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Radio Spectrum & Use of Associated Orbits for Space Services

International Telecommunication Union

New Space Economy

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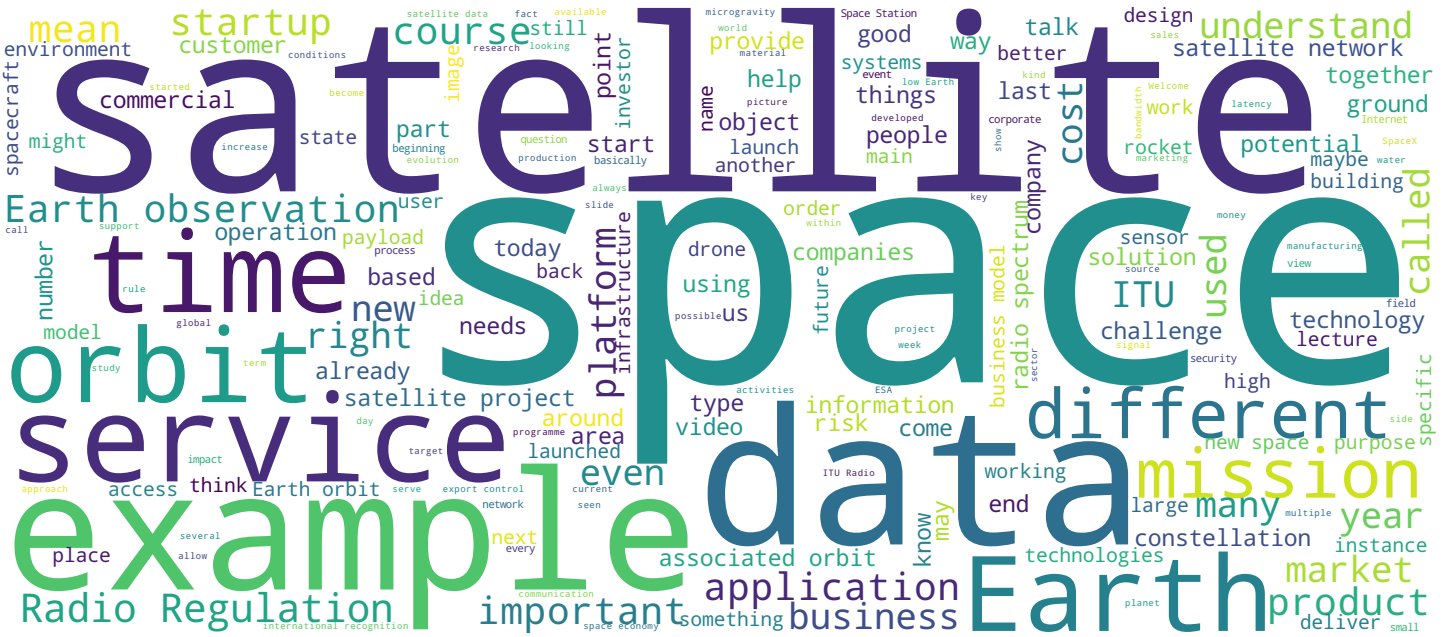

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Video

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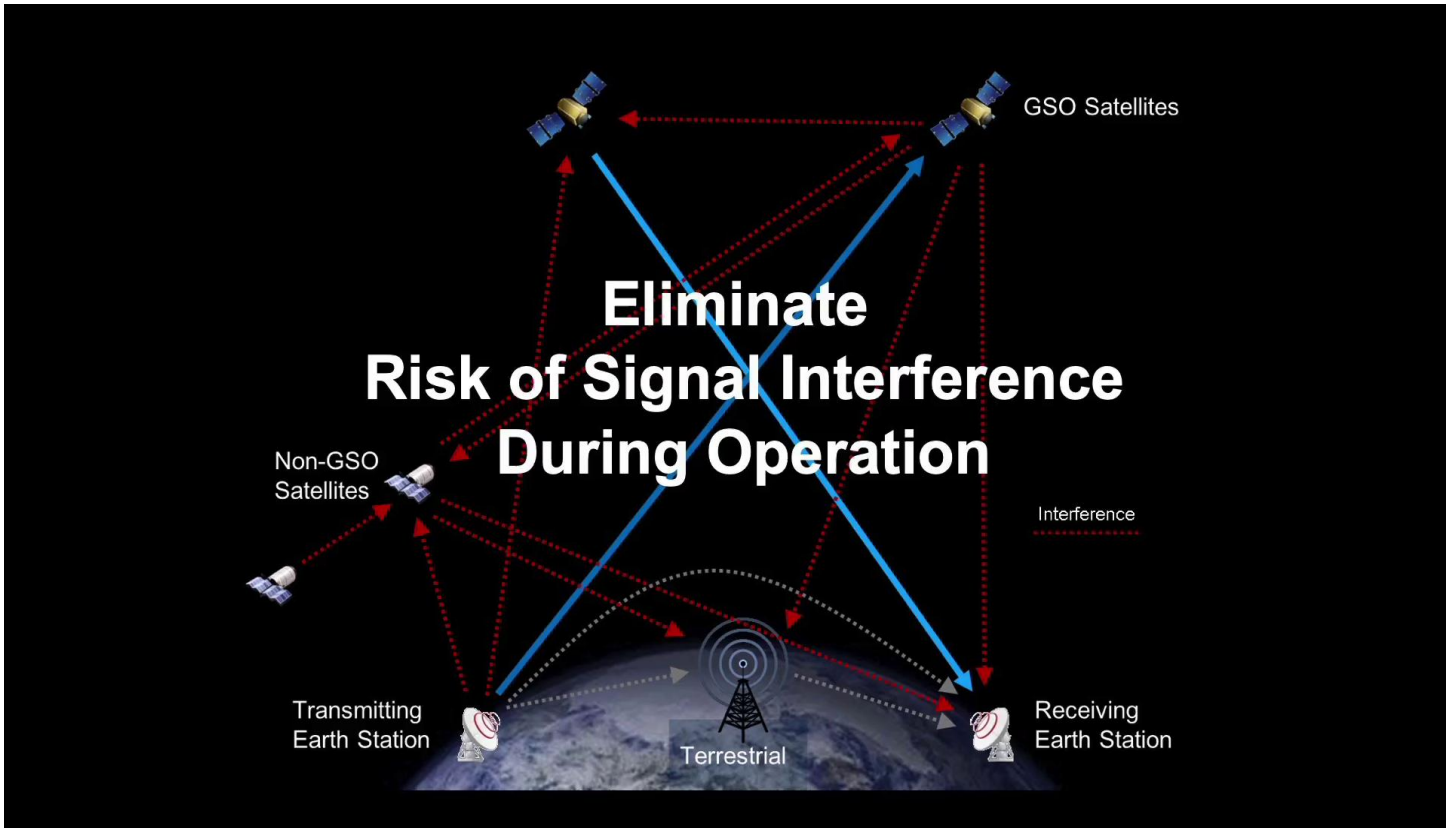
ITU and obtaining the international recognition to use the radio spectrum and associated orbits

Welcome to this video. My name is Veronique Glaude, and I'm Senior Space Radio Regulation Expert at the International Telecommunication Union in Geneva, Switzerland. In this video I will speak about ITU, and obtaining the international recognition to use radio spectrum and associated orbits. When we have a project in space, we think that we will have no limits. However, satellites must communicate with the Earth and use the radio spectrum from an orbital position, which are two limited natural resources. They are used on a global scale, and they must be shared efficiently among all the needs of various radio regulations, from broadcasting, to the Internet, to radio astronomy or Earth observation. Indeed, space is large enough for all operations only through effective cooperation and elaborate international regulations.

Notes

Summary

0m 05s



In practice, transmissions from different locations on Earth and from different altitudes in space can create interference between signals coming from all directions. These risks must be anticipated from the beginning of the design of a satellite project to ensure interference-free operations once launched into orbit. To this end, the radio spectrum can be first divided and allocated to different radio services. Then, by publicly recording antenna directions and parameters, linked characteristics can be calculated to identify acceptable interference levels based on limits consensually agreed. And finally, operators can coordinate to adjust parameters and make the satellite system compatible. This is what the ITU Radio Regulations are intended to do.

Notes

Summary

1m 11s

TODAY

40 Radio Services: Terrestrial, Maritime, Space

2 natural limited resources:

Spectrum: 8.3 kHz to 3'000 GHz

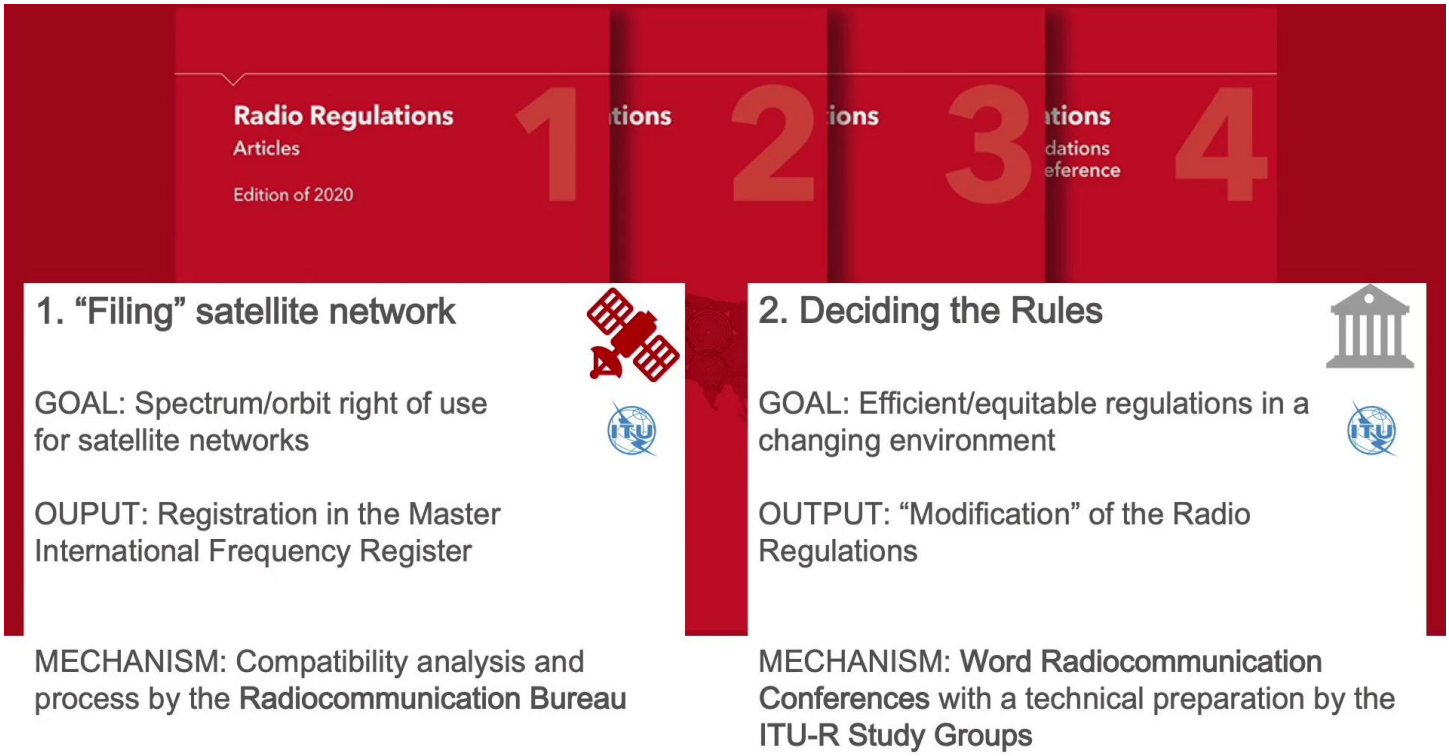
Use of associated GSO and other orbits

The ITU Radio Regulations are an evolving international treaty that governs two limited natural resources: the radio frequency spectrum since 1906, and the associated orbits since 1963, which is the beginning of the commercial use of satellite transmissions shortly after the first Sputnik launch. With the evolution of operational needs, the Radio Regulations now contain 40 radio services for space, but also for terrestrial transmissions, including 5G and maritime transmissions. Until recently, the activity for space services was mainly related to the geostationary satellites. But since 2015 and the constellations projects and the CubeSat development, the use of non-geostationary orbits are more present.

Notes

Summary

2m 14s



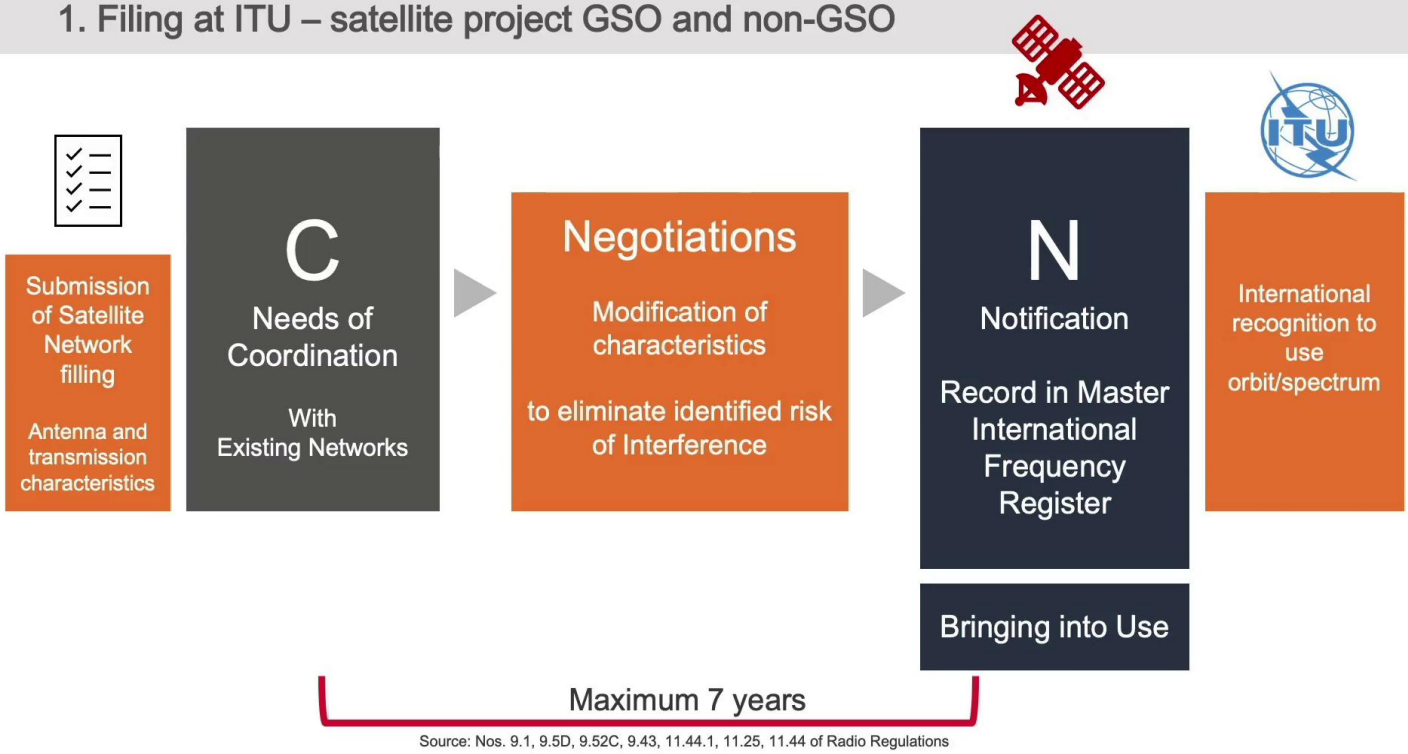
There are two main activities around the Radio Regulations in the ITU: filing satellite network, and deciding the rules. What does "filing satellite network" mean? Through the administration, operators submit the characteristics of the satellite project in a file to the ITU. Then, the ITU Radio Communication Bureau examines the compatibility analysis of a satellite project in accordance with the regulations in view of an entry in the Frequency International Master Register. This registration is important to maintain the recognition of the right to use the spectrum and the associated orbits free of harmful interference. What does it mean to decide the rules? It is the mechanism of the World Radiocommunication Conferences and study groups to amend the treaty in an evolving context. Now, let's look at these two activities in practice.

Notes

Summary

3m 14s

1. Filing at ITU – satellite project GSO and non-GSO



Source: Nos. 9.1, 9.5D, 9.52C, 9.43, 11.44.1, 11.25, 11.44 of Radio Regulations

The process of filing at ITU consists of two main phases: the coordination phase, in which the Bureau examines the notice of the satellite network submitted in accordance with the Radio Regulations, and publishes the result of the coordination requirements with all the previously submitted networks. Then, after the phase of negotiations and adjustment of the parameters of the satellite project to eliminate the risk of interference, it is the notification phase. The Bureau checks the final characteristics submitted and records the satellite network in the Master International Frequency Register. The satellite can be launched and operated with the international recognitions to use the radio spectrum and the associated orbit.

Notes

Summary

4m 24s

The International Telecommunication Union

The United Nations specialized agency for information and communication technologies (ICTs)

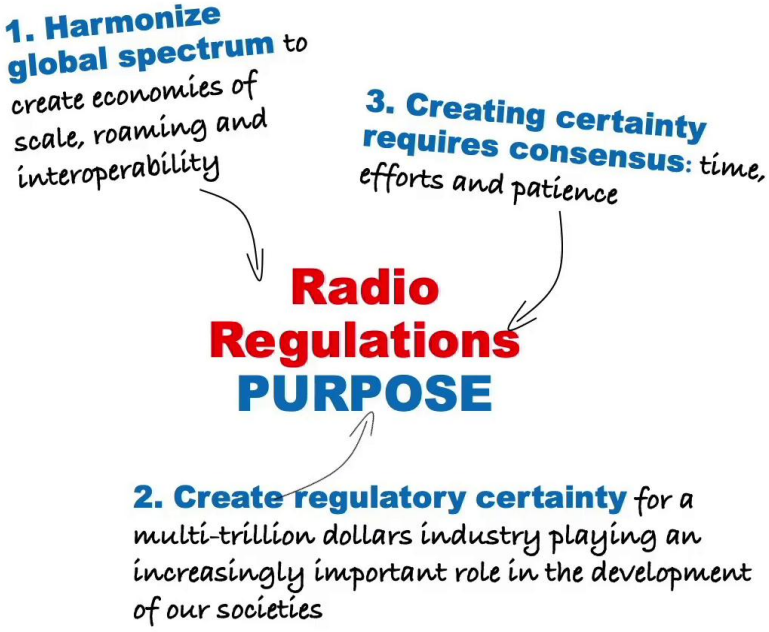
The World Radio Communication Conference Mechanism

The International Telecommunication Union is a United Nations specialised agency for ICT. It provides its members a forum to discuss ICT issues. The ITU is established as a federation of three bureau: Development, Standardisation, and Radiocommunications. It is the Radiocommunication Bureau that serves as the secretariat of the Radio Regulations and the ITUR sector. The members of the ITU are not only states. Different rights for different categories of members exist, including the private sector and academia. There are also observers. The headquarters is in Geneva, Switzerland, and has 750 employees with regional offices. The ITU is also the place where the evolution of this treaty is decided by consensus among member states. This is achieved through an elaborated mechanism of conferences and study groups that closely follow the needs of evolving technologies, while protecting existing technologies. All stakeholders can participate in the study of the treaty amendments.

Notes

Summary

5m 22s



To summarise the purpose of the Radio Regulations and its importance in a satellite project, we can say that the effort to harmonise the use of the spectrum allows to consider satellite projects with an interoperability worldwide. The certainty of an international regulation brings security for ambitious and costly satellite investments. However, this consensus mechanism may seem long: four years between two conferences. But it requires necessary efforts and rewarding patience during the negotiations.

Notes

Summary

6m 49s

ITU and obtaining the international recognition to use the radio spectrum and associated orbits

> *Satellite technologies are more and more diverse and pervasive but they all rely on the same core element: the availability of radio frequencies that can be operated free from harmful interference.*
>
> - *Mario Maniewicz, Director of the ITU Radiocommunication Bureau*

I would like to conclude this presentation about the ITU and obtaining the international recognition to use radio spectrum and associated orbits with a quote from our Director, Mr. Mario Maniewicz. "Satellite technologies are more and more diverse and pervasive, but they all rely on the same core element: the availability of radio frequencies that can be operated free from harmful interference." Never hesitate to contact ITU to receive assistance or to become a member.

Notes

Summary

7m 32s

Thank you.

Notes

Summary

8m 10s