EU SPACE

FOR PUBLIC TRANSPORT

Enhancing smart mobility and sustainability

#EUSpace

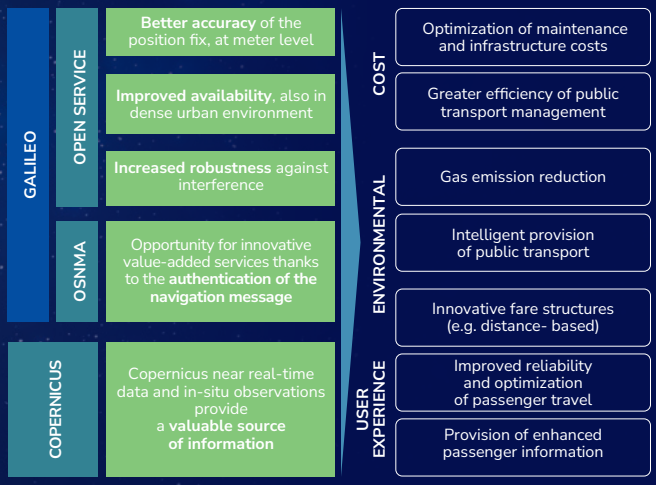
EUSPA
European Union Agency for the Space Programme

EU Space data driving smart mobility forward for better operations and improved sustainability

Thanks to technological evolution, in the last years the offer of public transport has evolved beyond the traditional one and users can now benefit from an array of intuitive and dynamic transport modes. To ensure an efficient operation of innovative smart mobility applications, which sometimes also require safety-critical services, a **reliable localisation information** has become a requisite more important than ever. Furthermore, transport operators are urged to undertake environmentally responsible decisions to ensure the provision of **clean and sustainable urban** transport services. The use of Galileo and Copernicus offers an added value to this new horizon of public transport, ensuring benefits for operators, users and the environment.

Copernicus usage in Public Transportation

- Copernicus provides fundamental data to evaluate factors such as **air quality, land use, traffic patterns and infrastructure conditions**
- Earth Observation data can support the **planning and optimization of the urban transportation network**
- These insights, also in synergy with Galileo data, empower **transportation authorities and operators** to assess existing services, identify areas for improvement and overall to make informed decisions

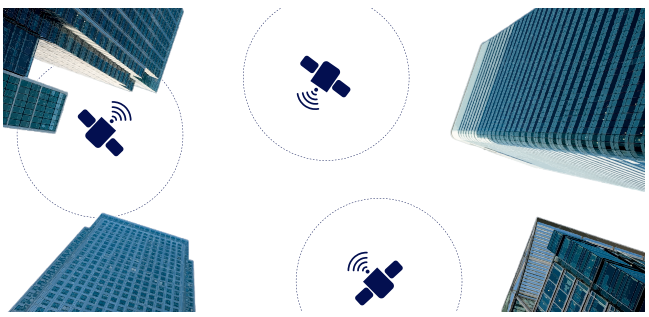


Galileo for Multi-Constellation and Multi-Frequency (MCMF) solutions

Urban transport is growing into new mobility solutions, also leveraging the ubiquity of smartphones. A reliable localisation information – both at user and transport level – is a key enabler of such new paradigm and a **new generation of Multi-Constellation (MC) and Multi-Frequency (MF) receivers** have emerged.

Studies and practical implementations show how the use of multi-frequency receivers in urban environments leads to improvements in both accuracy and availability.

Galileo satellites offer several advantages, such as the L1B/L1C and E5 AltBOC signals that are **more robust to multipath**.

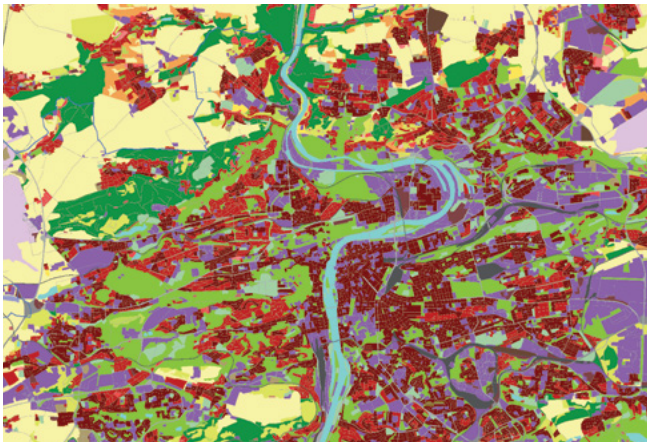


Galileo-enabled receivers

Galileo-enabled receivers (to be used on board buses, trams, cars and bicycles) are widely available in the market for no or marginal extra cost in comparison with GPS-only receivers.

Many companies manufacture Galileo-enabled receivers, in the form of chips, modules, OEM boards or packaged systems, many of which are already available in the market.

Key microelectronics manufacturers
such as u-blox, Qualcomm, Nexcom and Mediatek amongst others have already developed Galileo-enabled models.



Credit: European Union's Copernicus Land Monitoring Service information: Urban Atlas Land Cover/Land Use 2018, Prague

What are the technology standards for public transport?

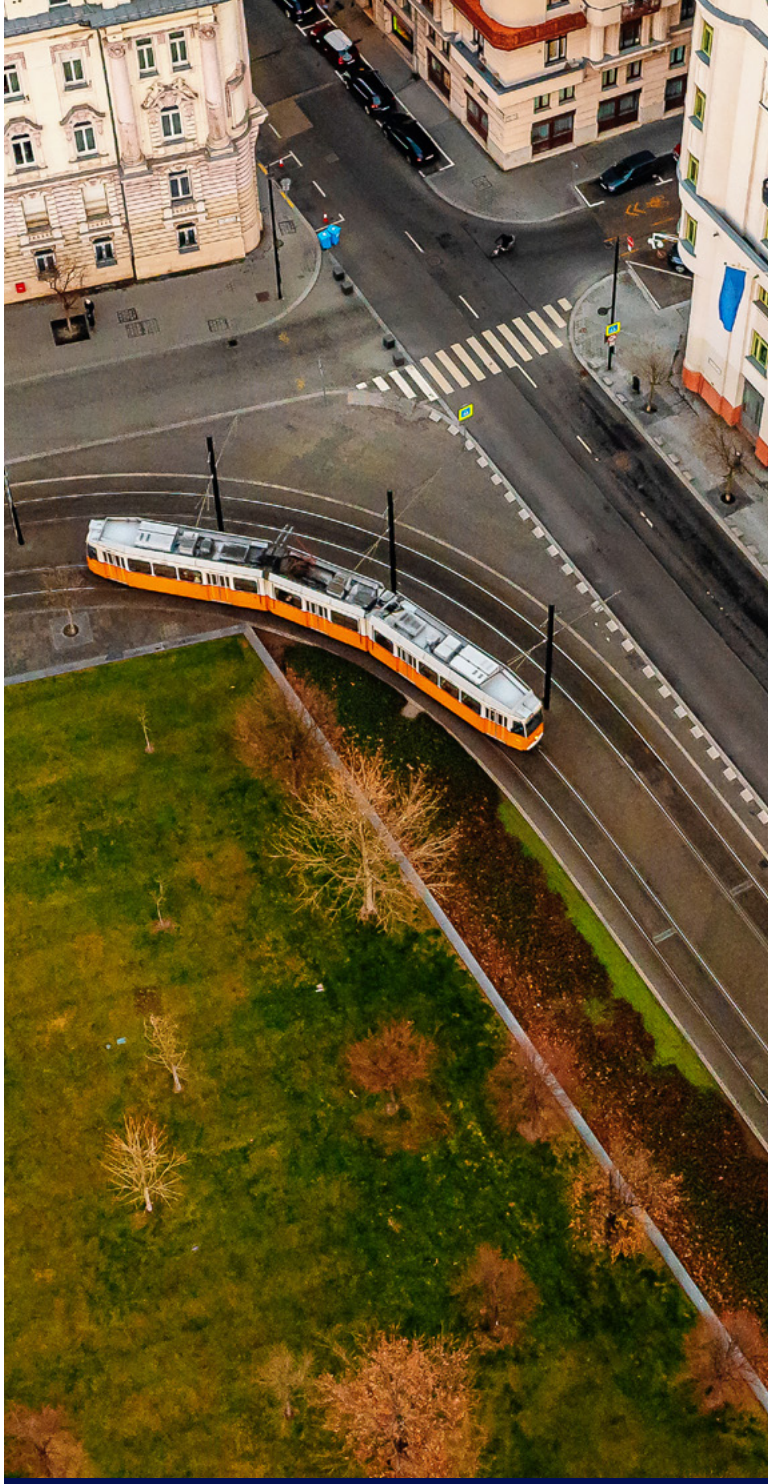
The **non-profit association** ITxPT (Information Technology for Public Transport) provides PT authorities and operators with Technical Specifications (TS) to support the adoption and integration of interoperable IT architecture.

ITxPT Technical Specifications define interoperability on 3 levels:

- HW level (installation rules, space requirements, connectors, etc.)
- COM protocol level (interface between systems, modules, declaration of service, etc.)
- Service level (list of services, format of the service, format of data, best practices, etc.)

This standard assumes a pivotal role in supporting public transport operators, line/fleet managers, IT suppliers, and vehicle manufacturers ensuring operational efficiency, cost reduction and an overall enhancement of passenger services.

The version 2.2.0 released in July 2022 recommends the usage of multi-constellation GNSS receivers (GPS + Galileo as minimum) to improve the signal availability and accuracy in urban environment.



Julia Project

Joint Developments For Urban ResiLlence Connecting Users To Public Transport Through SpAce Technology – JULIA combines digitalisation, public transport expertise, and EU Space services to offer a comprehensive solution for sustainable mobility. The project actively addresses users' pain points related to public transport reliability, safety, and convenience. JULIA introduces 10 cutting-edge applications for public transport based on EU Space services that aim to reduce barriers to sustainable travel.

Main objectives:

1. Showcase the unique benefits of EGNSS, as a powerful booster for the public transport sector, enabling smoother operations and improved efficiency
2. Leverage COPERNICUS data to help cities understand air quality and develop innovative solutions for more sustainable mobility strategies
3. Support decision-making and foster Galileo & Copernicus investment and uptake in public transport

EU Agency for the Space Programme

EUSPA provides safe and secure European satellite navigation services and promotes the commercialisation of Galileo, EGNOS, and Copernicus data and services. It also coordinates GOVSATCOM, the EU's governmental satellite communications programme, and is responsible for the Programme's Space Surveillance and Tracking (SST) Front Desk operations service. By fostering the development of an innovative and competitive space sector and engaging with the entire EU Space community, EUSPA contributes to the European Green Deal and digital transition, the safety and security of the Union and its citizens while reinforcing its autonomy and resilience.

The EU Space Programme

The EU Space Programme, composed of Galileo, EGNOS, Copernicus, GOVSATCOM, Space Situational Awareness and IRIS², is the first integrated space programme created by the European Union to support its space policy, address societal challenges such as climate change and technological innovation, support the EU internal market – and more.

Galileo

Galileo is Europe's Global Navigation Satellite System. It provides accurate, reliable and precise positioning, navigation, timing and safety services. Galileo is designed to provide Europe and European citizens with independence and sovereignty while creating a multitude of services and applications across sectors, ranging from aviation and maritime to agriculture and location-based services.

EGNOS

The European Geostationary Navigation Overlay Service (EGNOS) is Europe's regional satellite-based augmentation system (SBAS) used to improve the performance of global navigation satellite systems like GPS and soon, Galileo. EGNOS uses a set of geostationary satellites and a network of ground stations to increase the accuracy of existing Global Navigation Satellite Systems.

Copernicus

Copernicus is the European Union's Earth Observation programme, looking at our planet and its environment to benefit all European citizens. It offers information services that draw from satellite Earth Observation and in-situ (non-space) data.

IRIS²

The IRIS² Satellite Constellation is the European Union's answer to the pressing challenges of tomorrow, offering enhanced communication capacities to governmental users and businesses while also ensuring high-speed internet broadband to cope with connectivity dead zones.

GOVSATCOM

The EU GOVSATCOM initiative will ensure the long-term availability of reliable, secure and cost-effective governmental satellite communications services for EU and national public authorities managing security critical missions and infrastructures.

Space Situational Awareness

To mitigate collision risks between EU Space satellites and other spacecraft and debris, the EU established a set of capabilities through the Space Situational Awareness (SSA) component of the EU Space Programme. An integral part of SSA is Space Surveillance and Tracking (SST). SST uses a network of ground- and space-based sensors and other infrastructure to survey, track and protect EU Space assets from artificial space objects orbiting Earth (mostly debris from launchers or satellites).

Want to learn more about EU Space for public transport?

Download the EUSPA EO and GNSS Market Report here:
Or contact us at market@euspa.europa.eu.

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Linking space to user needs

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