EU SPACE

FOR MARITIME AND INLAND WATERWAYS

Sailing towards a greener, autonomous and digital future







The EU Space Programme

With water-based transportation booming worldwide, Europe's ports and inland waterways are becoming increasingly congested. This growth requires new solutions to improve efficiency and safety while also minimising the impact maritime operations have on the environment.

Earth Observation data and accurate and reliable positioning provided by the Global Navigation Satellites Systems (GNSS) and are key elements for a range of operations. They also help improve navigational safety and protect maritime and inland waterway environments. New satellite-based services that substantially reduce response times in case of an emergency will soon become available.

Three components of the <u>EU Space Programme</u>, EGNOS, Galileo and Copernicus, serve as the backbone for a wide range of solutions tailored to the sector. These include assisting commercial and leisure vessels navigate the seas and inland waterways, search and rescue activities, port operations and protecting the natural environment.



Copernicus Sentinel 2 imagery: Anchored vessels queuing to enter the Port of Piraeus, 15 July 2022.

Specifically, Galileo, EGNOS and Copernicus support:



How the EU Space Programme directly benefits port authorities

The amount of trade done via shipping is expected to double by 2030. To meet this increasing demand, new vessels are being built bigger than ever before. As a result, shipping lanes are being squeezed. This, coupled with an increase in the number of offshore wind farms and the designation of new protected areas, means maritime traffic now requires new levels of stringent accuracy.

This is where the EU Space Programme comes into play.

Take for example the EGNOS-based portable pilot units that provide increased confidence and accuracy in a vessel's in-port positioning. This accurate positioning enhances the precision of <u>Vessel Traffic</u> <u>Monitoring and Information Systems (VTMIS)</u>, which manage vessel movements and increases both safety and efficiency.

With automation being rapidly introduced across all aspects of container handling equipment, the demand for high-performance GNSS is on the rise. In fact, several ports around the world are already taking advantage of innovative port applications that work using European GNSS (EGNSS) in combination with additional sensors such as cameras and LiDAR. Advanced location and navigation solutions based on Galileo and EGNOS allow for the automation of such port vehicles as straddle carriers and cranes at significantly lower cost. This will open the door to short to medium term investments, which will eventually result in the introduction of autonomous vehicles in new port terminals.

The added value of EU Space

The maritime industry is facing an increasing amount of GNSS spoofing incidents. Erroneous data of a vessel's position, speed and direction poses real threats, not only to its own operations, but also to surrounding ships and especially those carrying dangerous goods. From leaving crew and cargo vulnerable to hijacking and theft to guiding a vessel off course, the implications of falsifying GNSS signals can have a negative impact on the Union's 'blue economy'. With the Galileo Open Service Navigation Message Authentication (OSNMA) service, vessels will be able to verify the authenticity of GNSS information, making sure that the data they receive is indeed from Galileo and has not been modified in any manner.

The Galileo High Accuracy Service (HAS) will be gradually rolled out for the benefit of the maritime sector. This service will be particularly useful for merchant navigation and piloting operations in ports and inland waterways, offshore supply vessels with dynamic positioning, autonomous surface vessels and others.

The **Copernicus** Marine Service (CMEMS) provides a variety of products to monitor the state of the sea (e.g., currents, waves, wind, sea ice, etc.), the quality of waters (including pollutants and sediments) and to estimate the depth of the seabed (coastal bathymetries). This information can be used for optimising routes, updating coastal nautical charts and monitoring pollution that could affect certain protected areas.

Galileo for Search and Rescue operations

The <u>Galileo Search and Rescue (SAR)</u> service is a unique capability of the Galileo programme. The service relays radio beacon distress signals to the relevant SAR authorities by means of dedicated payloads on-board Galileo satellites, supported by three ground stations strategically deployed across Europe. The Galileo SAR infrastructure is interoperable with GPS and Glonass SAR transponders. Galileo's SAR capabilities are integrated into the international COSPAS-SARSAT programme – a satellite-based SAR distress alert detection and information distribution system.

Galileo SAR services make a meaningful difference by offering:

- Faster alert localisation and message detection (from several hours down to just 10 minutes)
- More precise localisation of the distress beacon, with an error level below 5km
- Higher availability
- A pioneering <u>Return Link Service (RLS)</u>

The ground-breaking RLS service allows people in distress to receive an automatic acknowledgement that their location has been determined. The service increases survival rates by giving an important psychological boost to people in distress. COSPAS-SARSAT estimates that the international SAR system, with the contribution of the Galileo SAR and RLS service, saves more than 2000 lives a year.





EU space synergies make the EU blue economy more sustainable

The EU Space Programme's contribution goes beyond Search and Rescue and safe maritime navigation. It also benefits the environment.

For example, the accurate navigation offered by Galileo and EGNOS helps optimise routes, resulting in less fuel being used and less carbon being emitted. It also helps maritime operators comply with the <u>International Maritime Organisation's</u> <u>greenhouse gas strategy</u>.

Furthermore, Optical and Synthetic Aperture Radar images by Copernicus are used to detect oil spills. When combined with accurate positioning from Galileo, they assist authorities to reach the incident site easily and thus mitigate the negative impacts of oil spills.



Copernicus Sentinel-1 imagery: Oil spill on the coast of Syria. 24 and 25 August 2021

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 <u>EU Space Programme</u>, 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

<u>Galileo</u> 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 (<u>EGNOS</u>) 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

<u>Copernicus</u> 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 <u>IRIS²</u> 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 <u>GOVSATCOM</u> 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 <u>Space Situational Awareness</u> (SSA) component of the EU Space Programme. An integral part of SSA is <u>Space Surveillance and Tracking</u> (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).

Interested in learning more about EU Space for maritime?

Download the EUSPA EO and GNSS Market Report here:







Linking space to user needs

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