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INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

ICAO WRC-27 Preparatory Workshop

Agenda item 1.5 :

To consider regulatory measures, and implementability thereof, to limit the unauthorized operations of non-geostationary-satellite orbit Earth stations in the fixed-satellite and mobile-satellite services and associated issues related to the service area of non-geostationary-satellite orbit satellite systems in the fixed-satellite and mobile-satellite services, in accordance with Resolution 14 (WRC-23).

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Workshop on ITU World Radiocommunication Conference 2027
(WRC-27 Workshop)
(Bangkok, Thailand, 24-25 February 2025)

Presentation Overview

01 **Background**

02 **Potential Issues**

03 **ICAO Position**

04 **Conclusion**

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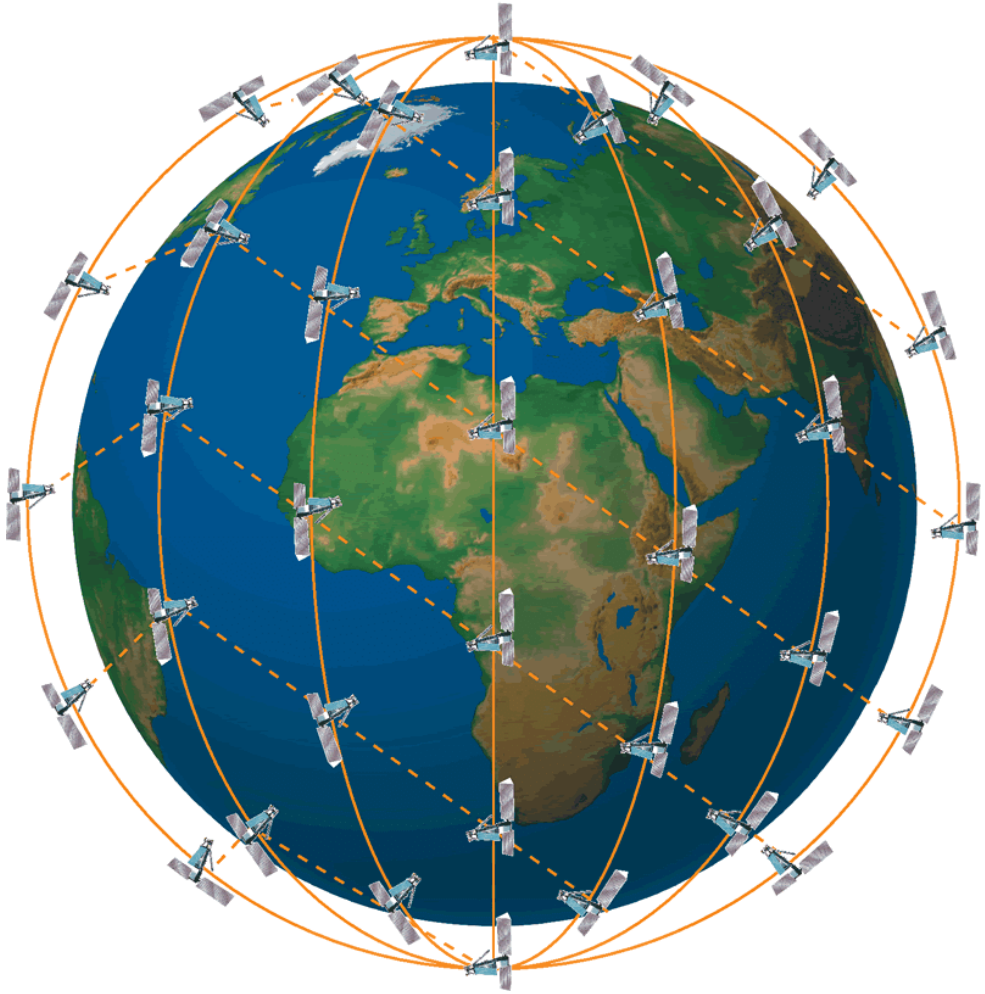
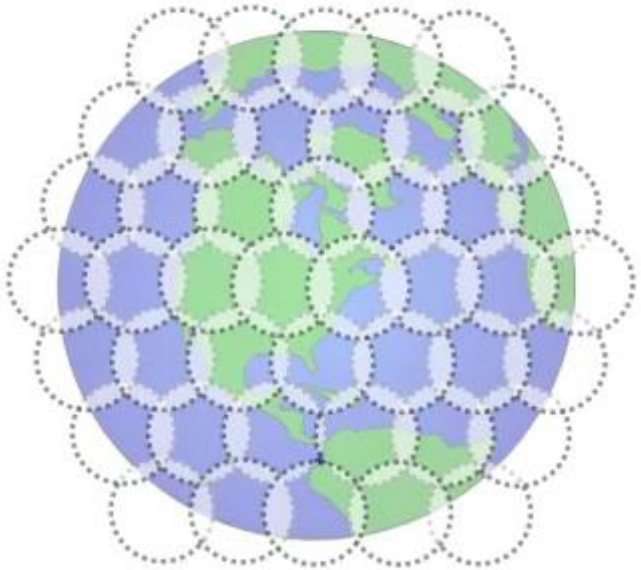
Background

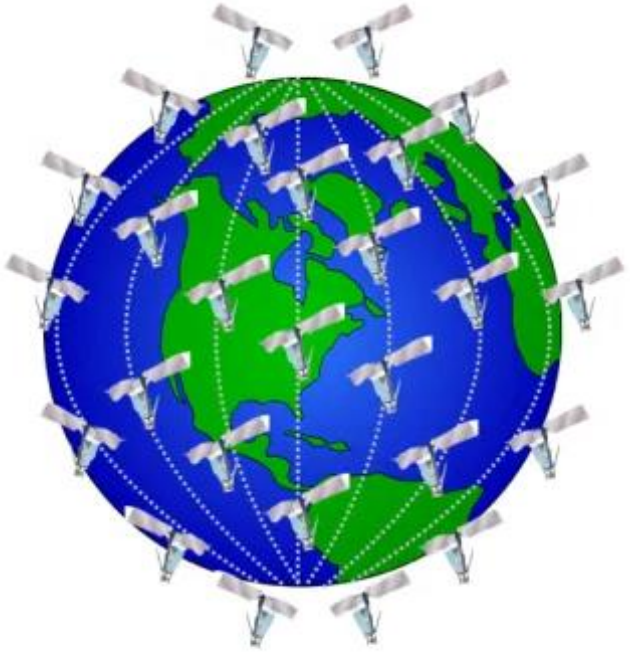
Non-geostationary-satellite

NGSO, or non-geostationary satellite orbit, refers to those satellites which occupy either a low-earth orbit (LEO) or medium-earth orbit. (MEO). Unlike geostationary (GSO) satellites, LEO (and MEO) satellites do not occupy a stationary position but **move** in relation to the Earth





Leo Satellite Footprints



Leo Satellite Orbits

Background

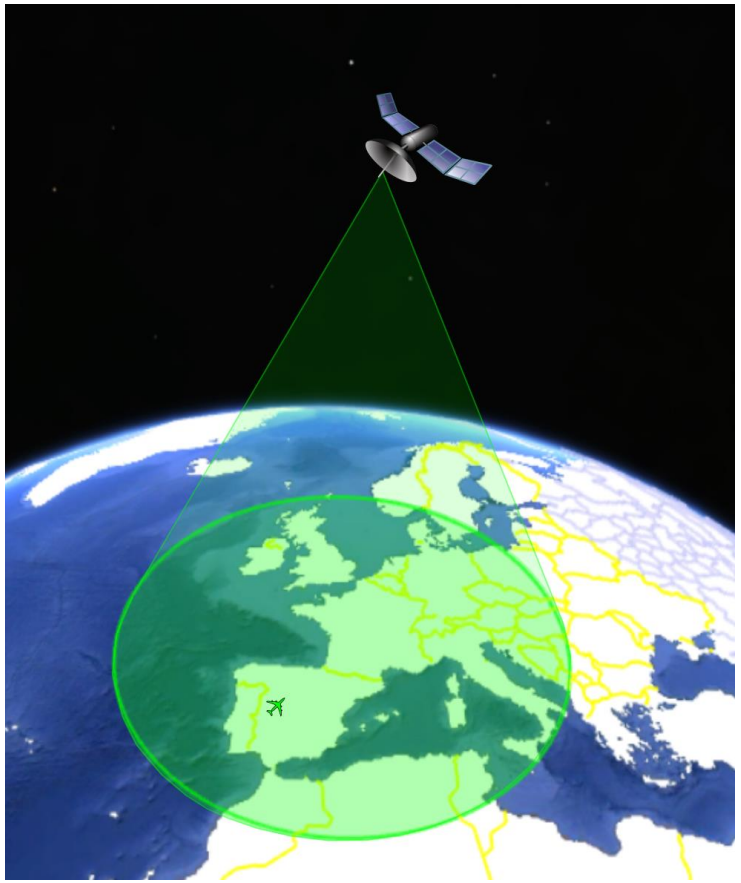
global coverage with MEO/LEO satellite

The footprint(s) of NGSO satellites evolve(s) according to the satellite's trajectory.

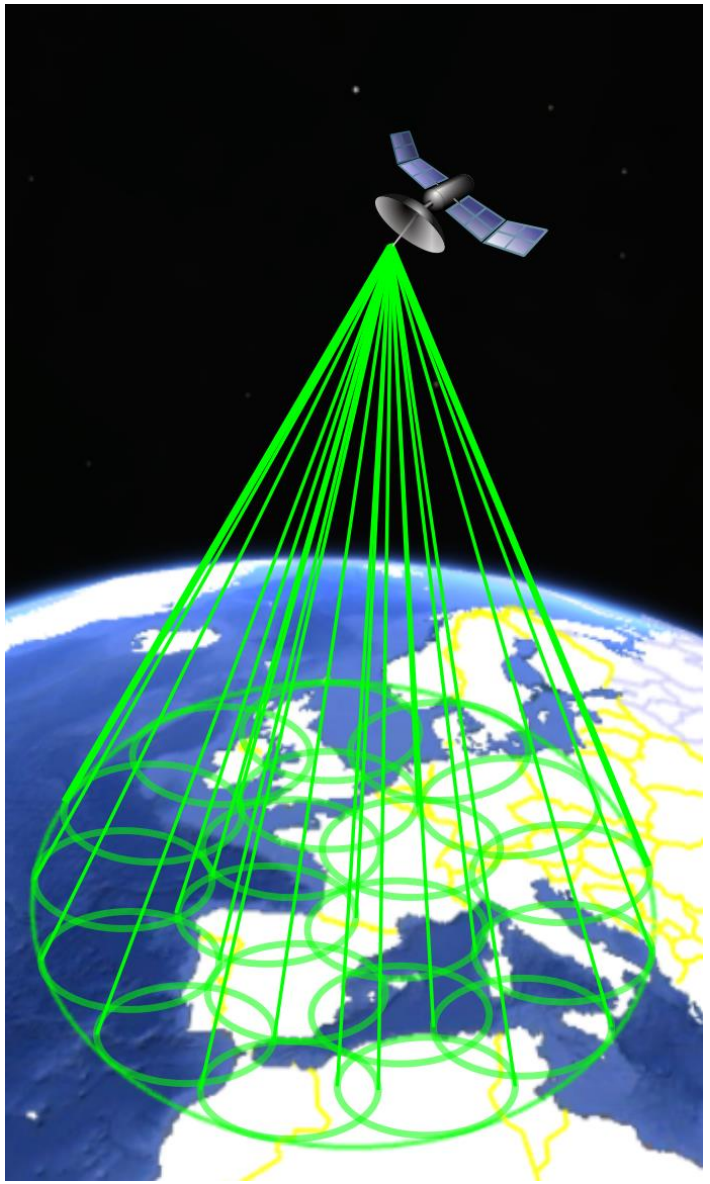
Background

Shape of the footprint of a Leo/Meo satellite

Single beam



Multibeam



Background

Non-Geostationary-Satellite Orbit Earth Stations

NGSO-ES

ADS-B 1090ES

Space VHF

C2 via Sat

Satcom

Terminal

STARLINK OneWeb amazon | project kuiper

RR N° 1.63 **earth station:** A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

– with one or more space stations; or

– with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

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Background

Unauthorized operations of NGSO-ES

Terminal

STARLINK OneWeb amazon | project kuiper

Space VHF	ADS-B 1090ES
Satcom	C2 via Sat

Unauthorized operations means that an administration did not allow from an Earth station (terminal) located over its territory to communicate with the satellite.

Example of measures preventing unauthorized operations:

- By prohibiting communications from the ground to a satellite or from an aircraft to a satellite. The terminal's geolocation in a given area will block transmissions and reception.

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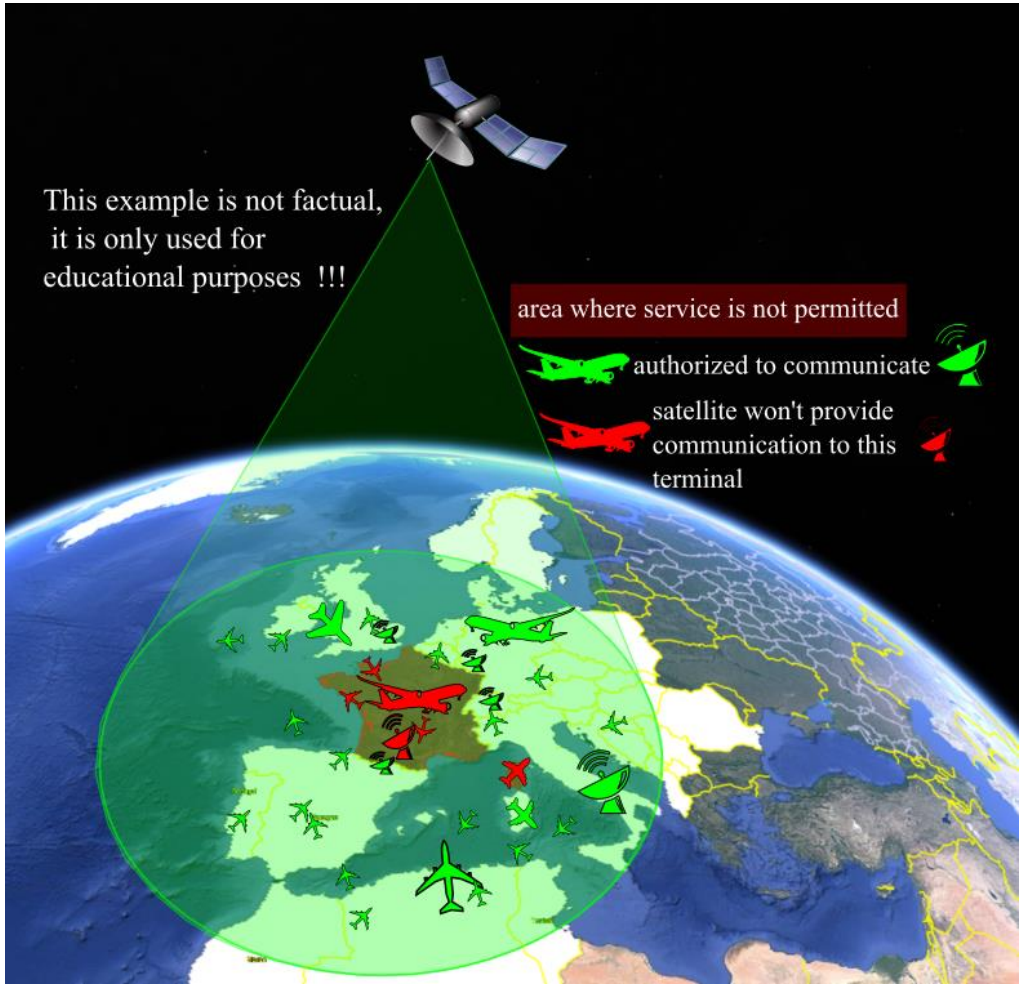
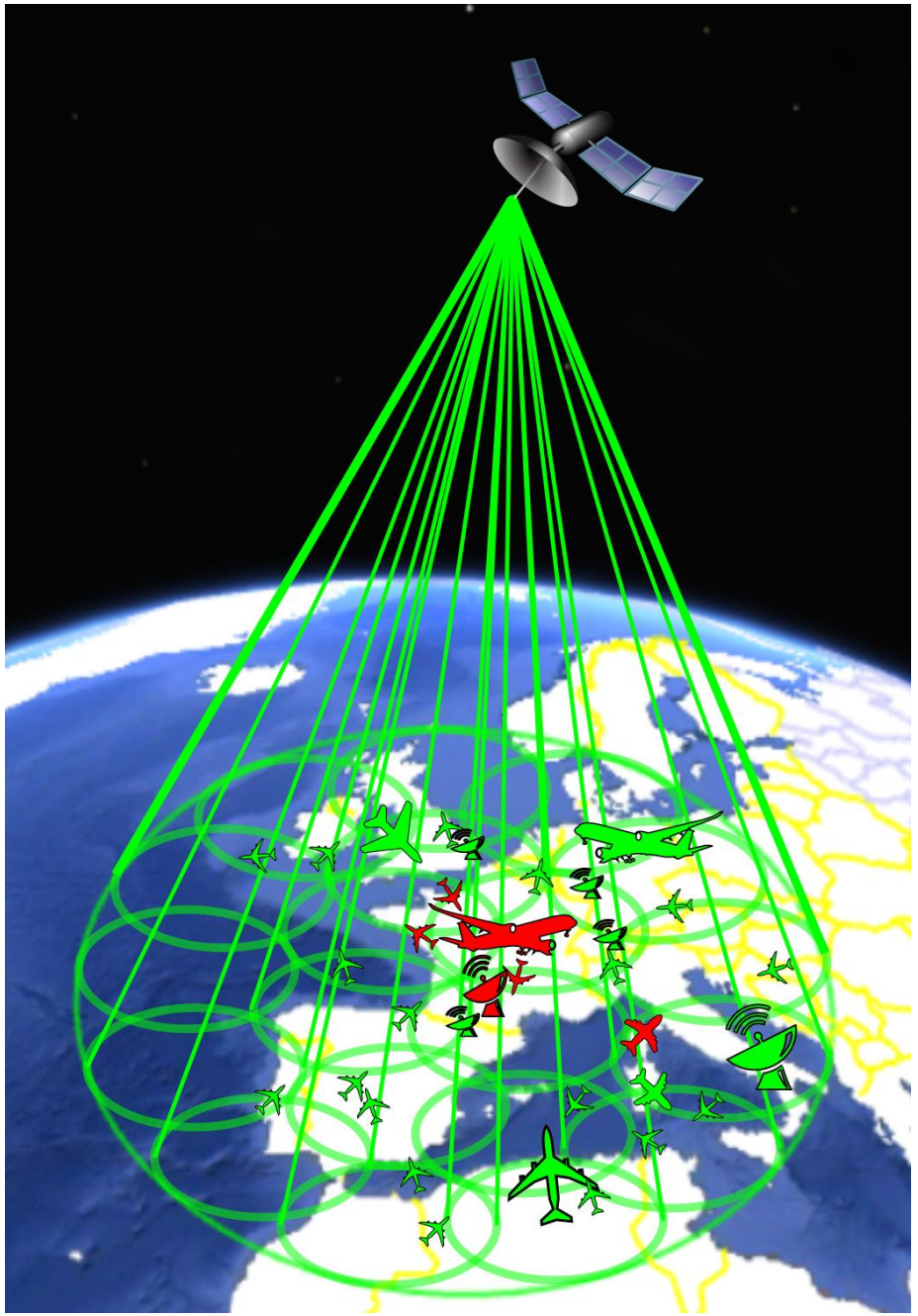
How to limit Unauthorized operations of NGSO-ES, example 1

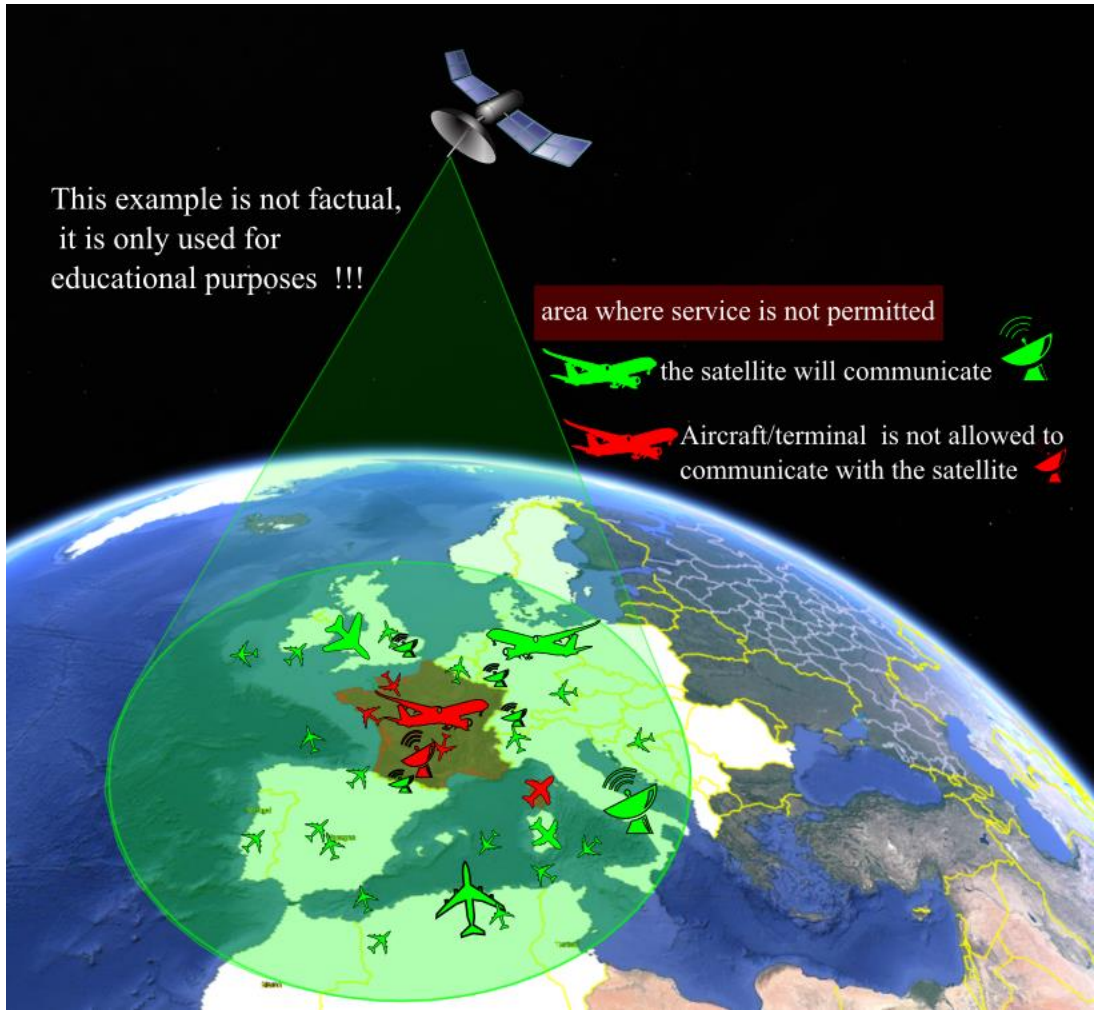
By prohibiting communications from the satellite with terminals located in a given area.

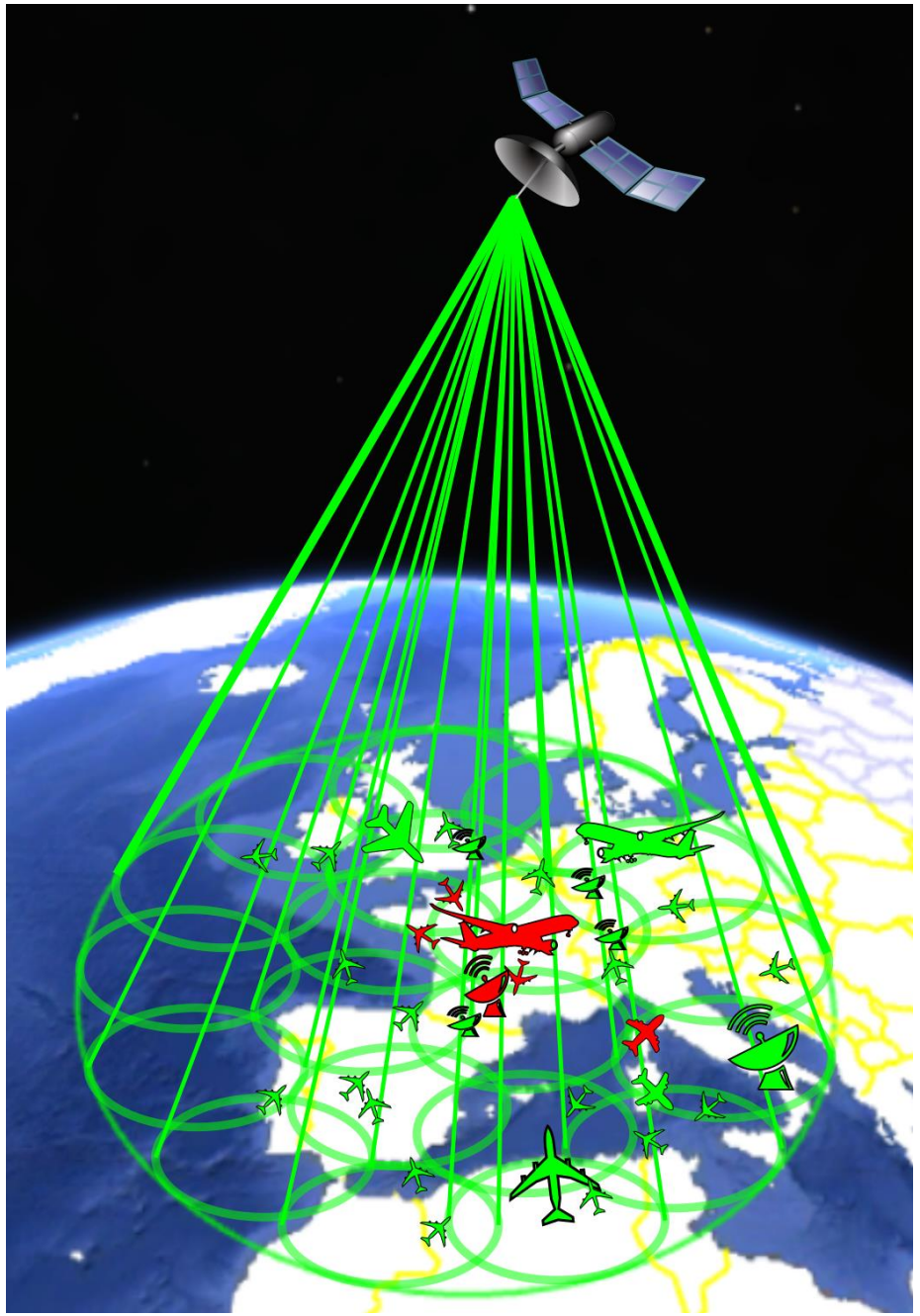




How to limit Unauthorized operations of NGSO-ES, example 2

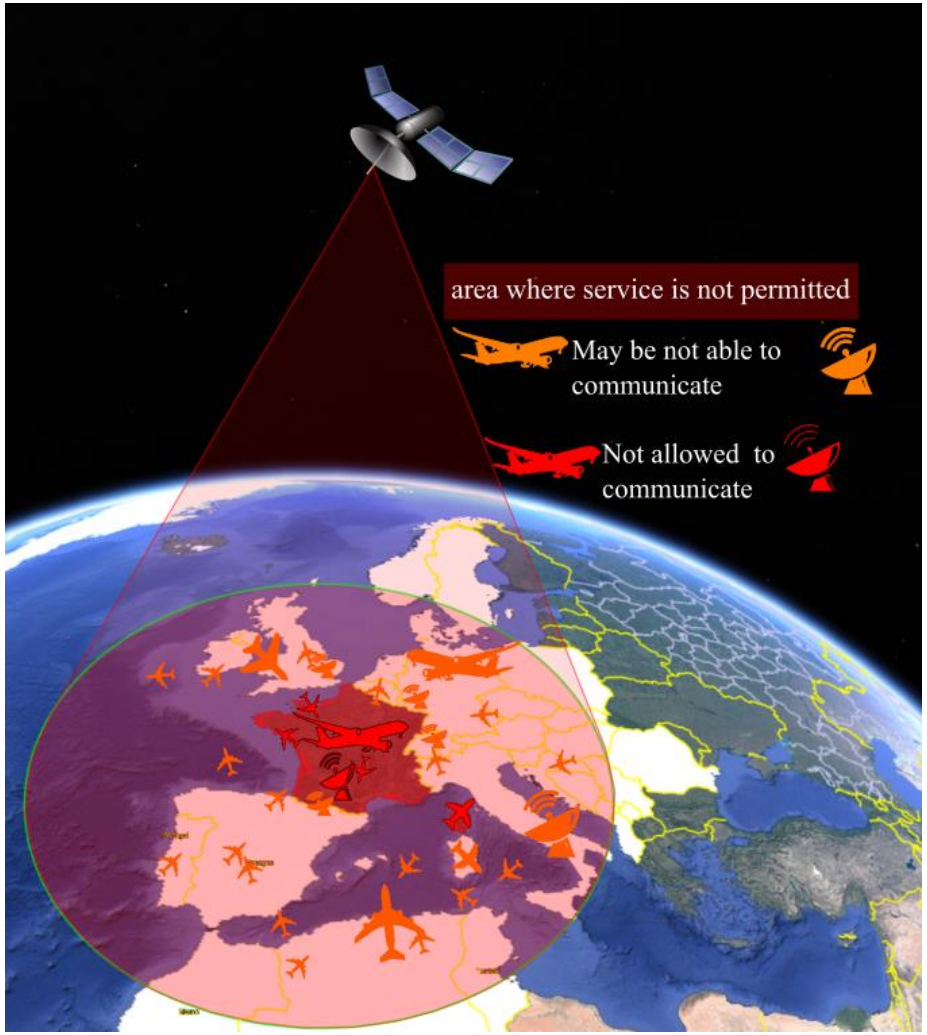
By prohibiting communications from the ground. The terminal's geolocation in a given area will block transmissions and reception

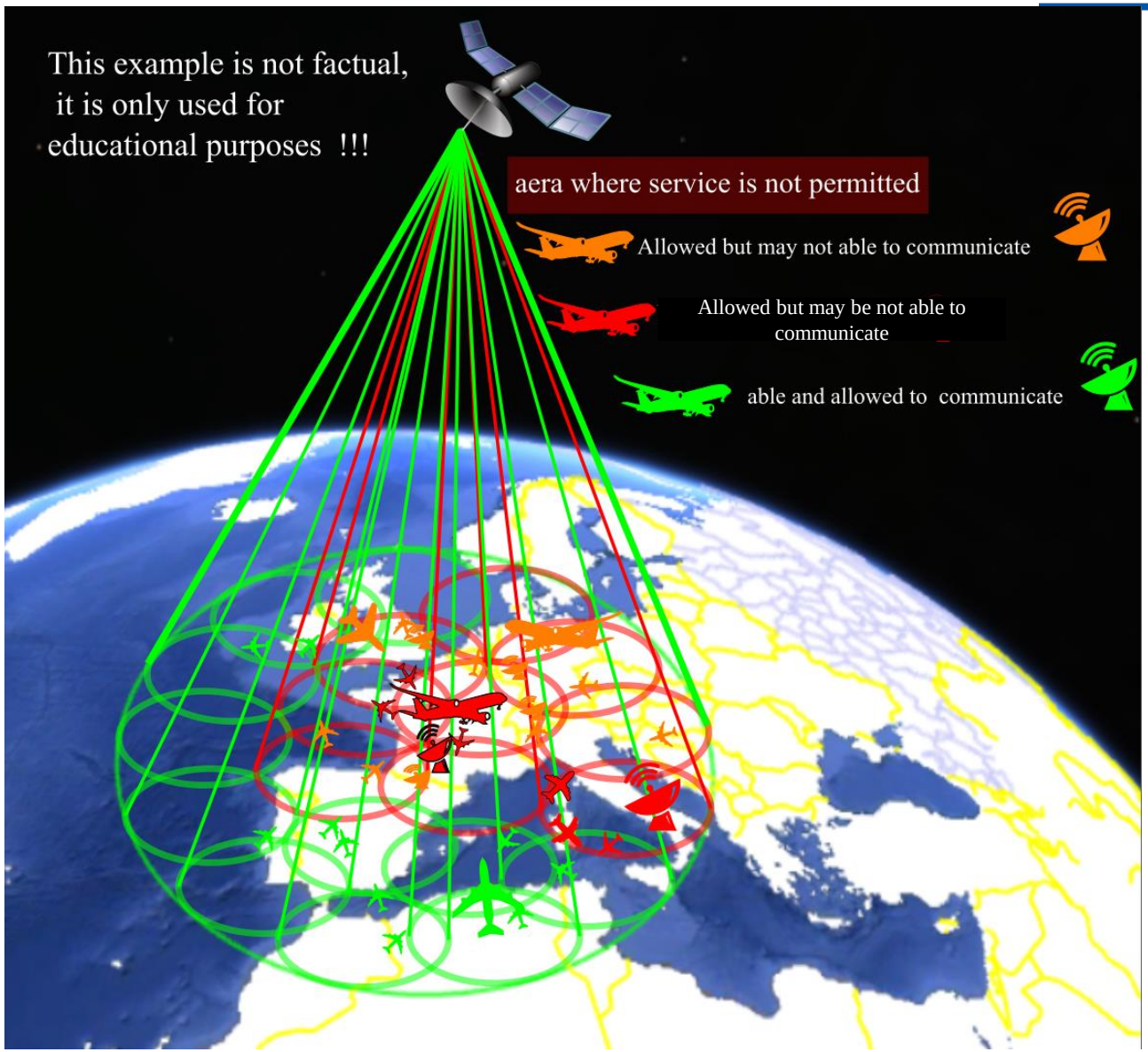




How to limit Unauthorized operations of NGSO-ES, example 3

By (drastically?) reducing the power density radiated by the satellite over a given area to prevent any communication.

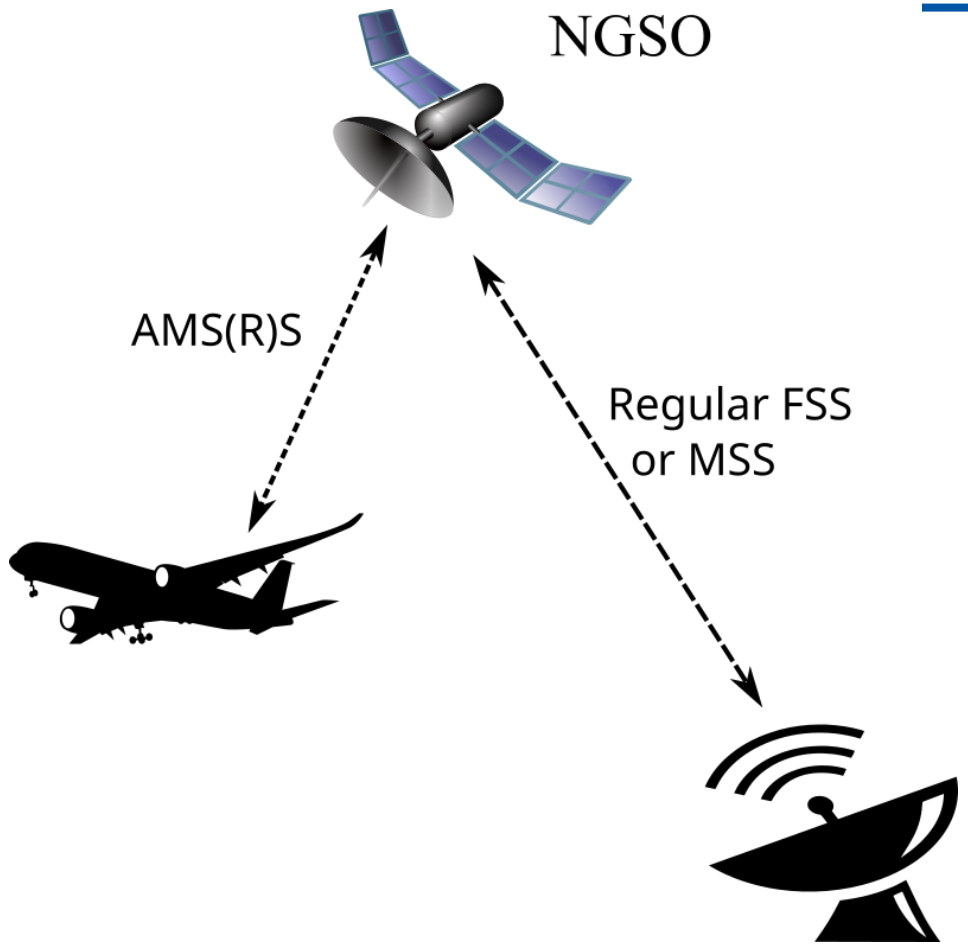




Potential Issues

- Future deployment of Space based VHF in the 117.975-137Mhz
- Future deployment of Space based C2 in the 5030-5091Mhz
- Space ADS-B in the 1090 MHz frequency band (1090Ex)
- Iridium Satcom Safety Communication
- All the gateway feeding the satellite systems

Are Non-Geostationary-Satellite Orbit Earth Stations could be constrained by the outcome of A.I 1.5



ICAO Position

To ensure the consequences of this agenda item do not impose new regulatory and technical constraints, including but not limited to the creation of service area exclusions, for non-GSO satellite systems which could disrupt or otherwise negatively impact the provision of AMS(R)S, and aeronautical emergency frequencies used by international civil aviation.

Conclusion

As Aeronautical Mobile Satellite (Route) Service (AMS(R)S) is a subset of the MSS. NGSO satellite systems* providing or supporting AMS(R)S are in the scope of AI1.5,

Resolution 14 contains a “safety net”: the provision of service in the rest of the service area of the non-GSO satellite system should not be affected (Resolve 2), however, in case WRC-27 outcomes do not respect this “safety net”, all safety communication systems that use or will use NGSO satellites may be directly impacted by the AI.1.5 WRC-27.

RESOLUTION 14 (WRC-23)

Studies on development of regulatory measures, and 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) and associated issues related to the service area of non-GSO FSS and MSS satellite systems

The World Radiocommunication Conference (Dubai, 2023)

considering

a) the active implementation of non-geostationary-satellite orbit (non-GSO) systems in the fixed-satellite service (FSS) and mobile-satellite service (MSS) with a global service area;

b) reports to the Radio Regulations Board (RRB) from administrations regarding the presence of unauthorized transmissions of transmitting earth stations of non-GSO FSS and MSS systems within their territory;

noting

a) that Article **18** specifies the requirements for licensing the operation of stations within any given territory;

b) that No. **18.1** provides that no transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of the Radio Regulations by or on behalf of the government of the country to which the station in question is subject;

c) that administrations involved in the provision of satellite services, including notifying administrations of satellite networks or systems, are subject to Article **18**;

d) that Resolution **22 (Rev.WRC-23)**, on measures to limit unauthorized uplink transmissions from earth stations, resolves that the operation of transmitting earth stations within the territory of an administration shall be carried out only if authorized by that administration;

e) that Resolution **25 (Rev.WRC-23)**, on operation of global satellite systems for personal communications, *resolves* that administrations licensing global satellite systems and stations intended to provide public personal communications by means of fixed, mobile or transportable terminals shall ensure, when licensing these systems and stations, that they can be operated only from the territory or territories of administrations having authorized such service and stations in compliance with Articles **17** and **18**, in particular No. **18.1**;

arest, 2022) of the Plenipotentiary Conference encourages on-GSO systems, to take all necessary actions to avoid other non-GSO systems, as well as to other radio services of ıe efficient use of radio-frequency spectrum and associated he necessary regulatory frameworks need to be developed for

hat “radiation in and reception from unnecessary directions ximum practical advantage of the properties of directional vice permits”;

quipped with devices allowing geolocation as well as cessation tion,

cognizes the sovereign right of each Member State to regulate

ıe sovereign right to license the use of non-GSO systems in l reception from unnecessary directions shall be minimized;

ish to exclude its territory from the service area of the non-GSO satellite system;

d) that unauthorized use of non-GSO FSS and MSS earth stations is prohibited,

resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference

1 studies on regulatory measures to limit the unauthorized operations of non-GSO FSS and MSS earth stations in the Earth-to-space direction in order to address and cease such operations, taking into account technical and operational aspects, as appropriate;

2 studies on regulatory measures, taking into account *recognizing c)* with regard to non-GSO FSS and MSS satellite systems, and the implementability of such measures, without adversely affecting the provision of service in the rest of the service area of the non-GSO satellite system,

invites administrations

to participate actively in the studies and provide the information required for the studies listed under *resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference* by submitting contributions to ITU Radiocommunication Sector,

resolves to invite the 2027 world radiocommunication conference

to consider the results of the studies under *resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference* above and take appropriate action.

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Question ?

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Thank You

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