

Galileo System Simulation Facility (GSSF)

The Galileo System Simulation Facility (GSSF) is a simulation environment that reproduces the functional and performance behaviour of the Galileo system to support the simulation needs during the entire Galileo programme lifecycle.

Summary

GSSF provides a single simulator that uses alternative models depending on the type of analysis the user wishes to perform:

- > **Service Volume Simulation (SVS):** Navigation and integrity performance analyses over longer time periods and over large geographical areas
- > **Raw Data Generation (RDG):** Galileo and GPS raw data production for experimental purposes (RINEX 3.00 observation and IGS SP3)

GSSF enables simulation of the nominal system and also its various degraded modes, in a deterministic or probabilistic manner. The Space Segment and User Segment are not limited to Galileo and provide GPS and EGNOS related models, and user-defined satellites or satellite constellations.

GSSF offers a rich set of functionality to allow the user to:

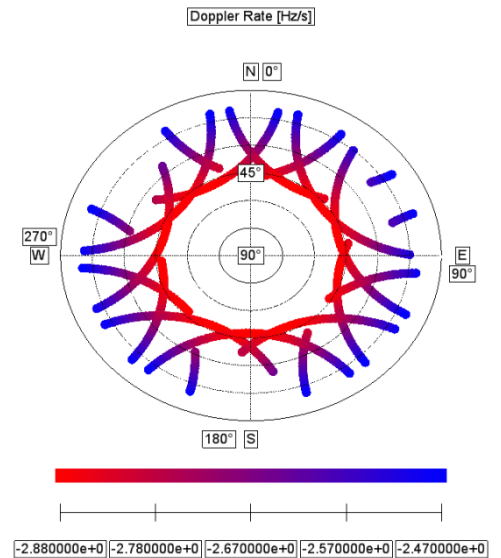
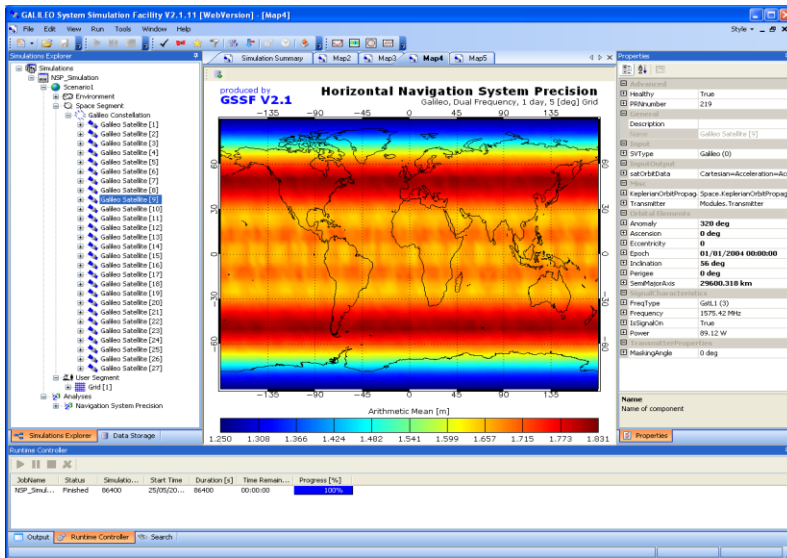
- > Configure simulation scenarios in detail
- > Analyse and visualise data
- > Import and export data
- > Perform model development and implement user-defined algorithms (i.e. Integrity)

GSSF provides a modern and flexible User Interface providing a Property Grid to edit the parameters of key elements such as users, satellites, and simulation models. For all parameters default values are provided to ease its use.

A reporting feature is also provided, allowing the generation of simulation report documents including the complete simulation/scenario details.

GSSF SVS Figures of Merit

GSSF offers flexibility in how analyses are executed. The user can either select analyses listed in the analyses catalogue so that the recorded data is then processed automatically after execution of the simulation – or run analyses manually on previously recorded simulation data.



The following standard analysis components are available in GSSF:

- > Visibility
- > Extended Visibility
- > Coverage (Depth of Coverage)
- > Inverse Coverage
- > Geometry
- > Dilution of Precision (DOP)
- > Navigation System Precision (NSP)
- > Independent Integrity Path
- > Signal-In-Space Monitoring Accuracy (SISMA)
- > Integrity

Additionally, the following post-processing components are available:

- > Service Availability
- > Critical/Redundant Satellites
- > Continuity
- > Generic Availability
- > Degradation
- > Granularity
- > Time-Validity
- > Statistics

Upgrades to GSSF SVS

Some of the upgrades applied to GSSF SVS are given below:

- > Inclusion of more integrity concepts
- > Implementation of an interface for Contact Planning/Uplink Scheduling
- > User Dynamics (mobile users)
- > SBAS/EGNOS support
- > Interface for user-defined integrity algorithms
- > Interface for user-defined ARAIM algorithms

Upgrades to GSSF RDG

Some of the upgrades applied to GSSF RDG are given below:

- > Enhancements of Ionosphere and Troposphere modelling
- > Antenna Phase Centre Offset
- > Code Tracking Error Variance
- > HW Biases and Receiver Cycle Slips
- > Earth Solid Tides
- > Solar Radiation Pressure Model (Galileo-specific)
- > RDG Model Calibration against real (GIOVE-A) data

Platform

GSSF runs on Windows PC systems.

GSSF SVS Download

Users can apply to ESA for a free GSSF SVS license at www.gssf.info. GSSF is being developed by Telespazio VEGA on behalf of ESA/ESTEC.

About Telespazio VEGA Deutschland

Telespazio VEGA Deutschland is one of the leading names in the European Space sector, working with Space agencies, satellite operators and manufacturers worldwide. We support the full programme lifecycle to ensure that the design, development and operation of Space missions meet the programme goals. We have a first-class reputation for innovation and pragmatism, providing consulting and engineering services and developing technology to help guarantee success.

