#EUSpaceResearch

EVOLUTION OF EGNSS INFRASTRUCTURE

ENSURING INDEPENDENT AND STATE-OF-THE-ART SERVICES FOR EUROPEAN CITIZENS AND BUSINESSES

Horizon Europe,
a programme of the
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European Global Navigation Satellite System (EGNSS)

and why it's important for our everyday lives

Today, the use of a Global Navigation Satellite System (GNSS) is deeply ingrained in our everyday lives and can be found in our phones, cars, planes, ships and many other applications. Navigation systems guide us to our desired locations, aid farmers in efficiently working their fields, and even speed up rescue operations. Europe has its own GNSS systems, **the European GNSS**, encompassing **Galileo**, a state-of-the-art global satellite navigation system, and **EGNOS**, a regional satellite-based augmentation system used to improve the performance of global navigation systems. Galileo is of strategic importance to Europe, providing robust and accurate positioning services to European citizens, industries and governments without having to rely on the US GPS, the Chinese Beidou, or the Russian GLONASS systems. It is also enabling the European Union to develop and maintain its know-how and its industrial capacity in such a high-value sector. Since Galileo went live in 2016, its fleet has grown to a total of 28 satellites in medium Earth orbit, delivering a rich portfolio of services, ranging from freely accessible timing and positioning services to authenticated signals or encrypted government geo-positioning, as well as search and rescue services, short messaging capabilities and broadcast of emergency warnings.

Global trends in satellite navigation

and how Galileo adresses them

Both Galileo and EGNOS services create extensive socio-economic benefits through a wide range of applications, spanning numerous market segments and generating value for both the public and private sectors. These competitive environments drive the need to anticipate ever-changing market demands and adapt the EU space infrastructure to meet them.

To this end, the Galileo infrastructure will evolve with the arrival of the **second generation of Galileo (G2G) satellites**. With a gradual introduction of cutting-edge new generation satellites in the current Galileo fleet, several important innovations will be made available to Galileo users:

- **Diversification of navigation services:** G2G will strengthen the already excellent Galileo portfolio with innovative services such as timing service, emergency warning, and provision of integrity.
- **Strengthen robustness of the satellite navigation services:** G2G will bring solutions including frequency diversity, increased power levels, signal encryption and various levels of authentication features.
- **Increased accuracy in time and position:** Building upon the standard set by the first generation of Galileo satellites, G2G will rely on new a generation of atomic clocks, an innovative on-board time generation approach, and in-orbit validation of experimental models.
- **Use of state-of-the-art satellite technology:** G2G spacecraft will be flexible and react swiftly to evolving user needs with their modern and powerful platforms. Technologies such as intersatellite links and electric propulsion will improve the capacity to control and operate the constellation, while simultaneously lowering operating costs.

The foundation of an efficient and robust system – now and in the future

In 2016, the European Commission published a 'Space Strategy for Europe', confirming its commitment to the stability of the EU Space Programme and to strengthening the systems' competitive advantages. In a changing environment and fast-evolving market, **this strategy laid down the principle of continuity of service with greater efficiency and robustness.**

To that end, the strategy recommended preparing the new generations of these systems on a user-driven basis and considering the technological progress. It also recommended addressing the vulnerability of the European supply chain by supporting the development of critical space components, systems and technologies associated with technological non-dependence.

In this context and together with the Member States, the European Space Agency (ESA), the Agency for the EU Space Programme (EUSPA) and the Joint Research Centre (JRC), the European Commission delivered in 2019 the **long-term plan for EGNSS Upstream R&D activity**. This framework identifies the strategic needs and recommendations for upstream R&D in Horizon Europe (2021-2027) to support the further development and evolution of the Galileo and EGNOS infrastructure and sets priorities for the accompanying upstream R&D activities.

Horizon Europe is supporting the evolution of Galileo

Horizon Europe is supporting the evolution of Galileo, both in space and on the ground, to leverage emerging trends, address evolving user needs and act on the other considerations outlined above. Horizon Europe is also supporting specific innovations, such as combining satellite signals with other solutions like 5G and 6G, allowing even more robust and continuous services or the diversification of Galileo's orbits and the integration between navigation and communication.

Funding Galileo's future

Attaining the necessary technology level for modernising its space infrastructure and for delivering innovative services

Achieving non-dependence

Fulfilling EU non-dependence in the supply of critical components of the EGNSS infrastructure

Supporting EU socio-economic benefits

Addressing the emerging needs of user communities and reinforcing the competitiveness of the EU space industry

Be part of the EU-funded space R&I

Horizon Europe is the EU's key funding programme for research and innovation, with a budget of around €95 billion over 2021-2027, of which close to €1.6 billion is dedicated to space research. The space R&I is managed by the Health and Digital Executive Agency (HaDEA), the EU Agency for the Space Programme (EUSPA), the European Space Agency (ESA) and the European Commission itself. Most calls are also published on the EC Funding and Tenders participant portal.