

STARGATE

Key facts

Full name

System for Trusted And Reliable Galileo Authenticated Time Ecosystem

Project call number

EUSPA/GRANT/02/2024-02

Project call

Galileo Timing receivers implementing CEN/CENELEC standards

EU contribution

€ 762,843.17

Market segment

Critical Infrastructure

Project start/end

01/09/2025 – 30/04/2027

Context and motivation

Modern digital infrastructures depend on precise and reliable time, yet most existing GNSS-based timing solutions rely on unauthenticated signals and lack formal integrity guarantees. This exposes operators to growing risks from interference, spoofing, and system faults. Galileo introduces a dedicated Timing Service and, for the first time, a European standard defining timing receiver requirements. STARGATE addresses the urgent need to translate this framework into an operational receiver that enables trusted European timing autonomy.

Scope

STARGATE covers the full chain from receiver requirements and design to implementation, testing, and user integration. The project develops a Galileo timing receiver aligned with EN 16605, validates it against the associated test suite, and integrates it into a representative timing server platform. The scope includes laboratory and simulated testing, demonstration in realistic conditions, and preparation for market uptake, ensuring readiness for deployment in operational environments.

Targeted Product

The targeted product is a Galileo Timing Receiver compliant with CEN/CENELEC EN 16605:2024. It is designed as a professional timing receiver module, supporting dual-frequency Galileo, OSNMA authentication, T-RAIM, and robust holdover operation. The receiver is intended to be integrated into timing servers and synchronization units used in telecom, energy, and other critical infrastructure domains.



Targeted GNSS innovation

STARGATE targets trusted and resilient GNSS timing for critical infrastructures by exploiting the new Galileo Timing Service and its associated integrity features. The project focuses on turning Galileo's authenticated timing signals into a deployable timing solution that users can trust under nominal and disturbed conditions. The innovation lies in combining system-level integrity information (Timing Service Message) with receiver-level protection mechanisms to deliver assured time, not just accurate time.

Challenge & technical solution

Key challenges include guaranteeing timing integrity under degraded GNSS conditions, correctly processing Galileo Timing Service flags, and achieving robust performance without over-constraining receiver design. STARGATE addresses these by implementing a performance-based architecture combining TSM processing, T-RAIM integrity monitoring, OSNMA authentication and communication with timing servers for them to decide holdover strategies. Extensive simulation and record-and-replay testing are used to validate compliance with EN 16605, ensuring the final solution delivers reliable, trustworthy time even in adverse scenarios.

