

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Mobile Satellite Communications and Navigation Technology (2)

Author: Dr. Gaetano Galluzzo
ESA, The Netherlands, gaetano.galluzzo@esa.int

Mr. Daniel Blonski
ESA, The Netherlands, daniel.blonski@esa.int

Mr. Rafael Lucas Rodriguez
ESA, The Netherlands, Rafael.Lucas.Rodriguez@esa.int

A METHODOLOGY FOR GNSS SYSTEM PERFORMANCE VERIFICATION, A GALILEO SYSTEM
PERSPECTIVE.**Abstract**

Three successful satellites launches in 2015 doubled the number of the satellites in orbit of the Galileo system, leading to a total of 9 operational and *healthy* satellites. Two additional launches planned in 2016, including a quadruple launch configuration with Ariane 5, will boost the deployment of the Galileo space segment.

In parallel to the momentum in space, the Galileo system ground infrastructure underwent two major upgrade milestones in 2015, resulting in enhanced processing elements comprising the two fully redundant Galileo Control Centres in Italy and Germany (GCC-I and GCC-D), providing an expanded worldwide distributed network of Galileo Sensor Stations, uplink and TT&C stations. The ground segment evolutions have enabled significant performance and operability improvements.

Along with this acceleration in the system deployment, the emphasis is now shifting towards a service oriented phase. It is therefore critical to ensure the overall system robustness in terms of availability and accuracy during the planned ground and space segment developments, as well as the provision of timely notifications to users in case of major service degradations.

In addition to the online mission monitoring operated by the operations teams at GCCs, this is also performed independently by two complementary system performance monitoring platforms, the *Time and Geodetic Validation Facility* (TGVF) and the *Galileo System Evaluation Equipment* (GALSEE). Both facilities generate of a common set of Key Performance Indicators (KPIs), including among others Signal In Space ranging accuracy, healthy SIS availability, positioning availability, UTC timing dissemination accuracy, and GPS-GGTO Time Offset (GGTO) performance.

An insight of the methodology and performance metrics used for the system performance validation, with a reference to international GNSS performance standards, is provided in the paper. Results of the Galileo system navigation and timing performance based on the latest verification campaigns are also presented.

The paper provides also an update on the roadmap towards the Full Operational Capability phase along with a glimpse of the expected performance evolution at user level