



# EUSpace for Rail

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# EU Space Programme Agency - Mission



## Exploitation

- Management, operation, maintenance, improvement, evolution, and protection of infrastructure
- Continuous provision of Galileo and EGNOS services and 24/7 operations in redundant control centres
- Development of GOVSATCOM Hub



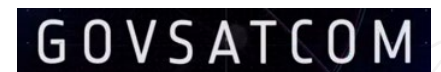
## Gatekeeper of security, including

- Security accreditation of all programme components,
- Operational security of Galileo and EGNOS, and
- Operation of the Galileo Security Monitoring Centre

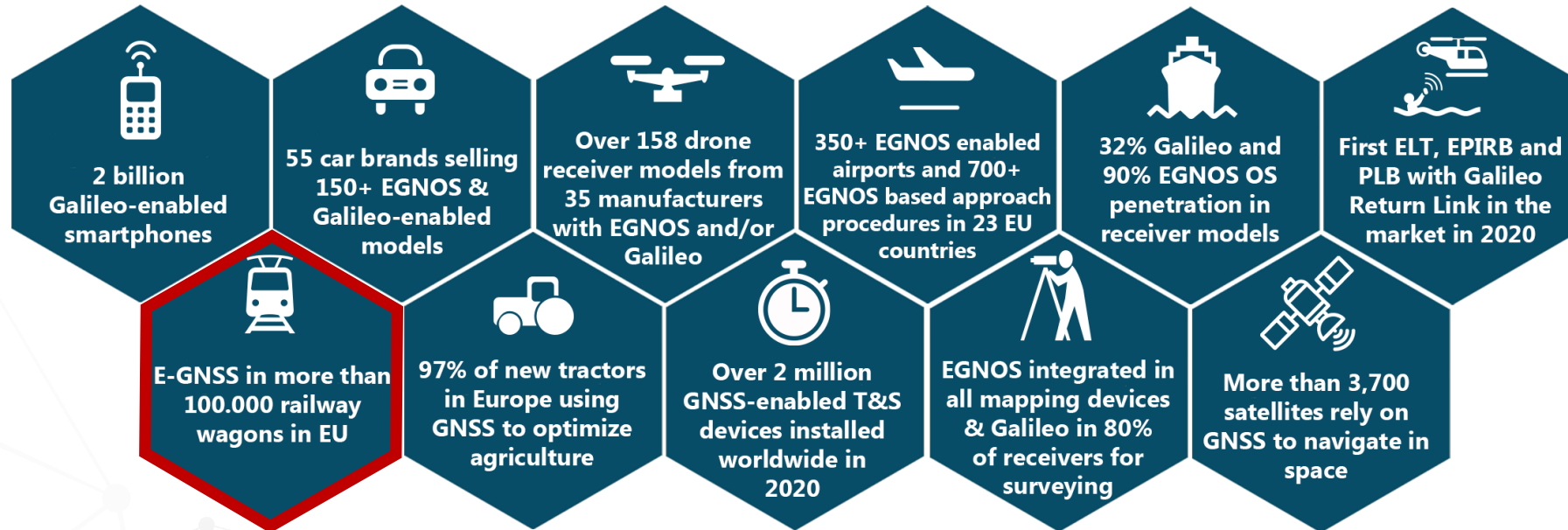


## Market development, communications, user uptake, applications and innovation

- For Galileo, EGNOS, Copernicus, and GOVSATCOM



# Galileo and EGNOS adoption in multiple market segments is progressing



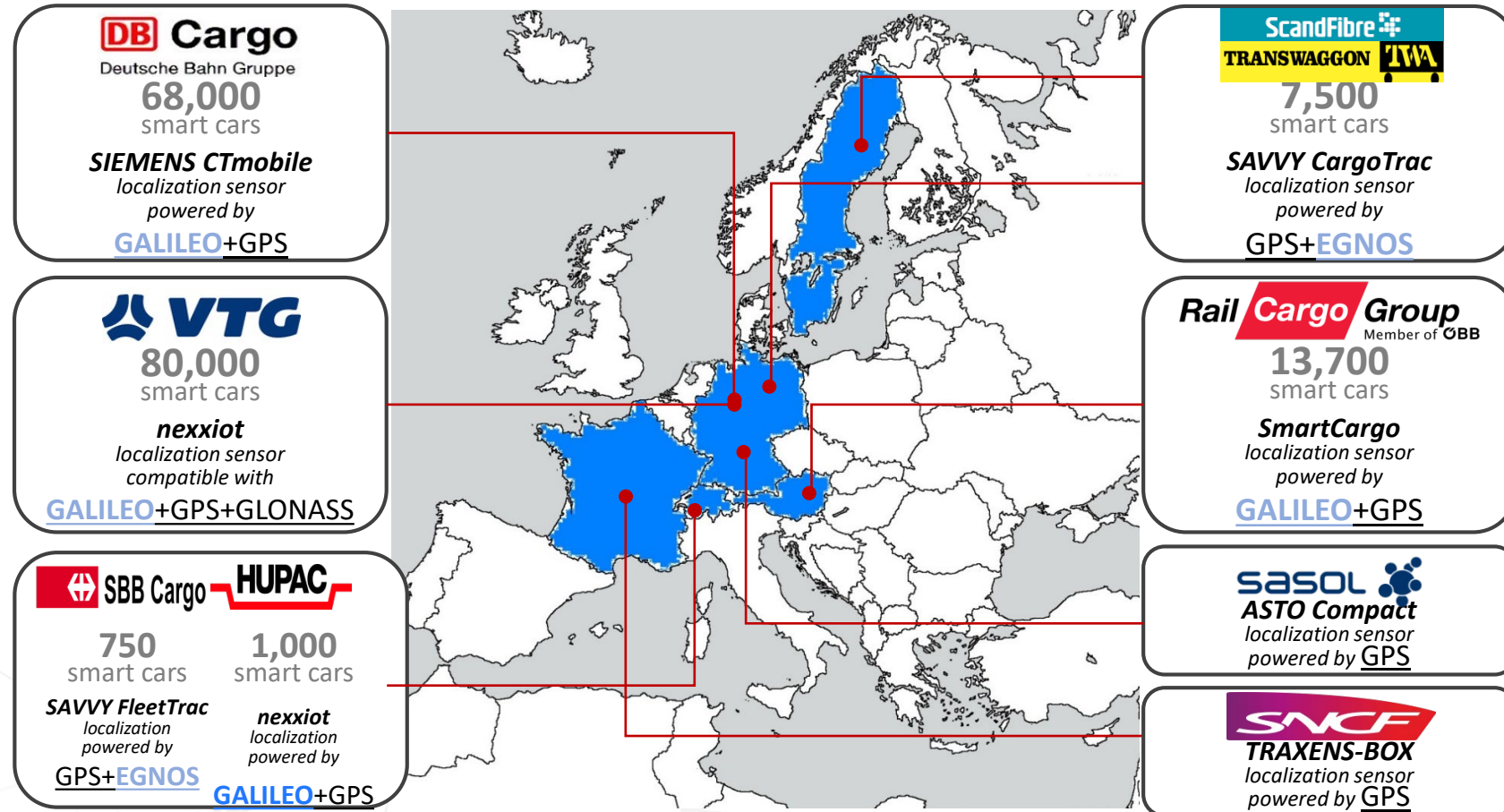
Multiple applications e.g. localization for passenger information / traffic management systems, predictive maintenance or timing are already within the adoption phase, **but fail safe train localization for rail signaling/ERTMS is still under development.**

# Galileo as an enabler for rail digitalization

- Galileo uptake in freight wagon track&trace continues to ramp up with **more than 150 000 wagons already equipped with GNSS receivers**

Nearly **2 billion position reports** are established per year with **European GNSS contribution to support railways with:**

- asset tracking
- status monitoring
- alerts/geofencing
- business process support such as cargo visibility for customers or billing





# EU Space support to rail signalling



European Parliament supports GNSS inclusion in ERTMS (resolution of 7 July 2021 on railway safety and signaling), calling on the EU rail industry to develop technical solutions in order for the GNSS to enable the ERTMS on a large scale;

## Actions and next steps to support GNSS use in Rail signalling:

- **Close coordination with ERA and ERJU:** EUSPA participates as gateway to space within ERJU System pillar SG
- **ERTMS Change request 1368:** Updated documentation for including EGNOS Augmentation in ERTMS under review by rail stakeholders to be provided as input to System Pillar
- **EGNSS Service for rail definition:** ERGO stakeholder platform - 2 mission studies to be finalized in 2022
  - Consolidation of the service implementation roadmap, defining the service milestones in 2022
- **EUSPA Fundamental elements programme:** 2 projects on receiver/antenna prototype development in progress
- Updated EU in rail signaling roadmap, coordinated with main rail stakeholder associations
- **Continued support in frame of EUSPA R&D**
  - EGNSS and Copernicus applications in support of the European Green Deal (HORIZON-EUSPA-2021-SPACE-02-51) – projects in Grant agreement preparation phase



# Main H2020 Projects in Rail segment



Mission analysis/needs identification and a preliminary feasibility study of an on-board localization allowing continuous localisation speed and other dynamics of the train compatible with the current ERTMS TSI or with its future evolutions.

*Note: A follow-up project at present in GAP-phase*



Development of a shared high integrity and high accuracy platform for train signaling and other applications such as connected and driverless cars or UAV for surveillance of roads and railways.



Development of tools for designing high integrity and accuracy ground truth and digital trackside map indispensable for train positioning with EGNSS and other sensors including procedures for automated collection of in field measurement data with commercial trains.



Development of a drone-based technology to monitor the physical status and electronic functionality of both non-safety-critical and safety-critical railway signalling assets and to execute specific maintenance activities



# Copernicus: Europe's eyes on Earth

Copernicus is the European Union's Earth Observation and Monitoring programme

Copernicus provides accurate, timely and freely accessible information on the Earth and its status, enabling the management of the environment, supporting EU policies, understand and mitigate climate change and ensure civil security.

The programme is managed by the European Commission and implemented in partnership with the EU Member States, European Space Agency (ESA), Entrusted Entities (ECMWF, EEA, JRC, Mercator Ocean, EMSA, SatCen, Frontex) and Agencies (e.g. EUMETSAT)



- **Space Component:** delivers data from Sentinel satellites
- **In-situ component:** collects data from ground-air-sea based sensors
- **Service component:** delivers actionable information and products



# Copernicus contribution in Rail

## **Monitoring of subsidence and landslide risks**

Copernicus can contribute to solutions providing monitoring capabilities and risk indications related to railway infrastructure protection, helping to ensure seamless rail infrastructure operation

## **Monitoring of vegetation**

Copernicus data is present within the mix of Earth observation techniques for protection of train gabarit from risks associated with vegetation growth

## **Construction monitoring of railway infrastructure and its proximity**

Copernicus can be used within applications focused on centralized monitoring of construction works on the infrastructure as well as construction around it with the objective to mitigate any possible negative effects on operations

## **Infrastructure maintenance**

Copernicus can help to indicate changes in status and condition of railway infrastructure assets, supporting decisions regarding necessary corrective or preventive maintenance



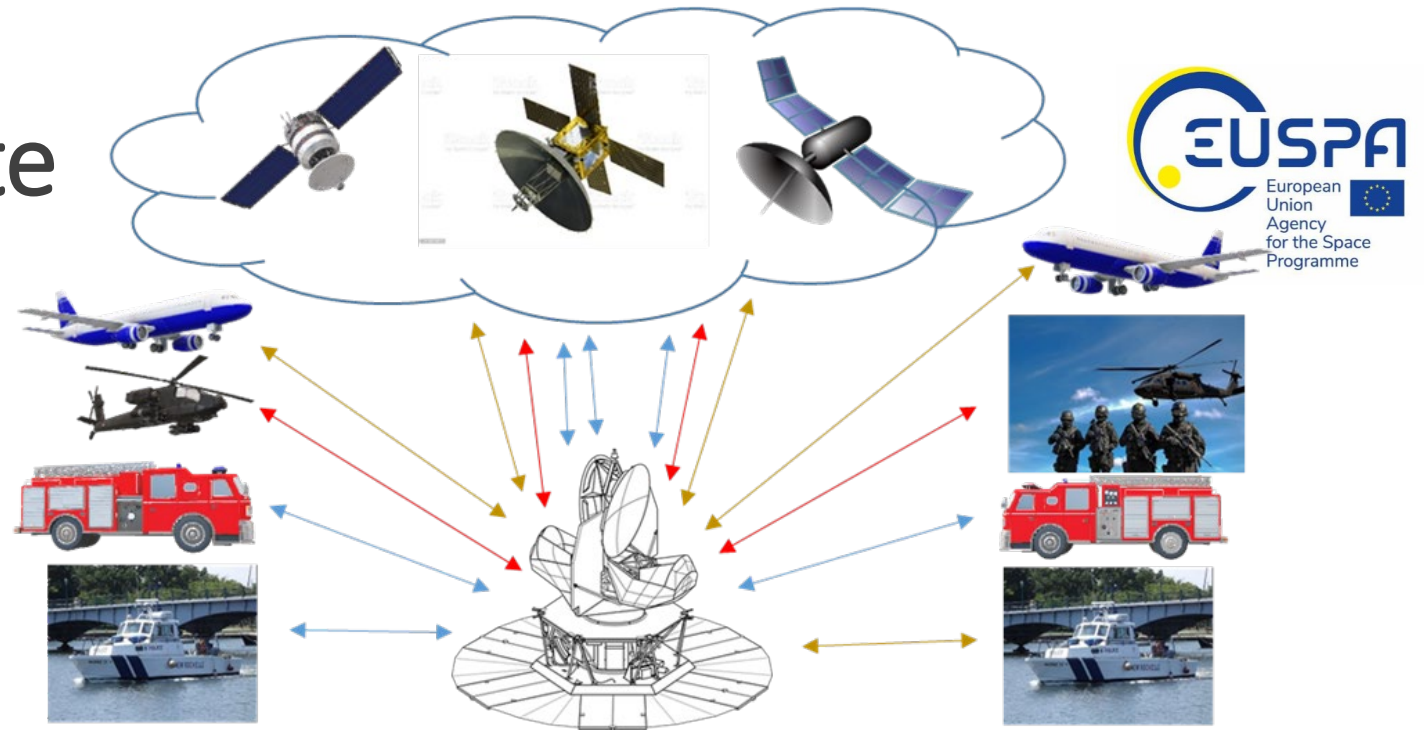


# GOVSATCOM

## (GOVermental SATellite COMMunications)

Today the fragmentation of military, governmental and civilian users results in:

- suboptimal use of resources,
- interoperability issues



- ❖ Under EU GOVSATCOM the existing satellite communication capacities (nationally owned + commercial ones) and services will be combined into a common Union pool with appropriate security requirements.
- ❖ The pooling of satcom resources and the aggregation of user demand will optimise the match between the GOVSATCOM demand and the supply, will support additional security features and foster interoperability.

### **GOVSATCOM to support major infrastructures**

where the absence of proper communication links can be detrimental to the security and safety of the EU, the Member States and its citizen, including transport (e.g. ATM or ERTMS)

# GOVSATCOM use case families



**CRISIS MANAGEMENT**



**SURVEILLANCE**



**KEY INFRASTRUCTURE**

## Secure SATCOM

- Availability
- Resilience
- Assurance
- Integrity
- Easy to deploy

...and Specific Use Cases:

Connectivity in the **Arctic region**, Remotely Piloted Aircraft Systems (**RPAS**) and Machine to Machine (**M2M**)

Source: EEAS(2017) 359 – GOVSATCOM High Level Civil Military User Needs for Governmental Satellite Communications

# Key Infrastructure

## GOVSATCOM to support major infrastructures

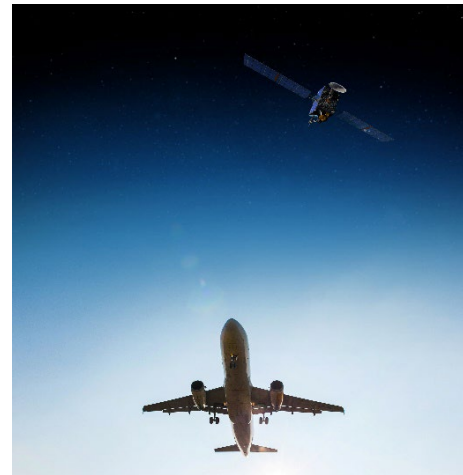
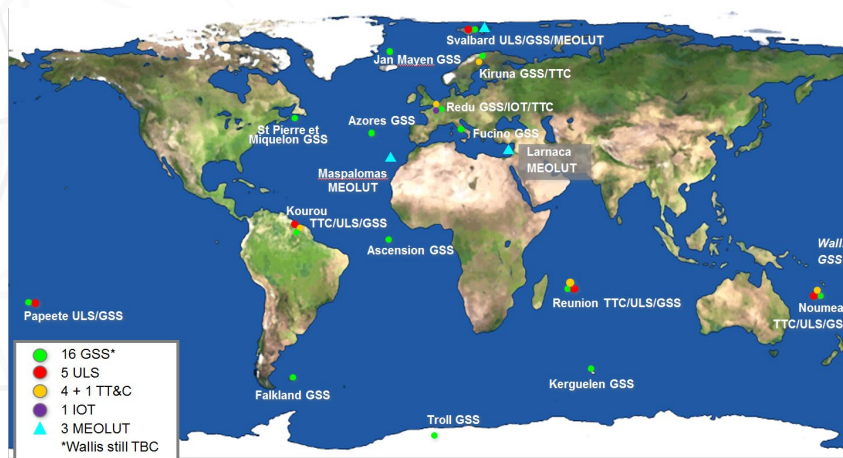
where the absence of proper communication links can be detrimental to the security and safety of the EU, the Member States and its citizen.

**Diplomatic networks**  
(Member States and EU)

**Energy Grid**

**Financial Infrastructure**

**Telecommunication and ICT Infrastructure**



## Transport Infrastructure

### Air Traffic Management:

future SATCOM solution for an increased ATM automation.

Link between in-flight aircraft and ground control centres

### Rail Traffic Management

### Road Traffic Management

### Maritime Traffic Management

## Space Infrastructure: (e.g. Galileo and Copernicus)

1. To support the infrastructure itself, e.g. interconnecting Galileo remote sites.
2. To distribute services to the users, e.g. for aviation users.

# EUSPA Horizon Europe call of 2022 (HORIZON-EUSPA-2022-SPACE)

Opening: 27 October 2022  
Deadline: 16 February 2023

Type of Action	Topic	Indicative budget (EUR mln)	Funding rate
IA	EGNSS applications for Smart mobility	9.5	70% (except for non-profit legal entities, where a rate of 100% applies)
PCP	Public sector as Galileo and/or Copernicus user	5.2	100 %
IA	Copernicus downstream applications and the European Data Economy	9.6	70% (except for non-profit legal entities, where a rate of 100% applies)
RIA	Large-scale Copernicus data uptake with AI and HPC	9.6	100%
RIA	Designing space-based downstream applications with international partners	5,1	100%
RIA	GOVSATCOM Service developments and demonstrations	9,1	100%
TOTAL budget:		48,1	

Innovation action (IA)

Activities to produce plans and arrangements or **designs for new**, altered or **improved products**, processes or services.

Research and innovation action (RIA)

Activities to **establish new knowledge** or to **explore the feasibility** of a new or improved technology, product, process, service or solution.

Pre-commercial procurement actions/ (PCP)

Activities that aim to help a buyers' group to strengthen the public procurement of research, development, validation and, possibly, the first deployment of new solutions





HORIZON-EUSPA-2022-SPACE-02-51

## EGNSS APPLICATIONS FOR SMART MOBILITY

- The action focuses on the development of **close to market** EGNSS transport applications and mobility services through the realisation of large scale **demonstration and implementation** projects.
- Proposals may be submitted in any of the transport areas or propose a multi-mode approach:
  - Aviation
  - Maritime
  - Rail
  - Road

Activities are expected to achieve TRL 7-9 by the end of the project

**Innovation  
Action**



HORIZON-EUSPA-2022-SPACE-02-56

# GOVSATCOM SERVICE DEVELOPMENTS & DEMONSTRATIONS

9,1  
Mio  
EUR

- **Consolidation of security-related services, demonstrations in a user context** and in particular for civilian users and synergies with the services provided by the other components of the Space Regulation (e. g. services for civil protection with Copernicus images).
- This topic address **service developments in support to all High Level User Needs**, including direct involvement of users and with emphasis on civilian users and interoperability of services. This should include Pooling & Sharing demonstrations, in particular on services enabled by new technology developments such as ground segment, RPAS, optical communications or Internet of Things. Service development should include an element of awareness building and outreach.
- **Scope:** R&I for the consolidation of integrated use cases and demonstration of EU GOVSATCOM service interoperability in real user environment:
  - Development of an innovative use case exploiting a **combination** of secure SATCOM services and Fixed Satellite Service (FSS);
  - **Interoperability** of services based on pooled and shared capacities, and interoperability of governmental satellite-based communication services with **terrestrial** ones;
  - Development of end-to-end GOVSATCOM user **services**;
  - Integrated application leveraging the **synergies** with services provided by other Space Programme components;
  - **Proof of concept** in a real user environment;
  - **Awareness** and **outreach** activities.

Specific security provisions (if the activities involve EU Classified Information)  
Entities shall comply with the conditions of Article 24 of the Regulation (EU) 2021/696

Research &  
Innovation Action

For the full description of the topics please see the Horizon Europe 7. Work Programme 2021-2022



Linking space to user needs

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