

SPACE SYSTEMS SYMPOSIUM (D1)
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USE OF GNSS RECEIVERS WITHIN THE SMALL GEO PRODUCT LINE

Abstract

GNSS receivers on Geostationary Earth Orbit (GEO) satellites enable simplified ground operations and increased onboard autonomy. These features led OHb System to decide, supported by ESA, to fly an experimental GNSS receiver on the first SGE0 satellite, Hispasat AG1. Another receiver is to be embarked on Electra, the first full electric platform of the SGE0 family. This paper describes the implementation of the GNSS receiver onboard Hispasat AG1 and includes results of extensive on-ground verification testing. The paper further details the embedding of a GNSS receiver on the Electra platform by describing the system architecture and modes of operation, including some first analysis results.

The Small GEO product line developed by OHb System is based on a modular satellite platform that can be adapted to various payload needs in the small and medium size range. One of the goals of this newly developed product line is to provide the satellite operators with an innovative satellite bus having the capability to increase on-board autonomy and simplify the on-ground operations. A GNSS receiver is a key enabler for these capabilities.

On the first satellite of the product line, Hispasat AG1, a hybrid spacecraft using a standard chemical propulsion system for the transfer to GEO and an electric propulsion system for station-keeping, a GPS receiver is embarked as an experiment. The purpose is to demonstrate the operation of the GNSS receiver in GEO and characterize its performance.

The first all-electric propulsion satellite of the SGE0 series, Electra, includes an onboard GNSS receiver as a nominal AOCS unit. Its use will be particularly beneficial during the long transfer phase, to provide onboard orbit determination functionality for navigation and collision avoidance tasks. Once in GEO, the use of a GNSS receiver allows high precision orbit determination with high availability and the potential of supporting autonomous station keeping.