

Consortium



a Thales / Leonardo company

Thales Alenia Space in Italy (TAS-I) is the Italian division of Europe's largest satellite manufacturer, it operates in the security, aerospace, transportation, defense and space markets. TAS-I is the **leader company** of the project, **being responsible of its development** in each phase



Business Integration Partners S.p.A (Bip) is an international management consulting company specialised in transforming the future of large and complex business realities.

Bip will provide its wide expertise to **business development** and **dissemination plan** of GIANO project, thanks to its consolidated know-how on downstream sector



PIKTime Systems is a Polish company specialized in precise timing applications and time-based products &

services. Piktime will **design the timing distribution module** of GIANO, providing accurate time synchronisation on the selected interfaces



Space Research Center of the Polish Academy of Science (SRC PAS) is an interdisciplinary research institute, which participates in space research, as well as development of space equipment in Poland.

SRC will contribute to **testing** and **validation phases** of the platform prototype, evaluating the time transfer receiver performance with live signals at the **Astrogeodynamical Observatory**



DEIMOS is a lead engineering and space system provider in Europe. Deimos will be responsible for design and implementation of **Galileo authentication algorithms**

and will support the architecture definition phase



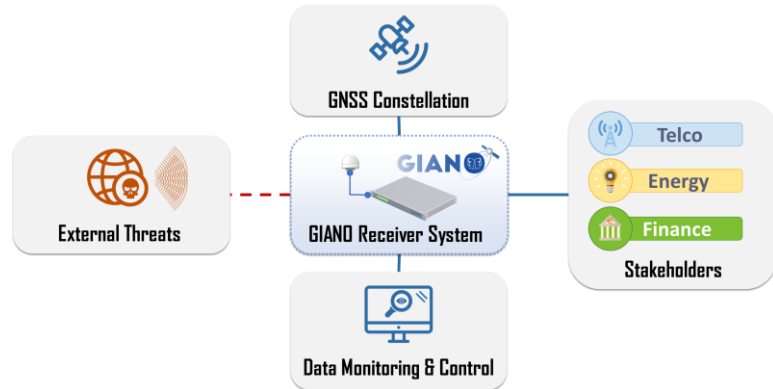
**Galileo-based
Timing receiver for
critical infrastructure
robustness**

<http://gianoproject.eu/>



Project Overview

GNSS technology is currently widely used by **Timing and Synchronisation users community** because capable to provide timing services granting time, phase and frequency network synchronisation



Unavailability of synchronisation due to unintentional or intentional interferences and/or attacks of **GNSS signal** can cause **economic losses** due to **disruption of the services**. The proposed GIANO technological solution will provide benefits to the operators by **increasing the robustness** of the system

BBC GPS error caused '12 hours of problems' for companies

Several companies were hit by hours of system warnings after 15 GPS satellites broadcast the wrong time, according to time-monitoring company Chronos.

The company observed problems in January 2016, after noticing some GPS time signals were 13 microseconds out.

Such a discrepancy is considered severe and several Chronos telecoms clients faced "12 hours" of system errors

The Economist GPS Jamming Out of sight

In July 2013, every day, for up to ten minutes, near the London Stock Exchange, someone blocks signals from the global positioning system (GPS) network of satellites. Navigation systems in cars stop working and timestamps on trades made in financial institutions have been affected losing access to timing data.

These accidental interferences didn't cause disaster because the home-built jammers have limited range.

Main aim of GIANO project is to **bring Galileo and EGNOS driven innovation to GNSS-based timing and synchronisation domain**. For this purpose, a Technology Readiness Level 7 (TRL7) platform, capable of fulfilling the **accuracy and robustness requirements of several timing applications**, will be developed and validated

Target User Segments

Telco

In the Telecom market, **40% of the network exploits GNSS as a Timing Reference** and GNSS-based timing & synchronization solution generates a **saving of about 600 M€ yearly** with respect to the deployment of terrestrial solution.

- Galileo based timing receivers are **enablers for 5G networks**
- Enhanced networks **synchronisation for emergencies**

Energy

In Energy production and distribution segment, especially for the **development of smart grids**, the impact of space services in the sector is estimated around **1.5 - 2 B€ of the Gross Value Added**.

- Prevention** of power outages
- Secured** Infrastructure
- Improved Quality** of supply & services

Finance

In the Finance sector, **35% of money transactions are stamped with GNSS-based time** and the economic impact of a sudden failure of GNSS would be massive

- Improved **transparency and legal values** of transactions
- Prevention** of service outages

Other

Several secondary target groups are directly involved in T&S topics, such as: Transportation, Research community, etc.

- Safety, quality-of-life and higher performance are the key-aspects for T&S receivers
- Protection against external threats can be a crucial differentiator

Product Solution

GNSS Capability

- GPS/Galileo/EGNOS Multi-Constellation
- Combined Solution capability
- Multi-Frequency (L1/E1, L5/E5a, E6)

High RF flexibility achieved thanks to innovative **Direct-Sampling** and **Digital Down-Conversion approach**

Improved Timing Robustness

- Improved **Resilience** with active **anti-Jamming** and **anti-Spoofing**
- Galileo OS authentication
- Availability of EGNOS corrections
- T-RAIM for improved time solution integrity
- Accurate **Digital Time-Steering** and/or **Holdover** mode with transparent timing output towards users

Interfaces & Standards

- Stable, accurate and robust **1PPS and 10 MHz** signals
- Synchronization with **UTC, GST or GPST**
- Time output through **standard interfaces & protocols: PTP (IEEE 1588v2), NTPv4 (RFC5905), IRIG 200-16**
- Receiver Data output compliant with **CGGTS-V2E** and **RINEX** formats