Chapter: One
Service: Fixed Satellite Service (FSS) and Broadcasting Satellite Service (BSS)
Agenda Item: 1.5
Description of the Agenda Item: Considers regulatory measures and the implementability thereof, to limit the unauthorized operations of non-geostationary-satellite orbit (non-GSO) earth stations in the fixed-satellite service (FSS) and mobile-satellite service (MSS), in accordance with Resolution 14 (WRC-23).

Focus: Development of regulatory and technical measures to prevent unauthorized operation of non-GSO FSS and MSS earth stations and to address issues related to inclusion and exclusion of administrations from the service area of non-GSO satellite systems.

Status of Studies

Studies under Agenda Item 1.5 are being conducted primarily within ITU-R Working Party 4A. The studies are examining both regulatory and technical mechanisms that could assist administrations in controlling unauthorized operation of non-GSO earth stations within their territories while respecting the sovereign right of administrations to authorize or prohibit satellite services.

Current studies are focusing on:

i. Measures to prevent operation of non-GSO earth stations in territories where authorization has not been granted.
ii. Responsibilities of notifying administrations and satellite operators.
iii. Capabilities and functionalities of Network Control and Monitoring Centres (NCMC).
iv. Geolocation, geofencing and remote deactivation techniques.
v. Procedures for reporting and resolving cases of unauthorized operation.
vi. Regulatory provisions related to inclusion and exclusion of administrations from the service area of non-GSO satellite systems.
vii. Potential modifications to Articles 9, 11 and 18 of the Radio Regulations.

Several draft methods and regulatory approaches remain under discussion and no final agreement has yet been reached.

Objective of the Studies

The studies seek to address concerns arising from the rapid deployment of large non-GSO satellite constellations and the increasing availability of user terminals capable of operating across national borders.
The objective is to:

i. Protect the sovereign right of administrations to authorize the operation of satellite earth stations within their territories.
ii. Prevent unauthorized operation of non-GSO FSS and MSS terminals.

iii. Improve compliance with Article 18, Res 22 and Res 25 of the Radio Regulations.
iv. Establish clear responsibilities for administrations involved in the notification and operation of non-GSO systems.
v. Develop practical technical mechanisms capable of identifying and disabling unauthorized terminals.
vi. Clarify procedures relating to inclusion and exclusion of territories from the service area of non-GSO satellite systems.

Existing Regulatory Framework

Several provisions in the Radio Regulations already address authorization of earth stations:

i. Article 18 of the Radio Regulations requires transmitting stations to be licensed by the relevant administration.
ii. RR No. 18.1 stipulates that no transmitting station may operate without authorization from the administration concerned.
iii. Resolution 22 (Rev. WRC-23) requires operation of transmitting earth stations only when authorized by the administration concerned.
iv. Resolution 25 (Rev. WRC-23) requires global satellite systems to ensure operation only within territories where authorization has been granted.

However, studies have identified limitations in the implementation and enforcement of these provisions for modern non-GSO satellite systems.

Methods to Satisfy the Agenda Item

Several methods are under consideration.

Method A – No Change
Maintains the existing provisions of the Radio Regulations and concludes that current Articles and Resolutions provide sufficient authority to address unauthorized earth station operations.

Method B
Introduces a new WRC Resolution establishing regulatory and technical measures to prevent unauthorized operation of non-GSO earth stations.
This method includes:

- Designation of a responsible administration.
- Mandatory use of NCMC functionality.
- Geolocation and remote deactivation capabilities.
- Reporting and enforcement procedures.
- Requirements for disabling unauthorized terminals.

Method C
Introduces new provisions in Articles 9 and 11 related to inclusion and exclusion of territories from the service area of non-GSO systems and establishes associated notification procedures.

Method D
Modifies Article 18 and updates Resolutions 22 and 25 to strengthen responsibilities of notifying administrations and satellite operators in addressing unauthorized operations.

Regulatory and Technical Framework

The studies have identified several technical mechanisms that could assist in limiting unauthorized operations:

i. **Geofencing**
Earth stations determine their location and compare it with authorized and unauthorized operating zones. Transmission is automatically disabled when the terminal enters an unauthorized area.

ii. **Geolocation**
Earth stations determine their geographic position and provide location information to the NCMC to verify authorization status.

iii. **Remote Deactivation**
Satellite operators can remotely disable terminals operating in unauthorized territories.

iv. **Network Control and Monitoring Centre (NCMC)**
The NCMC is proposed as the primary operational mechanism for monitoring and controlling earth station activities.
The NCMC would be capable of:

- Monitoring earth station operations.
- Determining terminal geographic location.
- Maintaining records of authorized and unauthorized operating areas.
- Controlling transmission parameters.
- Blocking access to the satellite system.
- Enabling or disabling earth station transmissions.

The studies also define minimum requirements for earth stations, including geolocation capability, interaction with the NCMC, remote control functionality and the ability to cease transmissions when required.

Service Area Issues

The studies distinguish between:
Service Area: An area including airspace and national waters where a satellite system is authorized to operate and where associated ES are expected to operate

Coverage Area: An area where the satellite signal physically reaches, defined by antenna characteristics and transmission power.

A key issue under study is whether administrations should have the ability to request the exclusion of their territories from the service area of a non-GSO satellite system.

Proposals under consideration would:

i. Allow administrations to object to inclusion of their territory in a service area.

ii. Require the Bureau to update service area information.
iii. Require operators to cease operations in excluded territories.
iv. Establish procedures for later inclusion of territories if requested by administrations.

Technical and Regulatory Challenges

Several challenges remain under discussion:

Regulatory Challenges

i. Limited enforcement mechanisms for unauthorized operations.
ii. Disconnect between ITU satellite filings and national licensing processes.
iii. Lack of harmonized procedures across administrations.
iv. Uncertainty regarding responsibilities when multiple administrations are involved in a satellite filing.

Technical Challenges

i. Feasibility of geofencing for all satellite systems.
ii. Accuracy of geolocation techniques.
iii. Implementation of NCMC functionality for small satellite systems.
iv. Management of cross-border and roaming terminals.
v. Maintaining continuity of safety-of-life communications while restricting unauthorized operations.

Conclusion

Agenda Item 1.5 seeks to strengthen the regulatory framework governing the operation of non-GSO FSS and MSS earth stations. The studies aim to provide administrations with practical tools to prevent unauthorized operations while preserving the benefits of global satellite connectivity.

The discussions are focusing on technical measures such as geolocation, geofencing, remote deactivation and NCMC functionality, as well as new regulatory provisions relating to service areas and responsibilities of administrations. The outcome of these studies may significantly influence how future non-GSO satellite systems are authorized, monitored and controlled at the national and international levels.