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PERFORMANCE CHARACTERIZATION OF EGNOS AND DGPS POSITIONING ON THE DANUBE RIVER

Abstract

The European Geostationary Navigation Overlay Service (EGNOS) is a Satellite Based Augmentation System (SBAS) designed to augment the American Global Positioning System (GPS) by improving the accuracy and providing reliability information. Since 2011, EGNOS provides a Safety of Life (SoL) service, which is mainly used for civil aviation applications. However, the information provided by the EGNOS system has a very big potential. Future versions of EGNOS will try to expand the successes in the aeronautical domain also in other transportation domains. In particular, possible requirements for maritime applications are being investigated in the design phase of the next version of EGNOS (V3). In addition, studies for the adoption of EGNOS on the railroads are currently on-going.

The most critical applications in both the maritime and the in-land waterways domains require augmentation. Nowadays, Differential GPS (DGPS) is the most used solution. Many research projects have already shown that the EGNOS performance accuracy is comparable to that of DGPS and within the current maritime and fluvial regulations regarding Global Navigation Satellite Systems. This makes EGNOS a very promising solution for fluvial and maritime users. As an augmentation system, it could be used to complement DGPS, with no further costs associated with the deployment and the maintenance of additional DGPS Reference Stations.

In this context, the GEURIW ("GNSS environment and user requirements characterization on Danube River") project has two major objectives: to compare the performance of EGNOS and DGPS in a rep-

resentative inland waterway environment (the Danube river) and to characterise the GNSS reception environment in different navigation phases. The project is part of the European GNSS Evolution Programme (EGEP) of the European Space Agency and is run by the Romanian Space Agency and the Institute of Space Science. The investigation is based on a data collection campaign on board a vessel navigating from the Carpathian canyons of the Danube river down to its slow flow through the Romanian flatlands. More in detail, five different cases will be considered for performance comparison and environment characterisation: flatland, canyon, port, under the bridge and water lock. The assessment will use a Real Time Kinematic (RTK) positioning solution to evaluate the actual ("reference") trajectory of the vessel. The results of this data collection campaign and its conclusions are presented in the following article, which focuses on the first objective of the project, i.e. the performance comparison between EGNOS and DGPS in a representative inland waterway environment.