



| ICAO

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).

FLEURY Christian



Direction Générale de l'Aviation Civile

DSNA

France

Presentation Overview

01 Background

02 Potential Issues

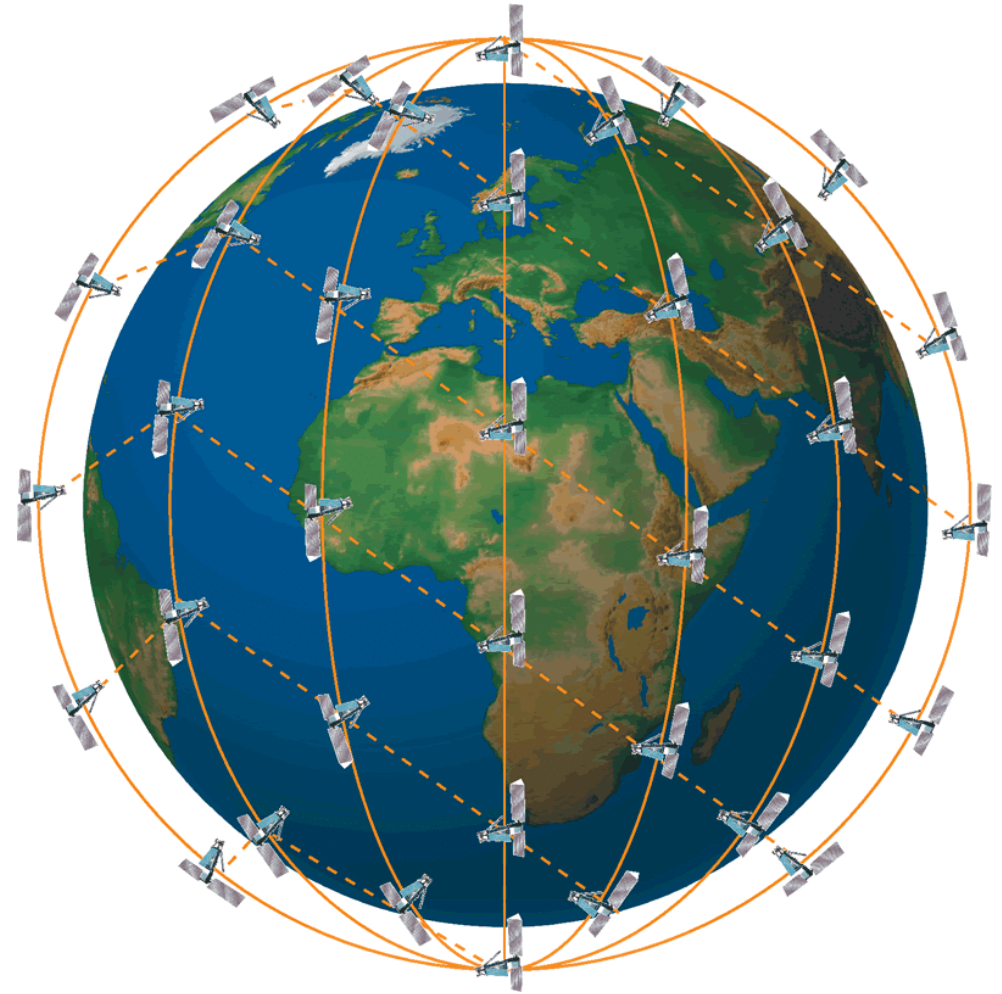
03 ICAO Position

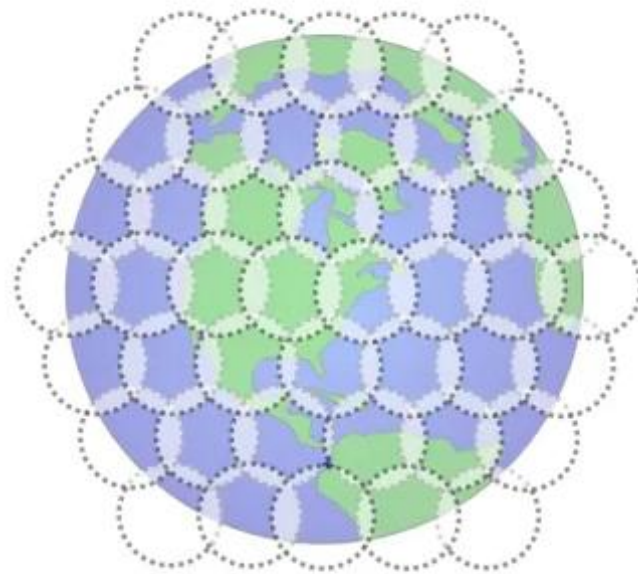
04 Conclusion

Background

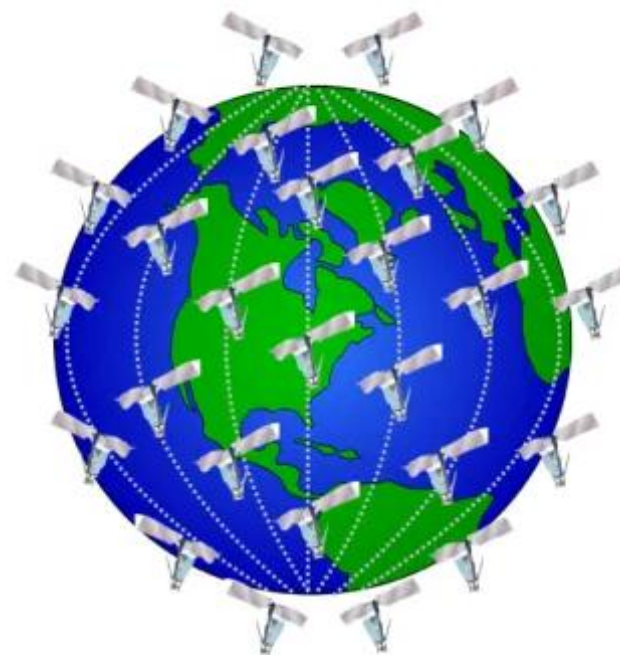
non-geostationary-satellite

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

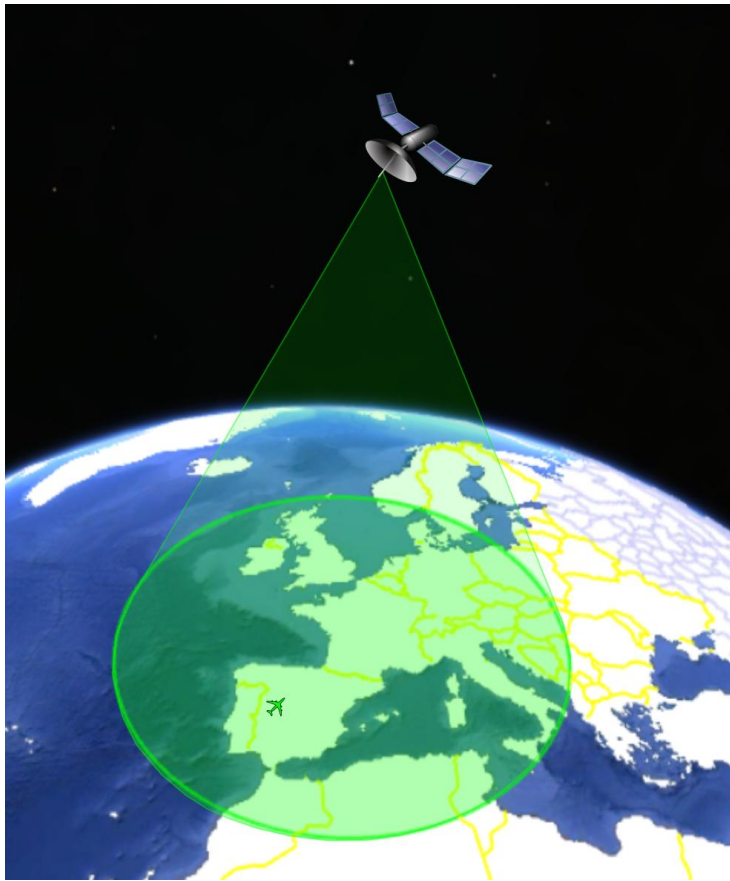
global coverage with meo/leo satellite

For NGSO satellites, their footprint(s) evolve(s) according to the satellite's trajectory.

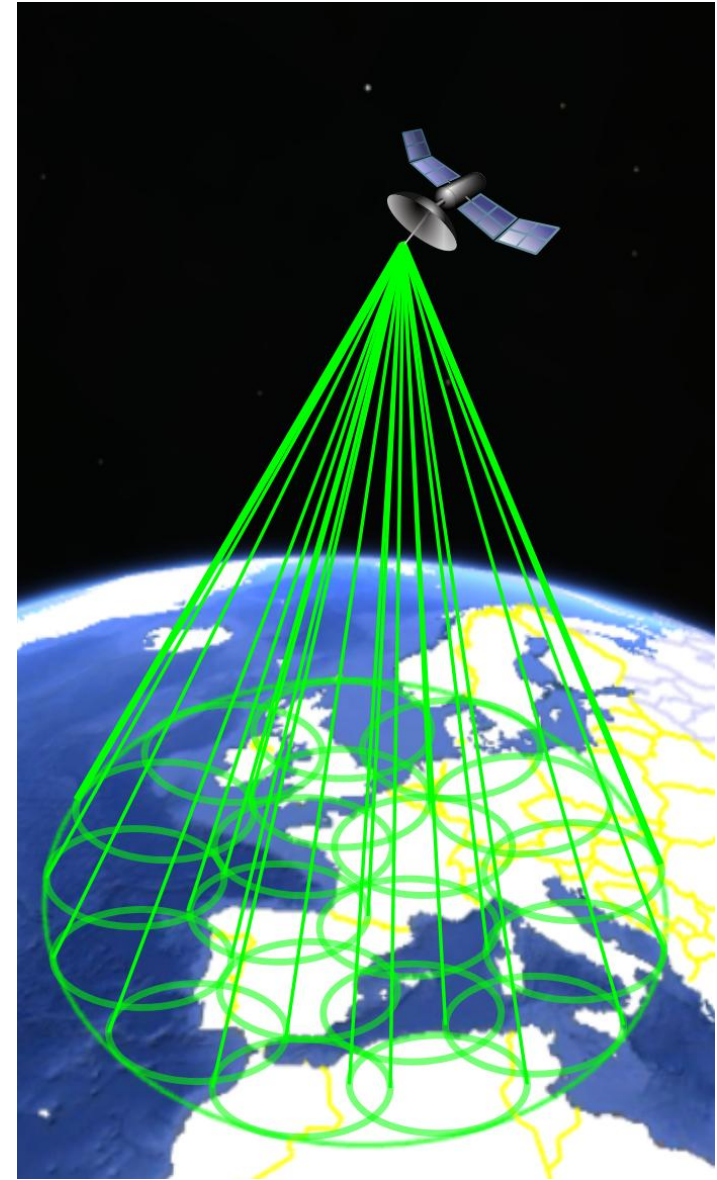
Background

Shape of the footprint of a Leo/Meo satellite

Single beam

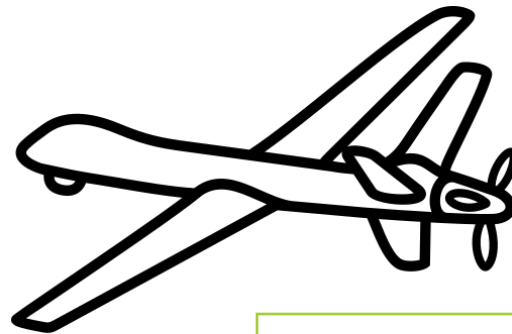


Multibeam



Background

non-geostationary-satellite orbit Earth stations



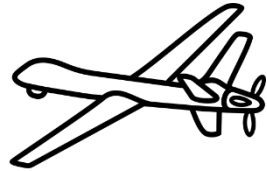
Terminal

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.

Background

unauthorized operations of non-geostationary-satellite orbit Earth stations



Terminal



Unauthorized operations means that you are not allowed to communicate with the satellite.

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

or

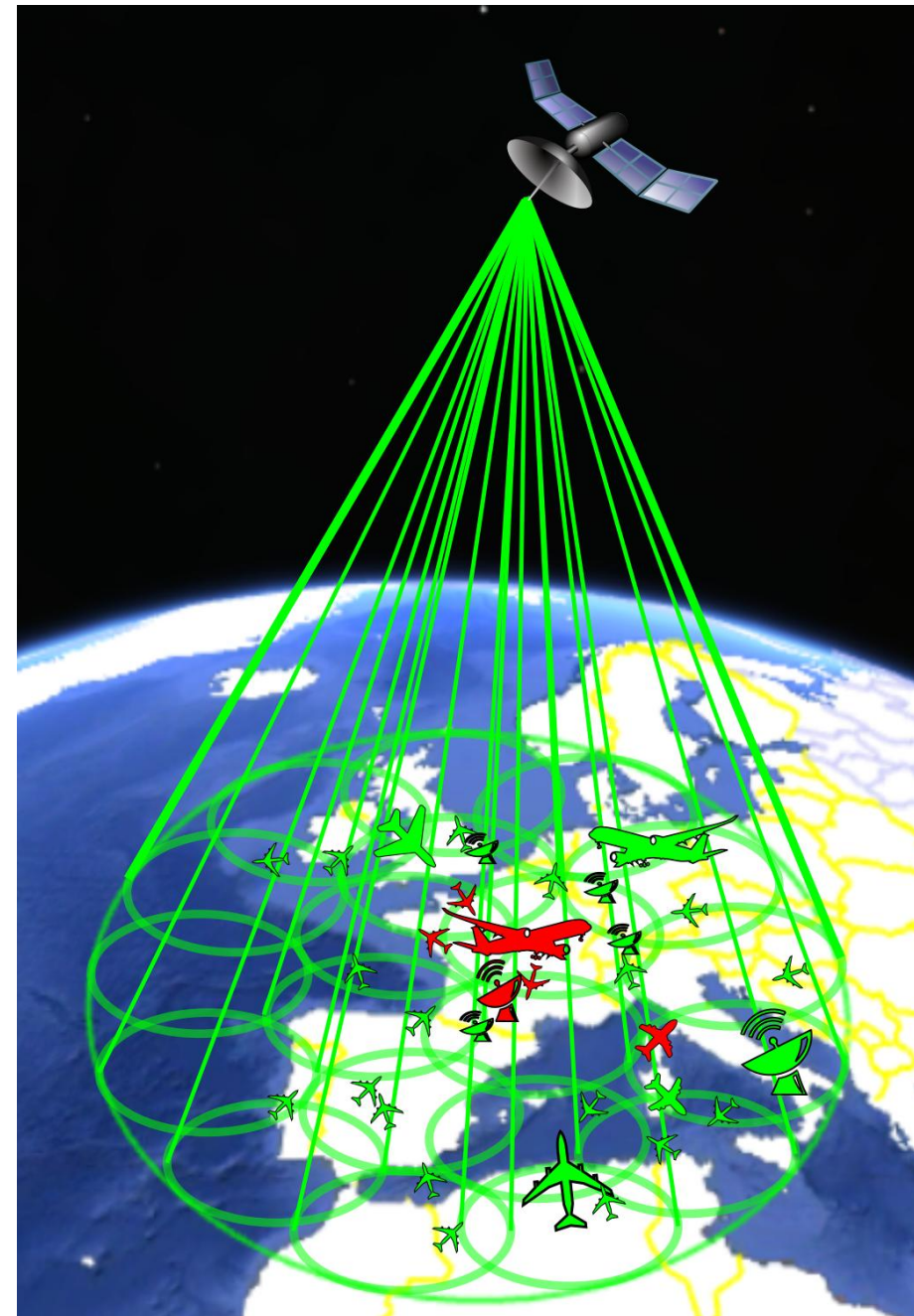
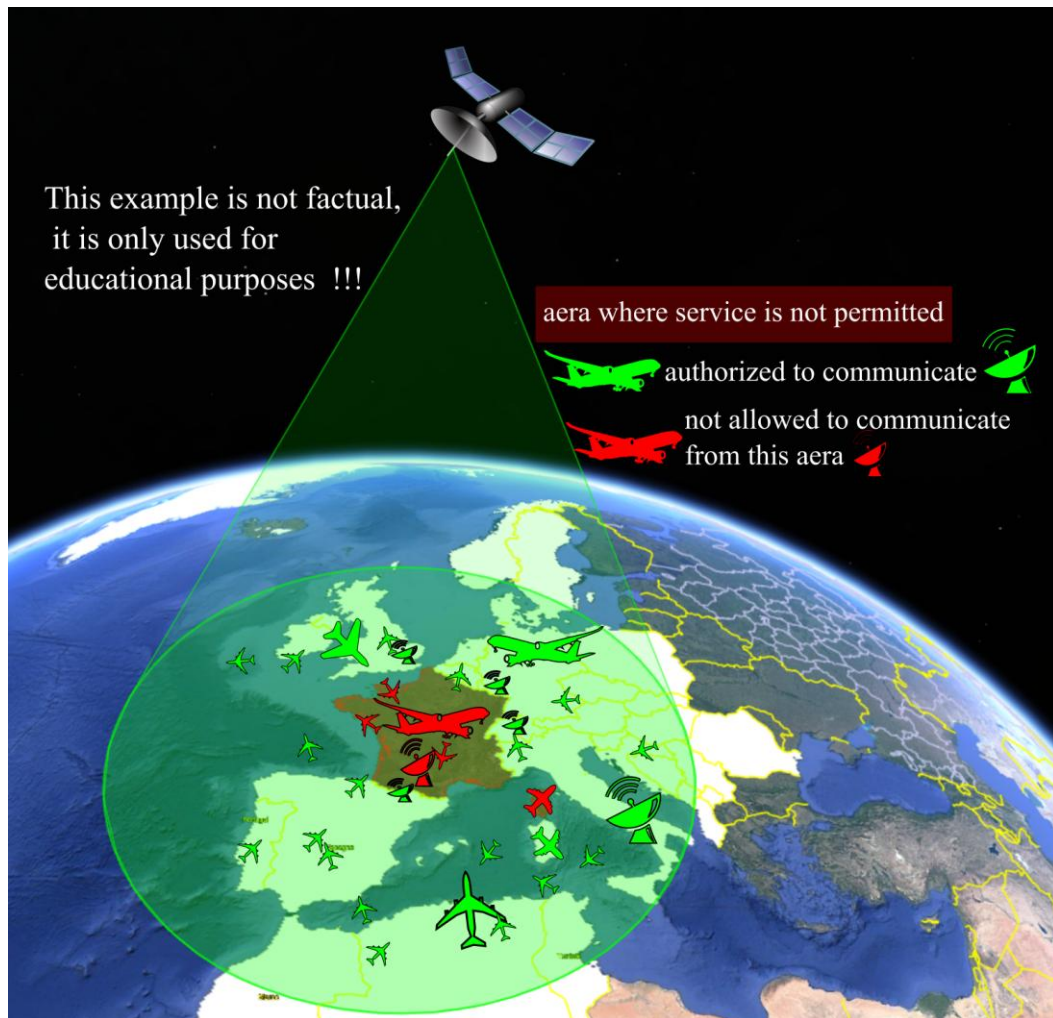
- By prohibiting communications from the satellite with terminals located in a given area.

or

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

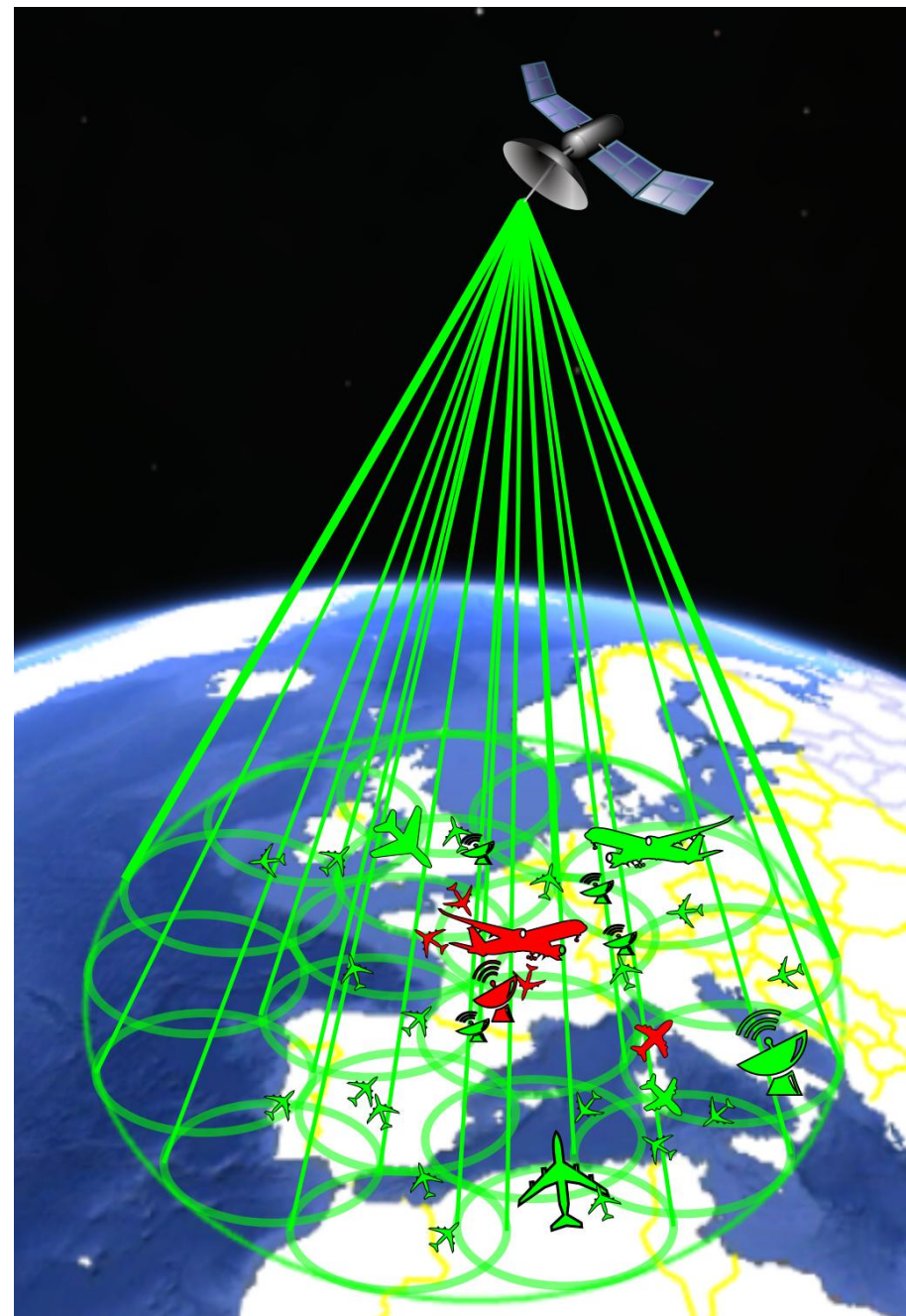
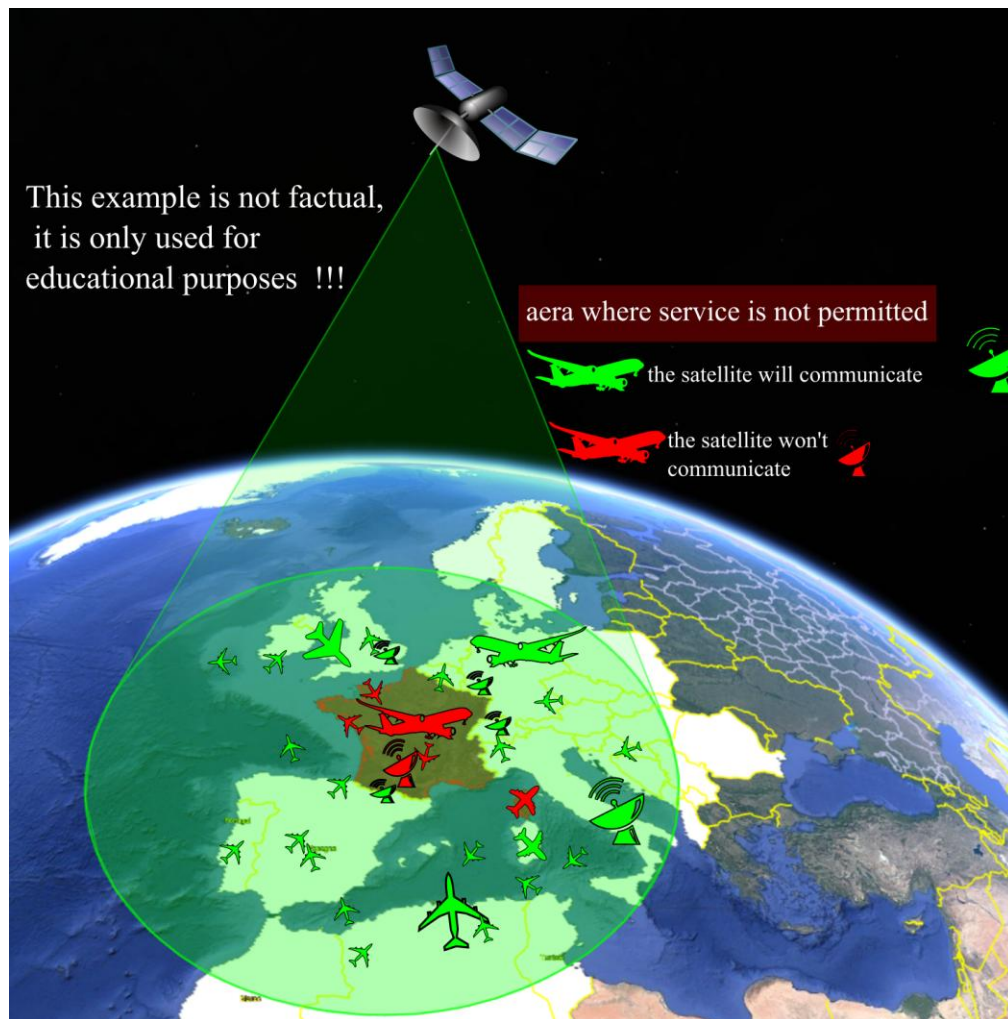
Potential Issues

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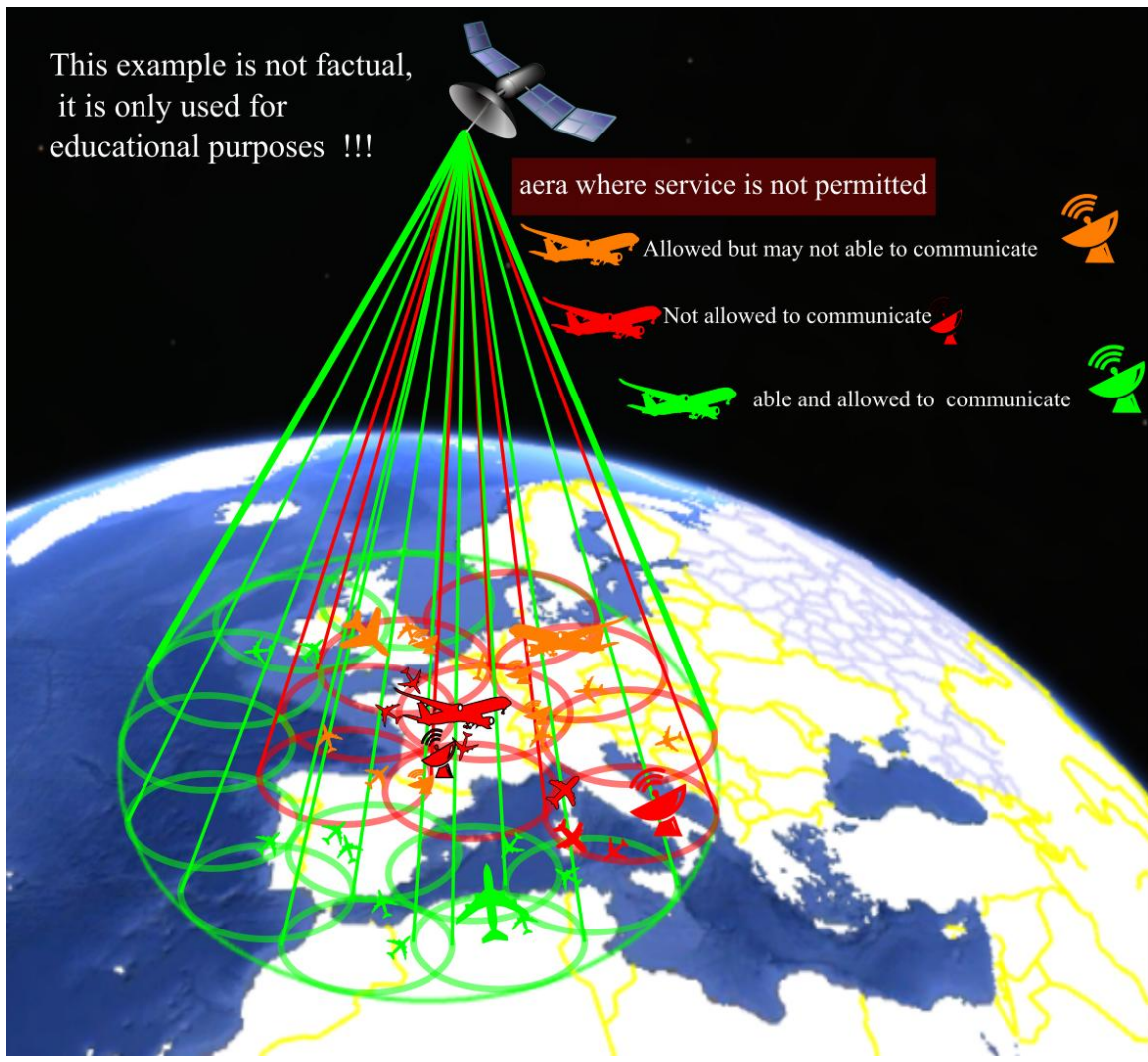
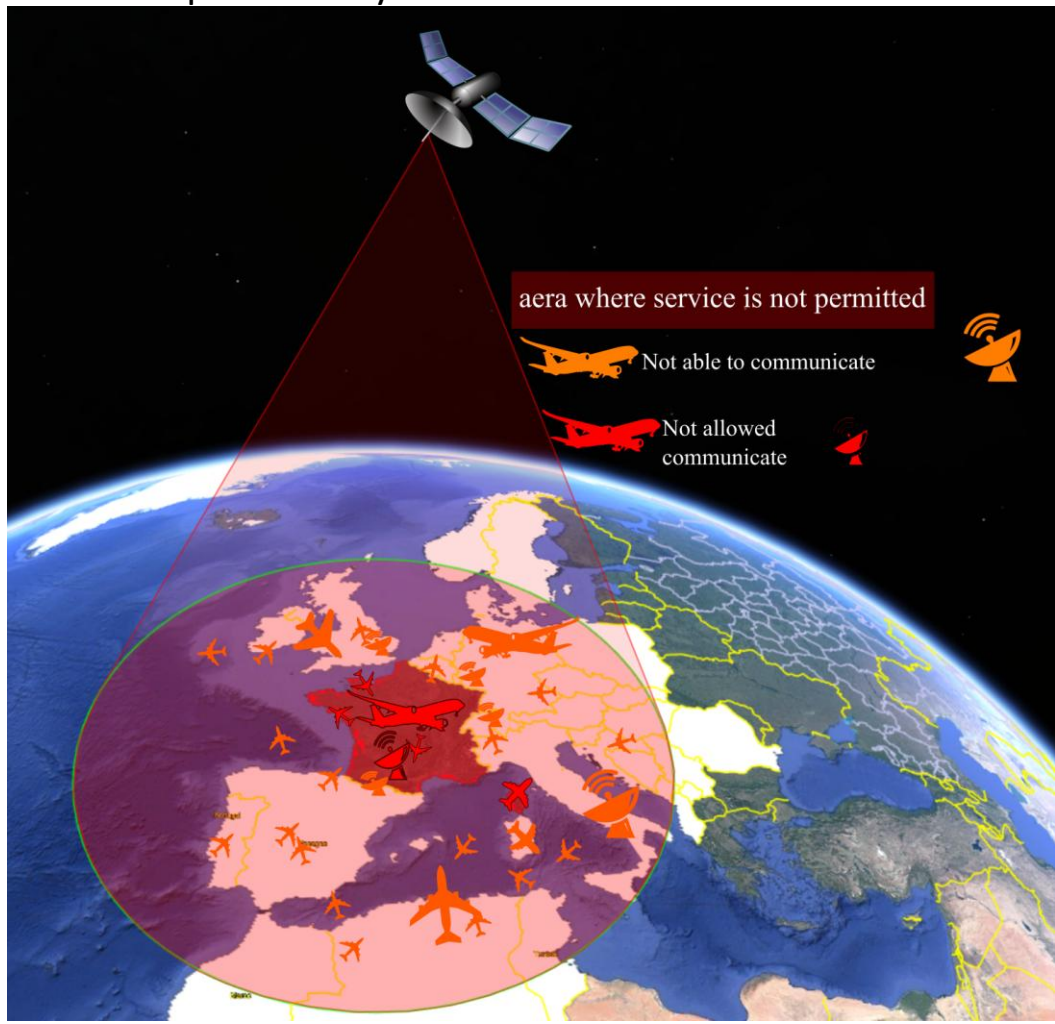
Potential Issues

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Potential Issues

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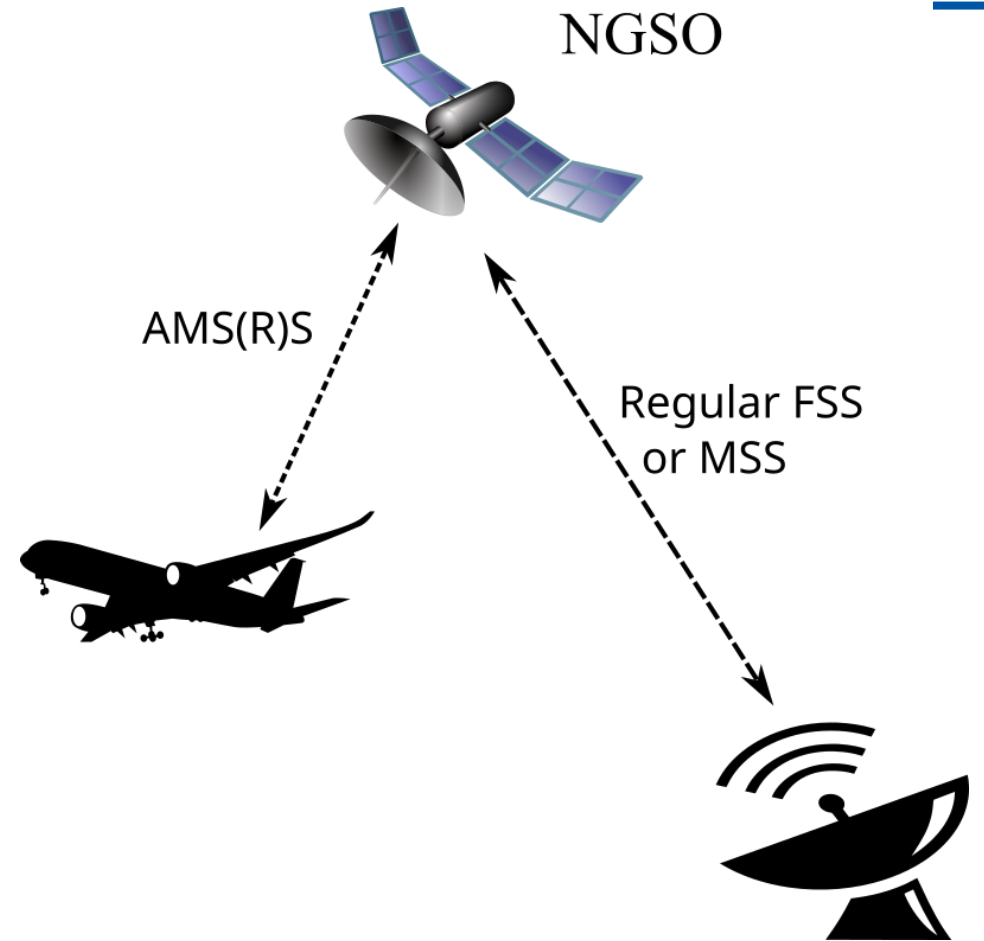


Potential Issues

- Aeronautical Mobile Satellite (Route) Service (AMS(R)S) is a subset of the MSS.
- NGSO satellite systems providing AMS(R)S services are « feed » by MSS or FSS service

All safety communication systems that use or will use NGSO satellites are likely to be directly impacted by the AI.1.5 WRC-27.

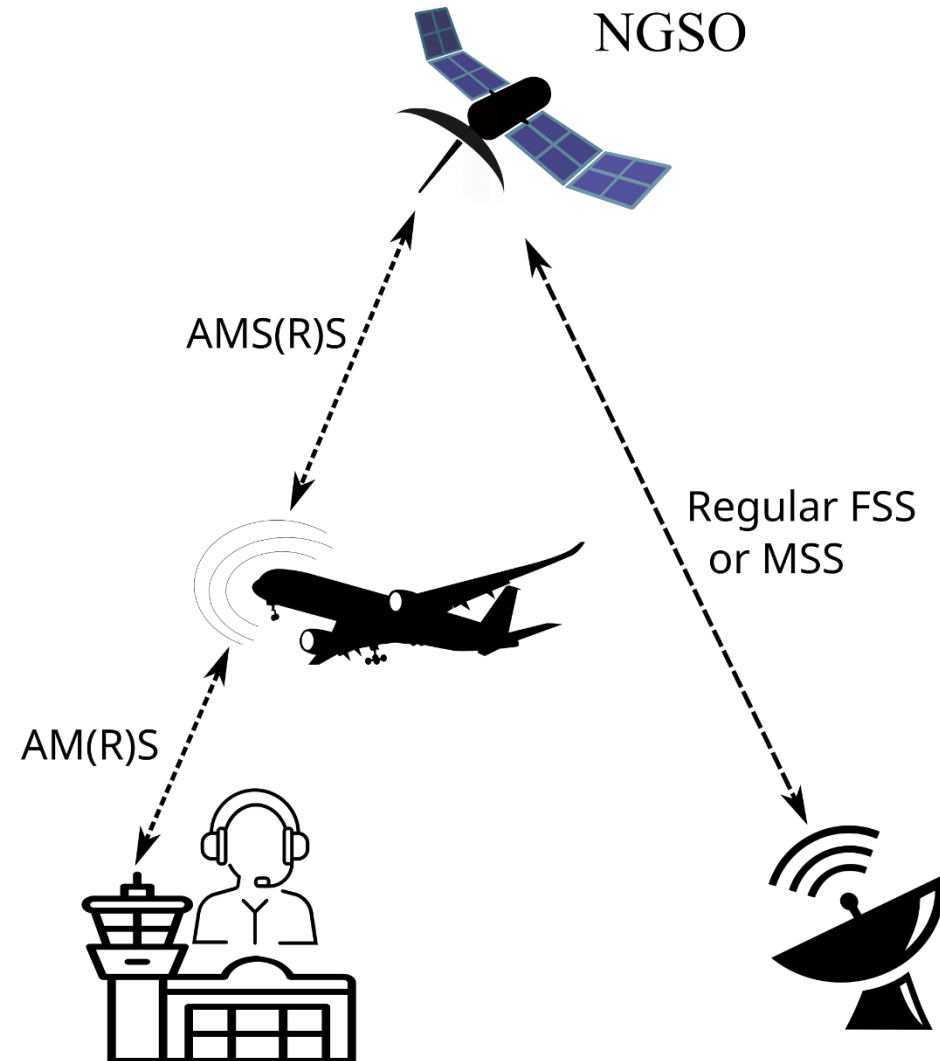
“Space VHF” in the 117.975-137Mhz band and Space ADS-B (1090Ex) , transmitters on board aircraft are considered as a non-geostationary-satellite orbit Earth stations (AMS(R)S) and Aeronautical Mobile (Route) Service (AMS(R)S) systems.



New potential issues identified but not identified in the current ICAO position.

- Prior to WRC-15, ADS-B transmitters operated only on the AM(R)S allocation. Since WRC-15, without any changes being made on board, ADS-B transmitters operate on both the AM(R)S and AMS(R)S allocations.
- Prior to WRC-23, VHF transmitters operated only on the AM(R)S allocation. Since WRC-23, without any changes being made on board, VHF transmitters operate on both the AM(R)S and AMS(R)S allocations.

This means that any restriction on AMS(R)S in a given geographical area will result in the same restriction on AM(R)S communications.





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

- Aeronautical Mobile Satellite (Route) Service (AMS(R)S) is a subset of the MSS and NGSO satellite providing Safety of life service are « feed » by MSS and FSS. And may therefore be directly impacted by the AI1.5 WRC-27 outcome.

Even if Civil Aviation is not targeted by AI 1.5 WRC-27, many harmful side-effects need to be anticipated in order to be avoided.



Question ?



Thank You

