

# Engineering and Standardising EGNOS ground segment software: a major challenge

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## Abstract

This paper will present the issues related to the massive utilisation of software in the EGNOS Ground Segment infrastructure and the specific problems which are raised by such an approach.

The EGNOS ground segment is based on a fault tolerant, pipeline architecture:

The Central Processing Facility (main computing node) and the Central Control Facility (24h manned monitoring and control) are software intensive subsystems. The Range & Integrity Monitoring stations (data collection points) and Navigation Land Earth Stations (uplink to Geo satellites) are also largely software based.

Software therefore implements the greatest part of the EGNOS ground segment functionality. Large amounts of code and documentation will be produced by the Egnos industrial consortium along the development phases.

This software is mostly of real time and embedded nature, downloadable via the EGNOS Wide Area Network, featuring command and control interfaces and remote diagnostics, which raise specific engineering and qualification challenges.

Because of the safety and certification considerations which pertain to the EGNOS system, the ground segment software development is constrained by standards based on RTCA DO-178B and ESA PSS-05 series documents. A specific effort was conducted to harmonise these standards and elaborate development rules consistent with both approaches.

In an attempt to optimise development costs and benefit from technology improvements, the ground segment software will use Commercial Off The Shelf software, both as development/verification tools and as part of the operational real-time software. Specific constraints related to safety and perennity of these products must be managed throughout EGNOS development and operational life.