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# Future Galileo Space Service Volume

## User Consultation Platform

December 2, 2020

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European Commission

# IN THIS PRESENTATION

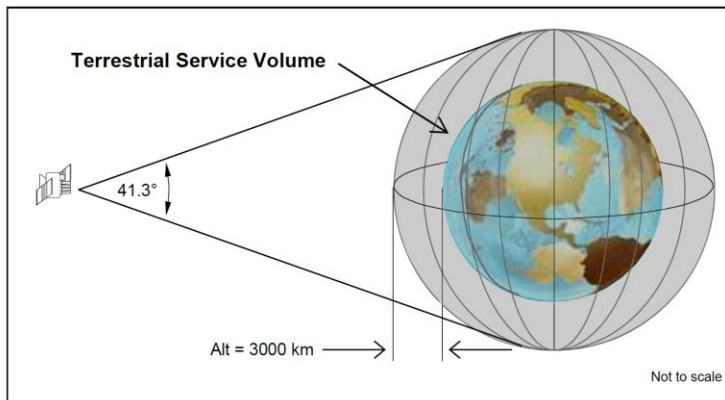
- **Context** of GNSS Space Service Volume (SSV)
  - GPS
  - ICG
  
- Galileo SSV **Definition**
  
- Galileo SSV **Validation**

# GPS SPACE SERVICE VOLUME

## GPS STANDARD POSITIONING SERVICE PERFORMANCE STANDARD, April 2020:

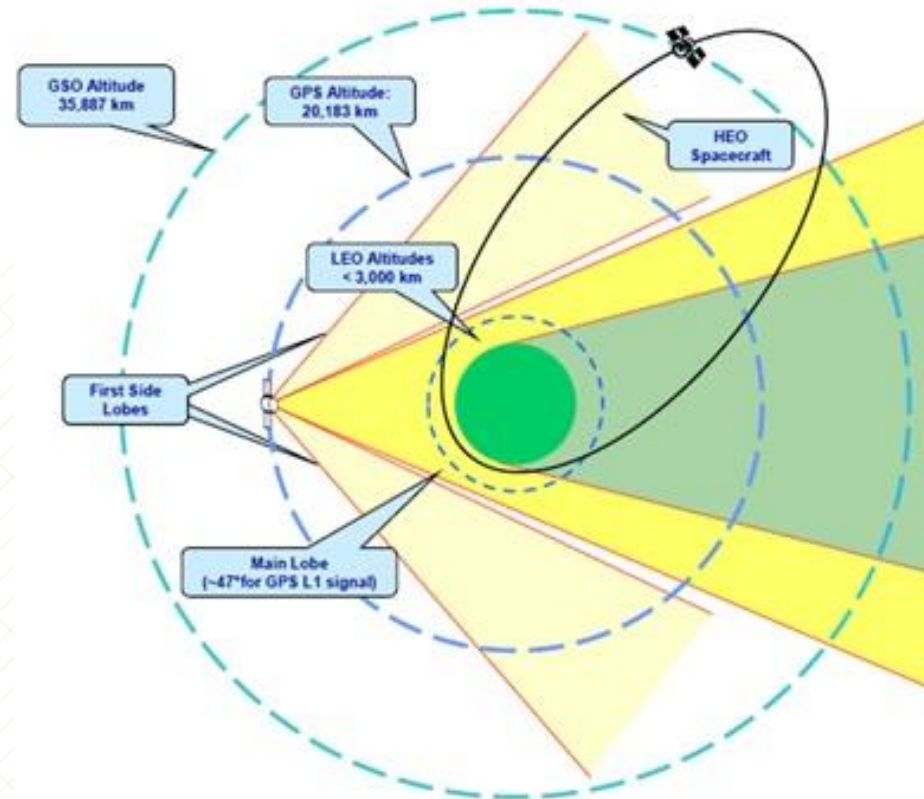
### « A.3.3.2 Terrestrial Service Volume

The near-Earth region extending from the surface of the Earth up to an altitude of **3,000 km** above the surface of the Earth is also known as the "terrestrial service volume" »



### « A.3.3.3 Space Service Volume

The spherical shell extending from the outer surface of the terrestrial service volume up to an altitude of 36,000 km above the surface of the Earth (approximately the geosynchronous orbit altitude) is known as the "space service volume". There are **no explicit constellation coverage standards** for the space service volume. »

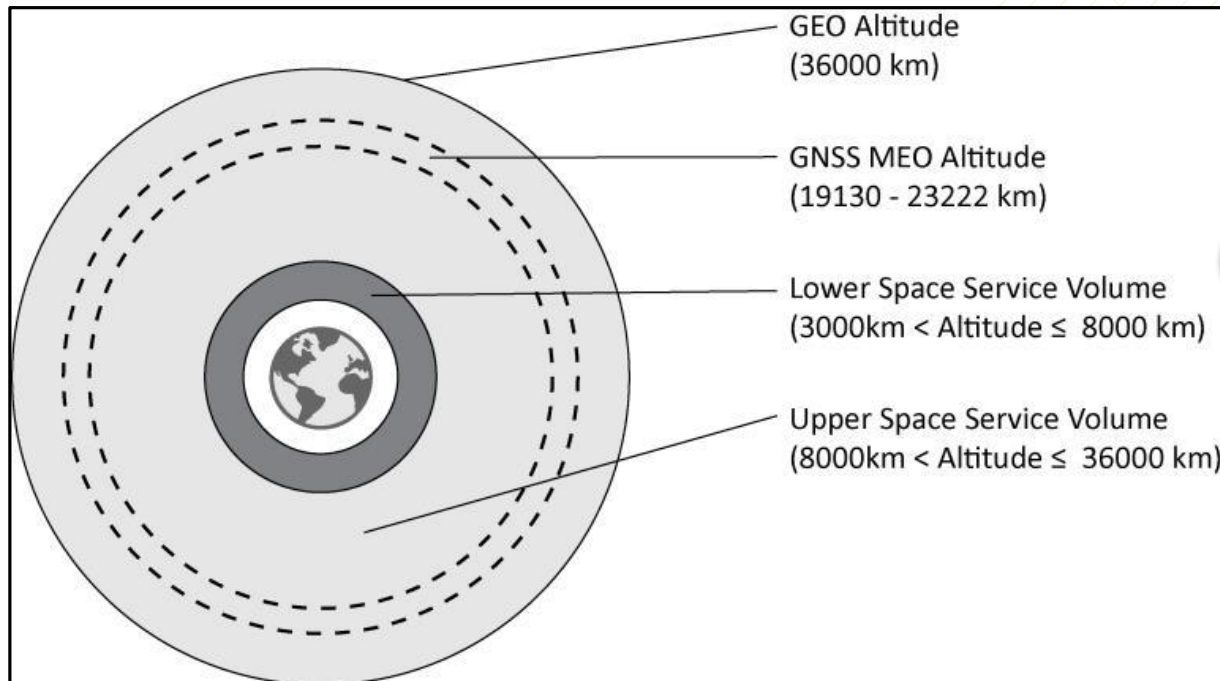


Orbits Illustration

# ICG SPACE SERVICE VOLUME

- Works on an **Interoperable** Global Navigation Satellite Systems Space Service Volume

The “**Booklet**” is document produced by Working Group B of **UN International Committee on GNSS (ICG)** with the objectives of defining, establishing, and promoting an **Interoperable GNSS SSV** for the benefit of GNSS space users and GNSS space receiver manufacturers



Two SSV regions defined:  
limit at **8000Km**

First version published in 2018:  
<https://digitallibrary.un.org/record/3829212>



# FUTURE GALILEO SSV: ORIGIN



- Growing interest on GNSS by **Space users**
  - GNSS can **complement**, in some cases even replace, the legacy **orbit and attitude determination** systems (ground-based ranging, star trackers, etc.)
  - The use of GNSS (GPS at first) for satellites and launchers is being **widely** exploited
  - This has led to a **rapid development** of spaceborne GNSS **receivers**
  
- Galileo Programme process set up to define the Mission for the **Galileo Second Generation (G2G)**
  - EC proposed a Galileo SSV
  - Specific **R&D Actions** launched to identify target **commitments** and corresponding **requirements** at Mission level (see next slide)
  - Process about to be concluded with the adoption of **G2G Implementing Act**

# GALILEO PROGRAMME INITIATIVE

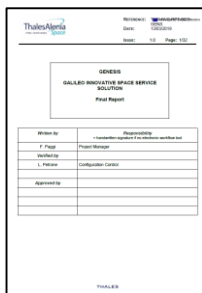


➤ EC published in 2016 the project under the **Horizon 2020 Framework**:  
«Innovative Mission Concepts: **R&D for a Galileo Space Service**»

➤ Amongst the objectives:

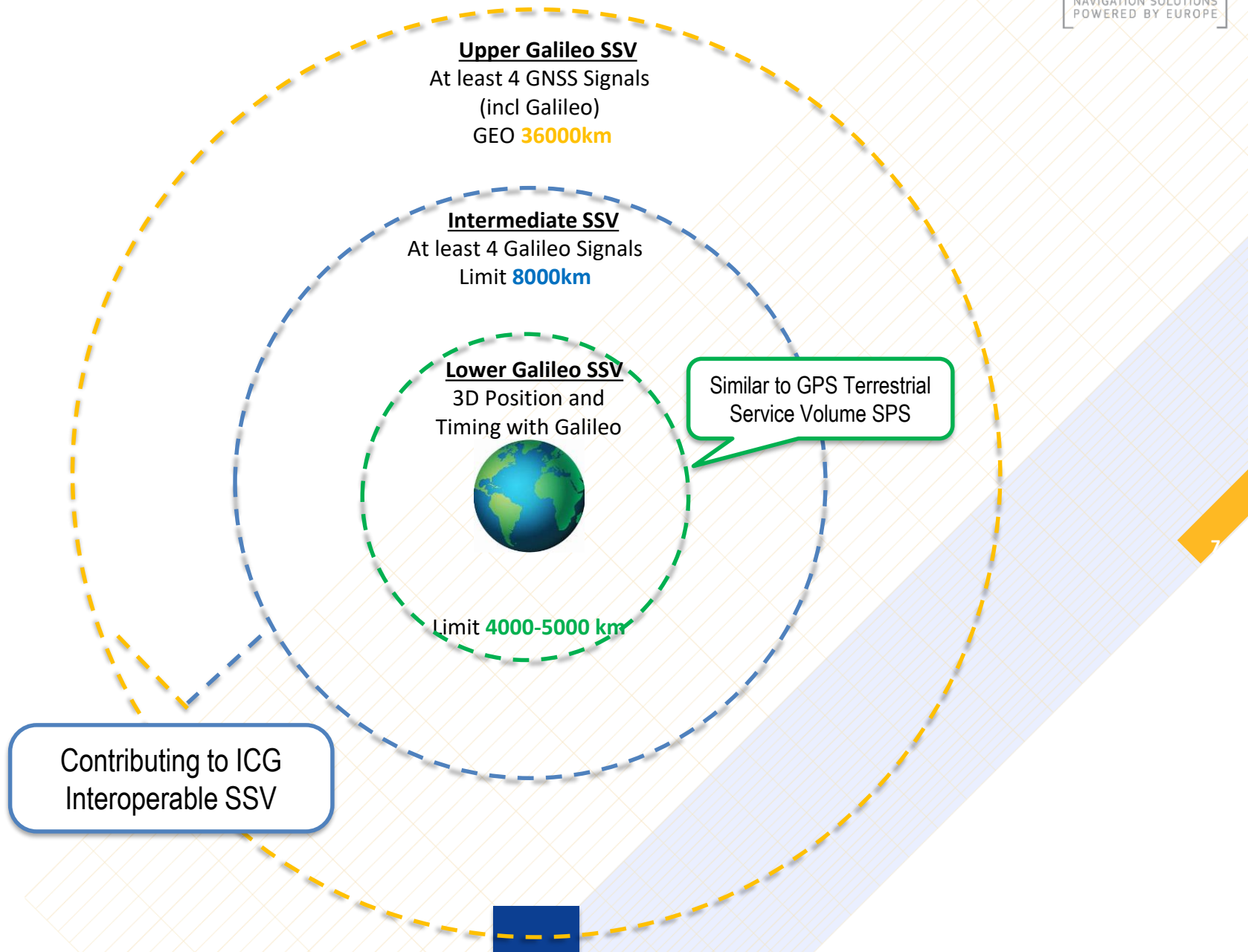
- Characterize the **GNSS Space Users and their Requirements** in terms of GNSS
- Characterize the **GALILEO and the Multi-GNSS Space Service Volume**
- Contribute to **Mission** definition for the second generation of GALILEO
- Study **characterization** of GALILEO signals and potential measurement campaigns
- Propose Advanced Signal Processing techniques and **algorithms for GNSS Receivers**

➤ **GENESIS** (Galileo Innovative Space Service Solution) run during 2017/18  
Project Summary and Outcomes are available at:



[https://ec.europa.eu/growth/sectors/space/research/horizon-2020/genesis\\_en](https://ec.europa.eu/growth/sectors/space/research/horizon-2020/genesis_en)

# FUTURE GALILEO SPACE SERVICE VOLUME



# GALILEO SPACE SERVICE VOLUME VALIDATION



## ➤ Horizon 2020 IOD/IOV MISSION

- Satellite will fly experimental Payloads and will carry a Galileo Space Receiver
- Processing of data on ground will allow Validation of Galileo SSV
- Characterization of the Galileo emissions within field of view of IOD/IOV mission Processing will be performed by the EC Join Research Centre (JRC)
- Timeline 2022

## ➤ Full characterization of Galileo emissions in space

- Will require other orbital profiles beyond IOV/IOC
- High Elliptical Orbit preferred
- EC looking for opportunities: inputs from community welcome

## ➤ Galileo Space data collected by other Missions also welcome

- Covering various type of orbits
- Different types of receivers



**THANK YOU**

<http://ec.europa.eu/galileo>