



HAUT Phase 2

Key facts

Full name

Galileo HAS Phase 2 Reference User Algorithm and User Terminal

Project call number

EUSPA/OP/35/23

Project call

Galileo HAS Phase 2 Reference User Algorithm and User Terminal (HAUA and HAUT v2)

EU contribution

€ 1,529,667.41

Market segment

Transversal

Project start/end

22/10/2024 – 22/10/2027

Context and motivation

Following the success of its predecessor project (HAUT), HAUT2 was conceived as an evolution of the User Algorithm and User Terminal for the next phase ("Phase 2") of the Galileo High Accuracy Service (HAS), which will provide increased accuracy, availability and better convergence performance to users worldwide. Galileo HAS is already providing accuracy at the level of few decimetres, through precise-point positioning (PPP) "corrections" broadcast by the Galileo satellites, free of charge and globally (HAS also distributes its information via Internet terrestrial links). The information disseminated today consist of clock and orbit corrections and code biases, to be applied to the navigation messages of both Galileo and GPS satellites.

The service roadmap for HAS is shaped towards the provision of additional phase biases, ionospheric corrections in the European Area, satellite correction accuracy parameters and authentication information ("Service Level 2", SL2), plus a general increase of the user accuracy performance ("Service Level 1", SL1) due to a higher number of sensor stations and improvements in the user algorithm (for instance, ambiguity resolution).

Project EUSPA/OP/35/23 was launched to enable the validation of HAS in Phase 2 of the service, well in advance to its official operation and monitor HAS performance following the official service declaration, while allowing backwards compatibility.

Targeted GNSS innovation

Galileo High Accuracy Service (HAS) for Phase 2



Challenge & technical solution

The HAS-UT implements PPP operating in several working modes, which include dual- and triple-frequency solutions for single constellation (Galileo) and multi-constellation (Galileo+ GPS).

It has the capability of exploiting all the HAS corrections delivered in both the Initial Service or Phase 2 Service, either from the signal-in-space (E6-B channel) or from the internet channel (through messages encoded in RTCM format following the NTRIP protocol). Special improvements, such as the concurrent generation of navigation solutions in three working modes, the provision of a software tool capable of processing station data in standard formats and the generation of a standalone software library make this project not only an upgrade of the HAUT product to cope with the service evolution, but also the basis for further solution developments. Certainly, the independence from constraining third-party software licenses, lack of royalties and UE-based ownership (apart from the improved readability and quality of the code) will make it a good start for entrepreneurs.

Targeted Product



HAS reference User Algorithm (HAS-UA) for Service Phase 2; prototype User Terminal (HAS- UT) implementing the HAS-UA.