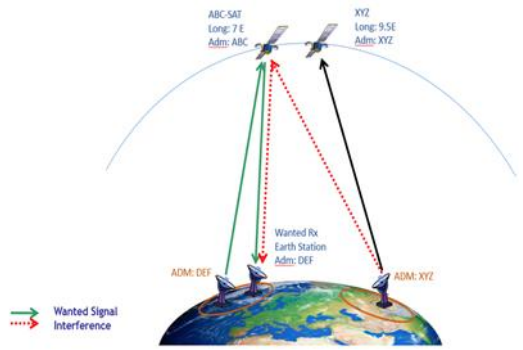
SIRRS – Create a New Report

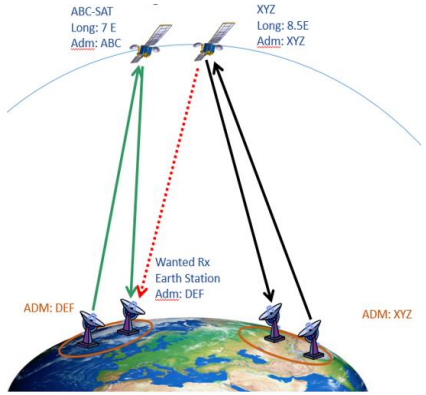


1) Station Causing Interference

2) Interference Scenario:
   - Earth to Space
   - space to Earth,
   - Radio Astronomy,
   - EESS-Passive,
   - intersatellite links,
   - NGSO to GSO

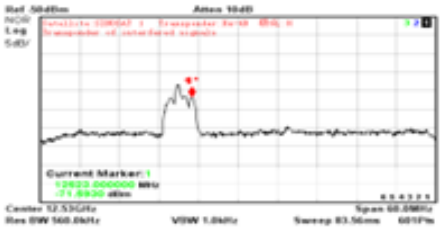
   and Characteristics of Station Interfered with

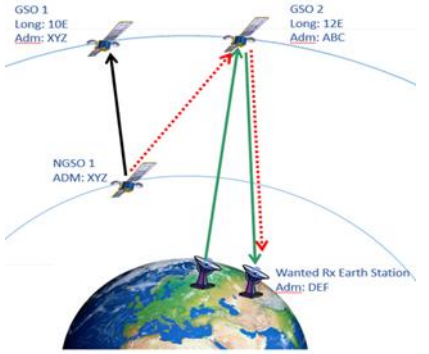




3) Affected Frequency Assignment(s)

4) Upload Documents:
   -Correspondences
   -Scan Plot
   -Geolocation Plot
   -Other Forms, Graphs, Analysis, etc
   -Info on Passive Sensors in the Format of REC.ITU-R RS 2106-0

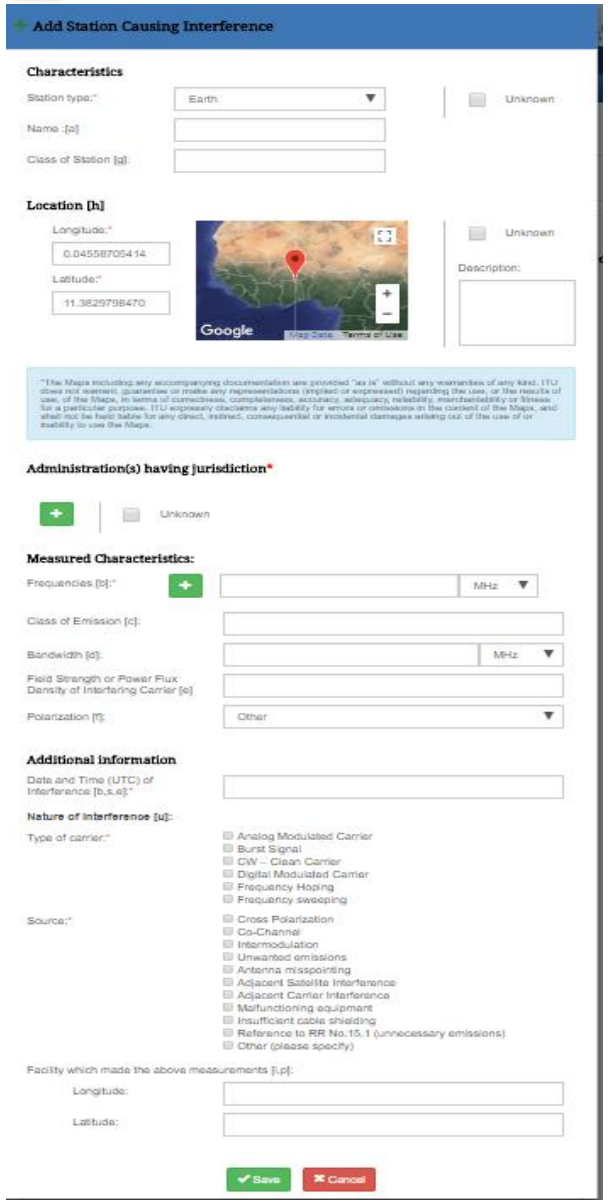




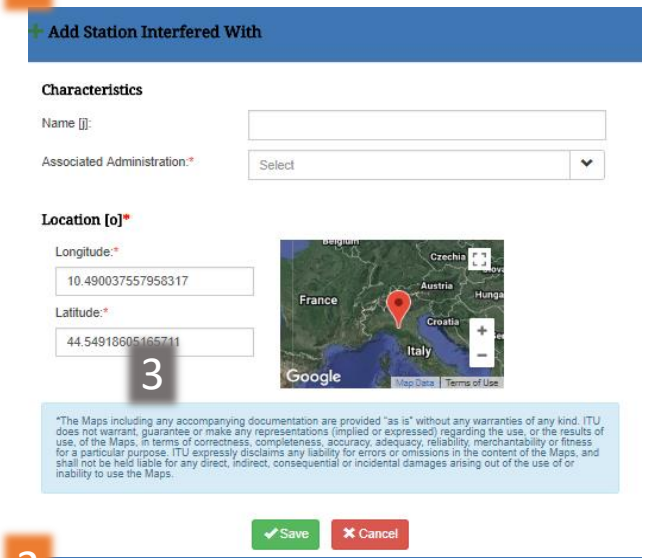
SIRRS-Select Stations, Upload Data, Submit Report

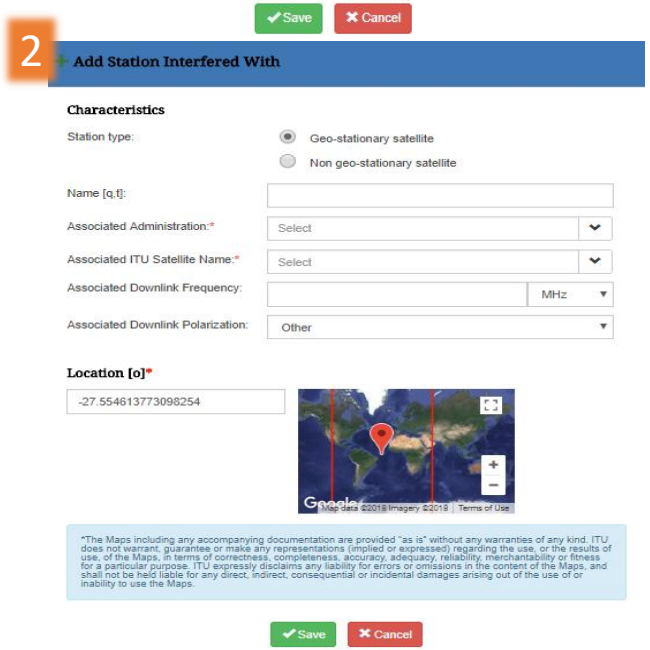
ITUWRS GENEVA2024

1 Interfering Station

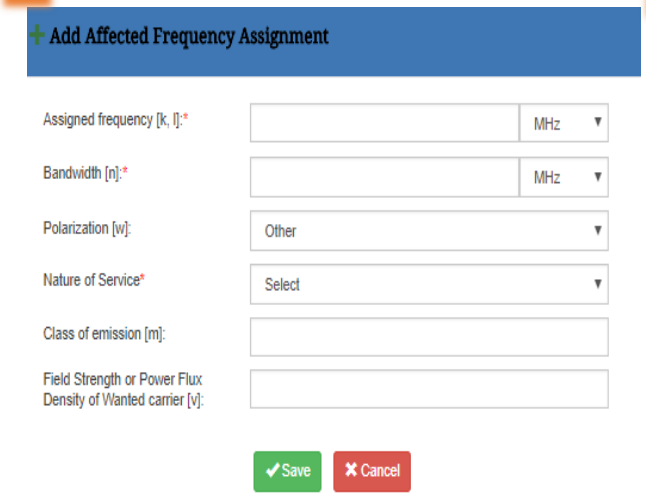


2 Affected Stations





3 Affected Freq. Assignment



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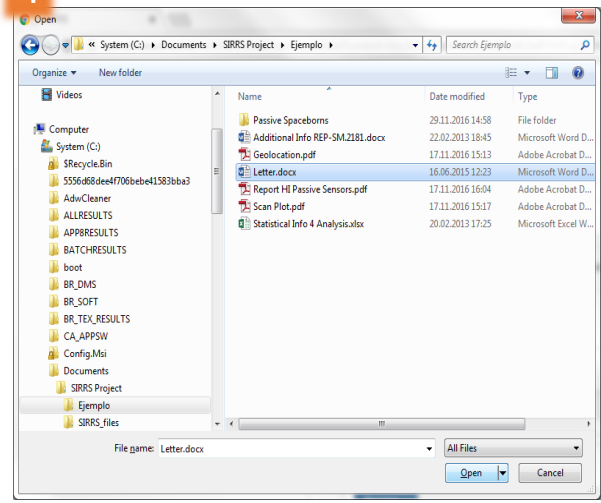
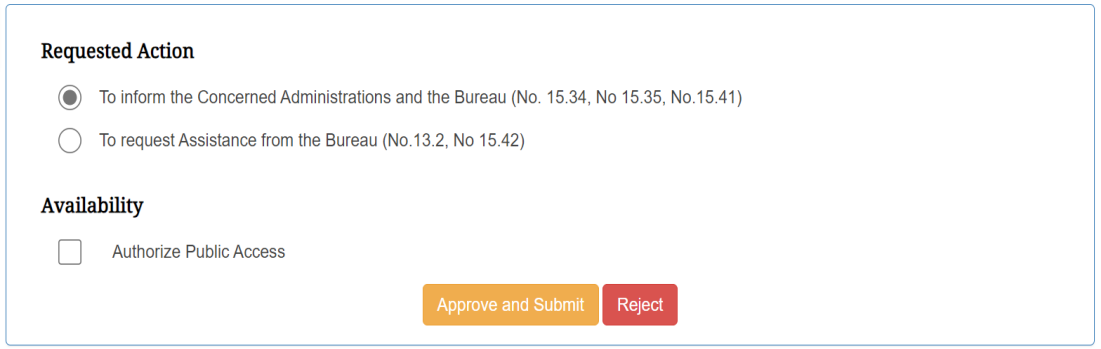


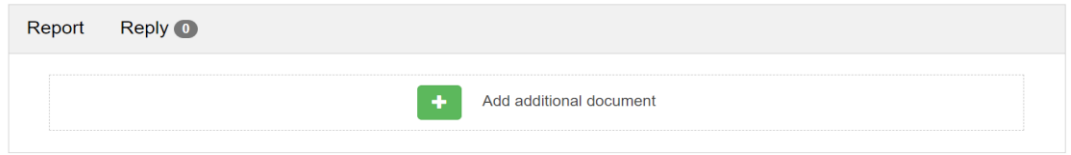
Purpose: BR Information (no BR Action) or Assistance from BR

5



Subsequent updates or Replies : Upload Documents

6



In Summary, we learnt on the need of :

1. Making a Responsible use of Space (spectrum and orbits)
2. Monitoring, Reporting and Cooperating in Interference Resolution
3. Protecting Radio Navigation Satellite Service
4. Using SIRRS