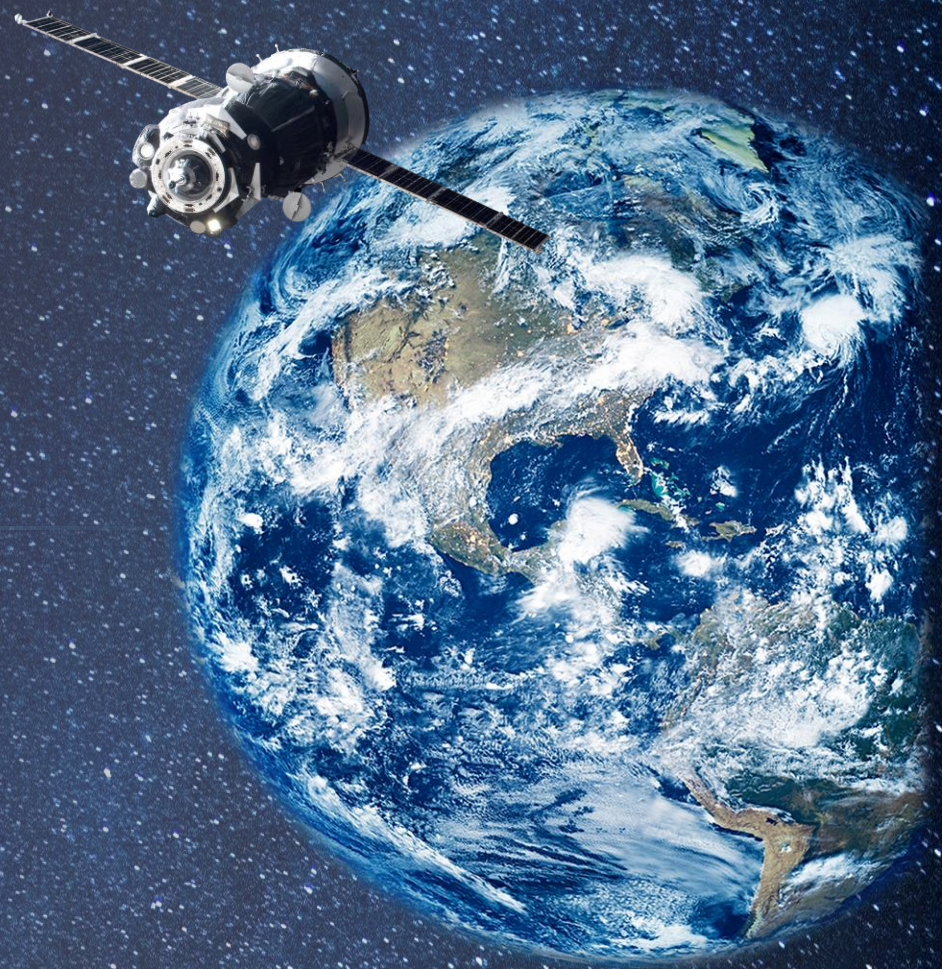
DARK AND QUIET SKIES FOR SCIENCE AND SOCIETY

2025

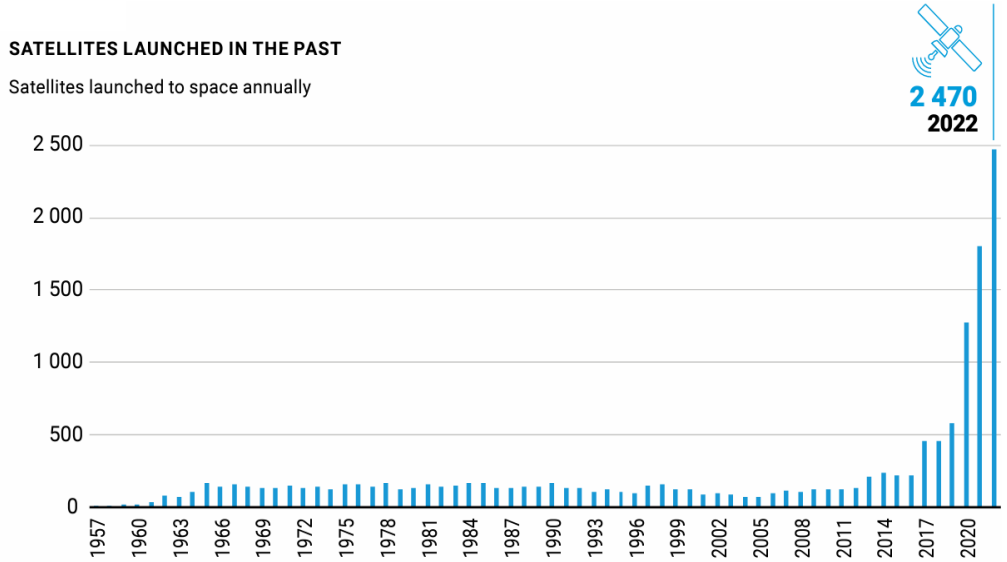
MARIO MANIEWICZ

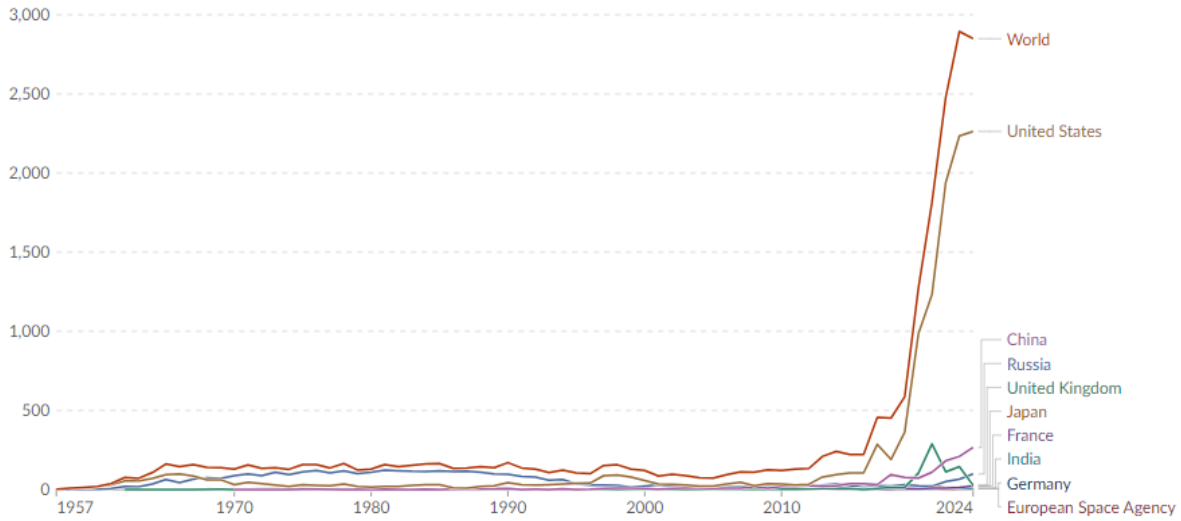
Director of the Radiocommunications Bureau



December 2025

CURRENT SITUATION

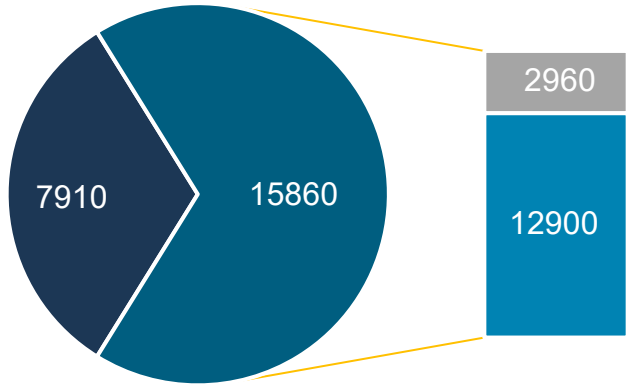




~ 1.7 Mil launches

of non-GEO satellites by 2030

Total of satellites as at Oct 2025



- No longer in space
- In space, non functionning
- In space, still functioning

Data: European Space Agency & UNOOSA

REFLECTED SUNLIGHT

RADIO SIGNALS

About The Itu

Established in **1865**

UN specialized agency for Information and Communication Technology **(ICT)**

Allocation of **global spectrum** and **satellite orbits**

Development of **international regulations** and **technical standards**

194
MEMBER STATES

1000+
PRIVATE SECTOR ORGANIZATIONS

170
ACADEMIA MEMBERS

International Treaties

The Constitution

Basic instrument of the ITU

The Convention

Complements the Constitution

The Administrative Regulations

Radio Regulations

International Telecommunication Regulations

Objectives of the Radio Regulations

Innovation

Enable new technologies through a structured WRC process

Interference-free environment

Enable radiocommunication services operate efficiently and effectively without harmful interference

Legal Stability and global Harmonization

Provide legal stability necessary for investments, facilitate global harmonization, economies of scale and emergency communications

Protection of existing services

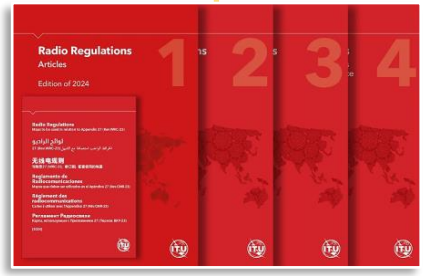
Ensure existing services are protected and can continue operating free from harmful interference

World Radiocommunication Conference

- The Radio Regulations are updated every 4 years during the **World Radiocommunication Conference (WRC)**

- WRC-27 in Shanghai will address several radioastronomy-related issues, including:
  - ✓ Prevention of interference from non-GSO constellations in **Radio Quiet Zones**
  - ✓ Out-of-band emission limits to safeguard **radioastronomy bands**
- WRC-27 will also consider the protection of radioastronomy services on the Earth and in the **Shielded Zone of the Moon**

ITU WRC
WORLD RADIOCOMMUNICATION CONFERENCE

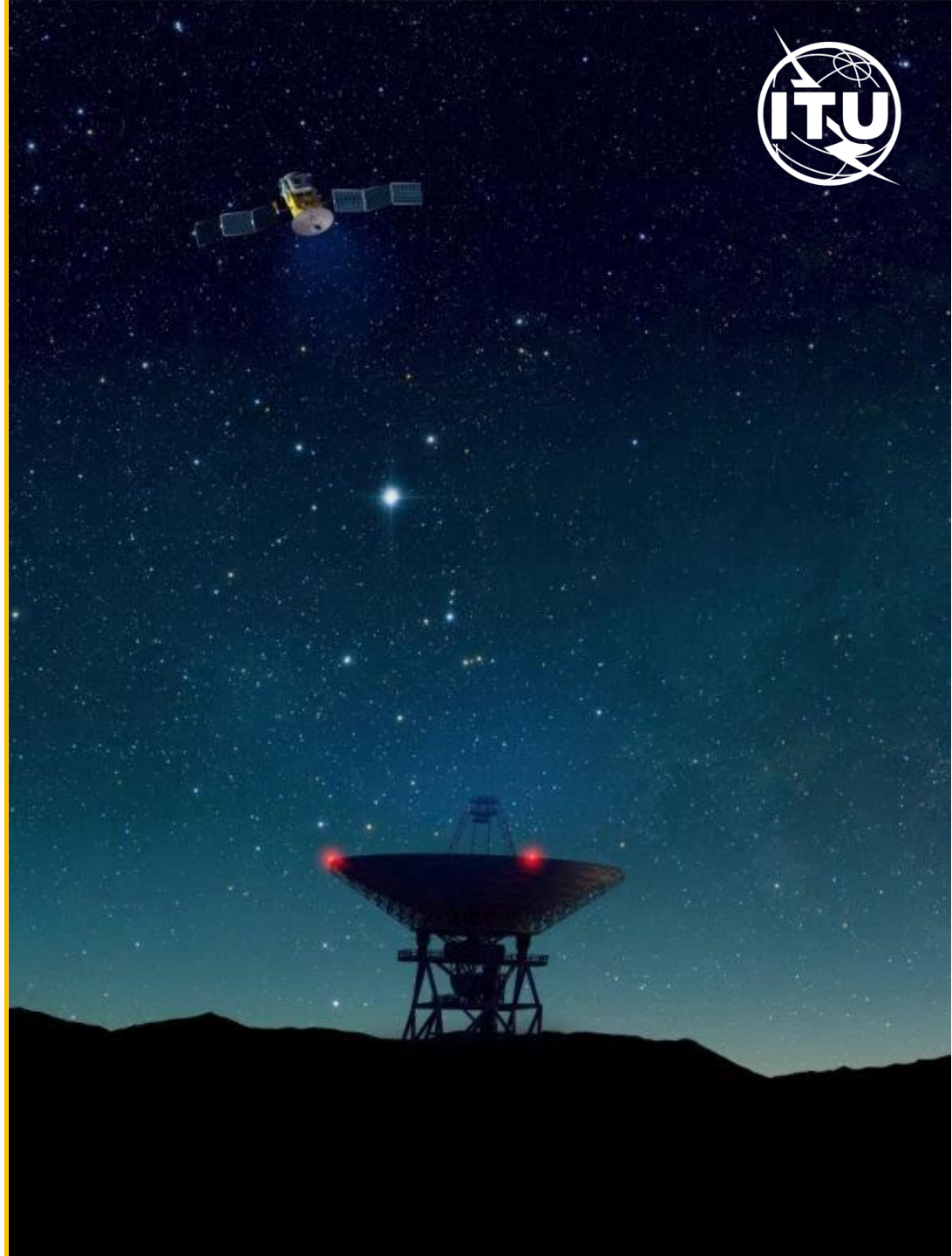


RADIO QUIET ZONES

WRC-27 – AGENDA ITEM 1.16

Protect radio astronomy operating in specific **Radio Quiet Zones** (RQZ) and in frequency bands allocated to the radio astronomy service on a primary basis globally (**Resolution 681**) from **aggregate interference** caused by systems **in the non-GSO satellite orbits** as number of satellite launches increases

WP 7D is developing a working document towards Preliminary Draft New Report **ITU-R RA.[NGSO-RAS-RQZ]** on mitigation techniques to improve data collection quality at Radioastronomy Observatory and coexisting measures between NGSO satellite systems and RAS stations, in the RQZ supporting Square Kilometre Array (SKA) and the Atacama Lage Millimeter/submillimeter Array (ALMA)



EESS(PASSIVE) AND RAS PROTECTION WRC-27 – AGENDA ITEM 1.18

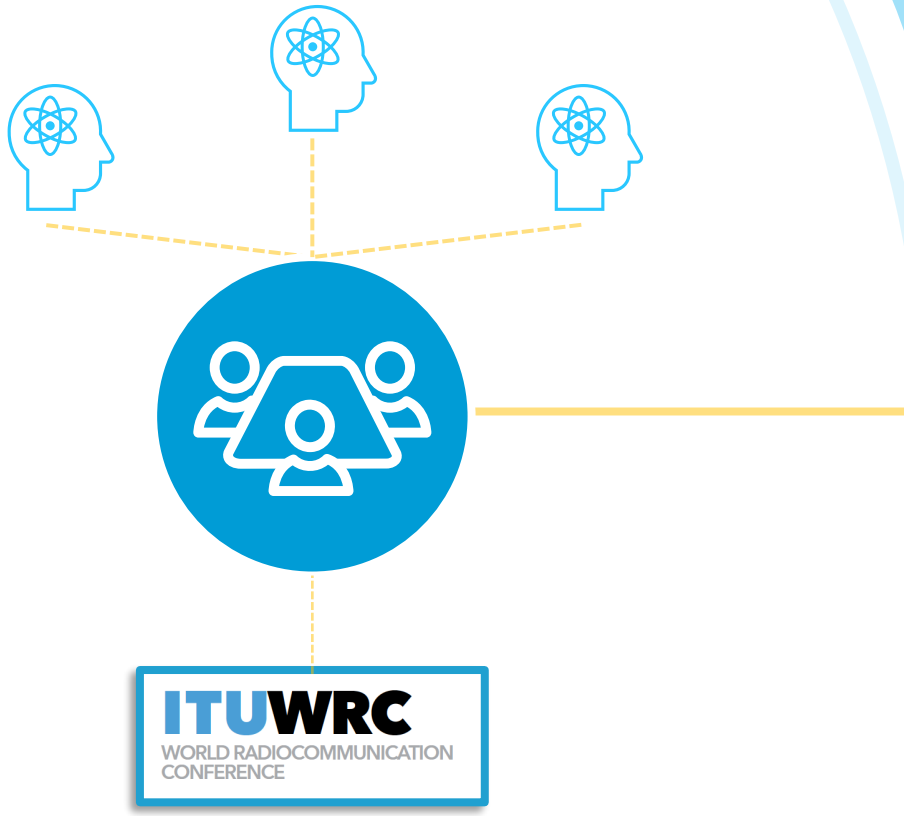
Possible regulatory measures regarding the protection of the **Earth exploration-satellite service** (passive) and the **radio astronomy service** in certain frequency bands **above 76 GHz** from unwanted emissions of active services (**Resolution 712**)

WP 7D is revising Recommendation **ITU R RA.1631**, which provides a reference antenna pattern for the radio astronomy service to be used for compatibility analyses between non-GSO systems and radio astronomy service based on the equivalent power flux-density (epfd) concept, where appropriate, for frequencies up to 275 GHz

WP 7D is also developing a working document towards Preliminary Draft New Report **ITU-R RA.[RAS-SAT 71-235 GHZ]**, which addresses compatibility between the RAS and the active satellite services in the 71 235 GHz range and adjacent and nearby frequency bands

ITU-R Study Groups

- ITU-R Study Groups provide the **technical foundations** for WRC decisions
- **Working Party 7D** leads the study work related to radioastronomy
  - **Contributions remain essential**
  - Studies for WRC-27 must conclude by October 2026



ITU AND SPACE SUSTAINABILITY

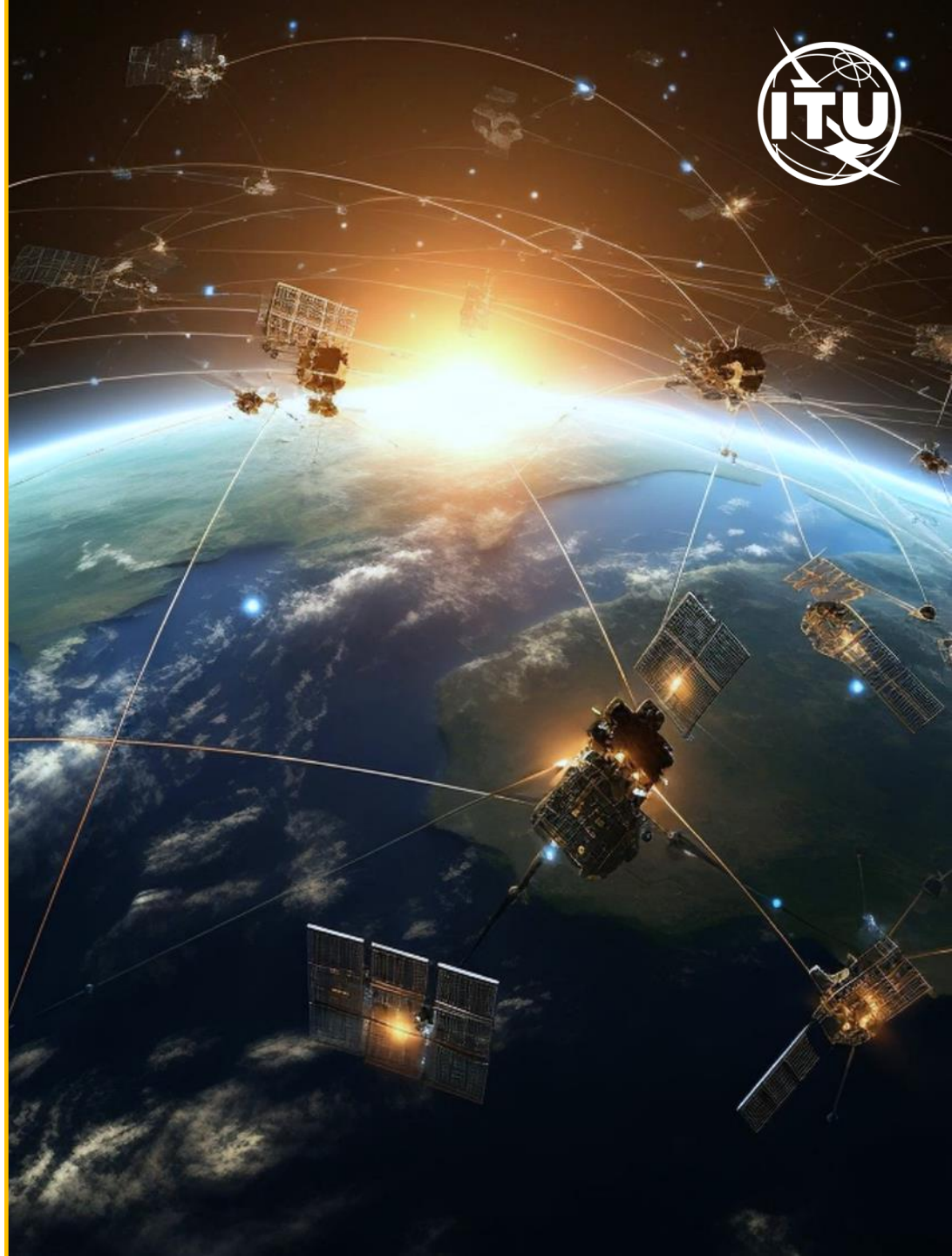
ITU Plenipotentiary Conference (2022):

- **Resolution 218 (Bucharest, 2022)**

  ITU's role in the implementation of the "Space2030" Agenda: space as a driver of sustainable development

- **Resolution 219 (Bucharest, 2022)**

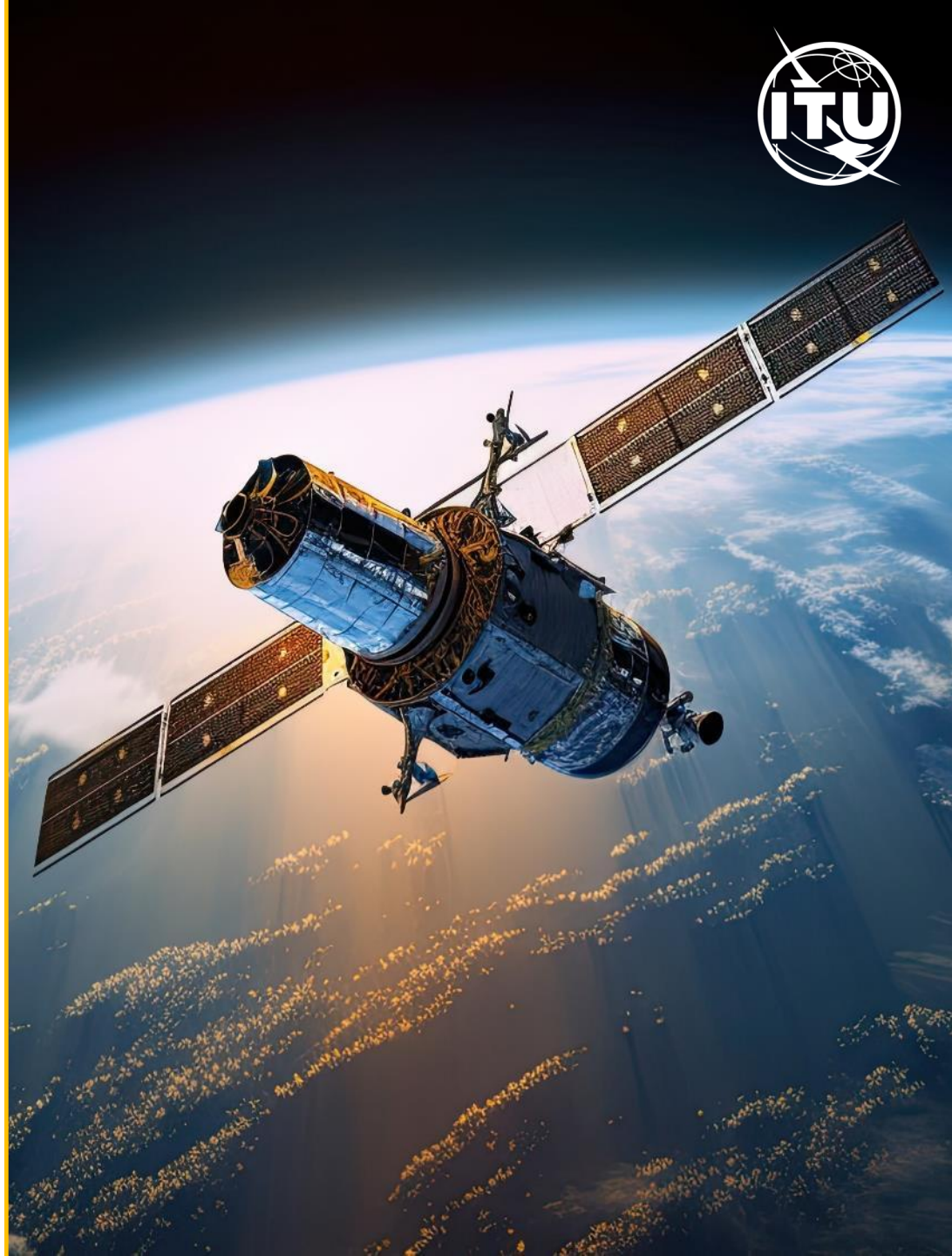
  Sustainability of the radio-frequency spectrum and associated satellite-orbit resources used by space services



ITU AND SPACE SUSTAINABILITY

- **Handbook** - best practices for the sustainable use of frequencies and associated non-GSO orbits by space radiocommunication services
- **Recommendation** - providing guidance on safe and efficient deorbit and/or disposal strategies and methodologies for non-GSO space stations involved in radiocommunication services after the end of their life, focusing on the radio-frequency spectrum and associated satellite-orbit resources used by space services
- **Space Sustainability Gateway -** consolidates best practices and received information **(https://www.itu.int/space-sustainability/)**
- **Space Sustainabilty Forum**

  (https://www.itu.int/ssf/)



COLLABORATION WITH UNOOSA AND COPUOS

- Cooperation and collaboration with UNOOSA and COPUOS is crucial to **ensure coherent UN action** on Dark and Quiet Skies
- ITU-R experts actively contribute to **UNOOSA workshops and COPUOS sessions**
- **More on ITU-COPUOS coordination** in the dedicated panel discussion

UNOOSA
COPUOS

UNITED NATIONS
Office for Outer Space Affairs

THANK YOU!

MARIO MANIEWICZ

Director of the Radiocommunications Bureau

December 2025