



DEGREE

DronEborne Galileo RecEivEr

Key facts

Full name

DronEborne Galileo RecEivEr

Project call number

GSA/GRANT/07/2019

Project call

Development of a drone-borne double frequency Galileo receiver

Funding

833 863,24 EUR

EU contribution

583 703,96 EUR

Topic

Aviation

Market segment

Aviation

Project start/end

01/09/2021 – 31/08/2023

Galileo differentiators

Multi-frequency GNSS
Galileo OSNMA

Context and motivation

Drones represent a global phenomenon and one of the first pervasive platforms in which multiple PNT technologies are integrated, including GNSS, Inertial Navigation Systems (INS), Vision-Based Systems and Signals of Opportunity. To date, multiple GNSS receiver manufactures offer chipsets and OEM receiver boards for drones in a wide range of performance, grade and price. In this context, European GNSS (EGNSS) is at the core of the drone revolution and future U-space services. EGNSS provides significant added value to drone navigation, positioning and related applications, and the use of their differentiators will be instrumental in developing new business opportunities.

Receiver manufacturers are well aware of the benefits that EGNSS can bring and are eager to pass on these advantages to their users.

In order **to improve security and safety of navigation subsystems**, technology development and EU investments on GNSS receivers are now focusing on the requirements related to the Specific Category of UAS operation. The development of the **DronEborne Galileo RecEivEr (DEGREE)** supports this strategy with high flexibility and adaptability to Risk Assessment processes, to allow safe flight operations.



Targeted GNSS innovation

Multi-frequency GNSS, INS



Targeted Product

Dual GNSS Receiver & Dual Antenna Hardware architecture

Scope

The objective of DEGREE project is the development an **innovative Galileo Dual-Frequency receiver** with target Technology Readiness Level (TRL) 7 and a **competitive cost** for the launch in the market.

The integration of the DEGREE receiver in a UAV Flight Control System enables the validation of the algorithms and navigation solution in a representative environment. Multiple test flights were conducted in real conditions, both in Galileo-only mode and in multi-constellation mode. For a proper assessment and test, the **procedures used** for flight testing fully **comply with EASA regulation for UAV operations.**

Challenge & technical solution

The new DEGREE solution was built addressing the following key differentiators:

- **Innovative Dual GNSS Receiver and Dual Antenna HW architecture**, embedding a state-of-the-art chipset GNSS receiver supporting all GNSS constellations
- **Assured Navigation Engine**, powered by a smart and highly multi-constellation and multi-frequency navigation software.
- **Support to robust PNT and Open Service Navigation Message Authentication (OSNMA)** for cybersecurity threats
- Support to **High-Accuracy services and L1/L5 SBAS**
- Signals of Opportunity, with capability to **support non-GNSS signals.**

