The benefits of EGNOS in augmenting GPS were presented to Captain Ben R.J. van Scherpenzeel, Director of Nautical Developments, Policy & Plans during a demonstration from GS1 and the European GNSS Agency (GSA) at the Port of Rotterdam on 21 October. The demonstration targeted the Port’s ongoing hinterland connectivity projects, which complement the scope of the GSA’s EGNOS Multimodal Adoption Plan for the rail and inter-freight transport markets.

EGNOS has shown outstanding performance in safety-critical aviation applications, which could also be applied to railways, logistic services and operations. In the past, there have been initiatives to promote and communicate the benefits of EGNOS, but it has not yet been possible to cover the entire implementer community. To address this issue in the multimodal logistics market segment, the demonstration at the Port was organized in conjunction with the PRONTO (Port Rendezvous of Nautical and Terminal Operations) project.

The demonstration visualised the expected levels of performance that EGNOS can achieve when used in logistics for terminal freight operations.

The location read results were fed into a GS1 Electronic Product Code Information Service (an ISO standard for supply chain and asset tracking and services), and through a supply chain scenario demonstrated the added accuracy of augmented GNSS using EGNOS.

Diverse representatives from the Port user community, the navigation industry and the GSA attended the demonstration. The European GNSS Agency, Port of Rotterdam policy and planning department, European Satellite Services Provider (ESSP), and GS1 Global standards and Telespazio were all represented.

After taking the geolocation readings during the demonstration, positioning results were post-processed and shared with GS1, showing promising benefits for users applying this technology in an EPCIS application.

The result was, according to Mr. Douglas W. Hill, "a very efficient demonstration of EGNOS capabilities".

The inclusion of EGNOS data in the GS1 EPCIS would undoubtedly improve the accuracy of the available location data, however, a main feature in my eyes is the fact that EGNOS together with Galileo (when on line) will be able to deliver validated and tamper-proof GNSS data.

Douglas Walker Hill (GS1 Denmark)
What is PRONTO?

PRONTO (Port Rendezvous of Nautical and Terminal Operations) is an R&D activity, led by GS1, aimed at producing a traceability system for goods and services (the EPCIS system, an ISO standard as of this year), and testing it in limited trials in key logistics scenarios, to increase visibility in the supply chain. According to GS1, “the PRONTO EPCIS system is a social business communication platform for the port community. It invites all parties to share and receive information regarding the planning of all services related to the vessel. This leads to optimization of the port call.” It is an initiative that originates from the Avanti project and is based on GS1’s standards.

With this system, service events (e.g. start and finish times of a service) are registered by the service provider in an information server giving precise and immediate feedback to the shipping agent. Additionally precise location and reliability of position information of the event is assured by use of augmented satellite navigation systems like EGNOS for ensuring position accuracy and integrity.

The demonstration

The demonstration consisted of setting two receivers at the Cruise liner terminal in the Port of Rotterdam and feeding the results into a program installed on a laptop. Both GPS and GPS + EGNOS positioning outputs were shown in real time and were recorded for further post-processing.
Telespazio, who organised the demo, also showed the potential of using EGNOS Data Access System (EDAS) which is applied in order to increase the integrity of a position. This means a higher degree of trust can be placed on the EGNOS positioning results, which is realised through a solution called LCS (LoCation Server). LCS improves the availability of the EGNOS corrections (via EDAS) and enhances the EGNOS Open Service positioning accuracy through a patented algorithm, especially suited to the needs of logistics applications.

During the demo it was also shown that Horizontal Protection Level provides an upper boundary for horizontal errors which can be used to measure the geolocation information quality and the confidence of the EGNOS position solution.
Demo: EGNOS positions and the overbounding confidence level, HPL

<table>
<thead>
<tr>
<th>Test</th>
<th>EGNOS Horizontal Accuracy, m</th>
<th>GPS standalone Horizontal Accuracy, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average deviation from true position</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>95% confidence</td>
<td>3.1</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Overall accuracy results of the tests.**

In summary, it was demonstrated that EGNOS provides improved performance when compared to the use of a GPS-only solution. In addition, although EGNOS Signal-In-Space is limited to locations where at least one EGNOS GEO satellite is in line-of-sight, this limitation can be overcome with EDAS (EGNOS Data Access Service) where EGNOS messages can be obtained with a simple Internet access. In addition, the “protection level” delivered by EGNOS is a guarantee of the position information reliability, allowing for the establishment of a liability scheme among the various stakeholders, thus supporting the implementation of the European policies for logistics such as e-freight and logistics applications.

According to Virginia Antón, from ESSP, the EGNOS Service Provider: “*EGNOS can increase the accuracy performance and guarantee such level of performance thus providing added value to the positioning inputs in the logistics value chain management*.”
Additional resources for GS1/ Port of Rotterdam communications

What is EGNOS?

The European Geostationary Navigation Overlay Service (EGNOS) is a European programme managed by the European Global Satellite Navigation Agency (GSA) and operated by the European Satellite Services Provider (ESSP).

It provides an augmentation service to the Global Positioning System (GPS). Presently, EGNOS augments GPS using the L1 civilian signal function by providing correction data and integrity information for improving positioning, navigation and timing services over Europe. EGNOS is provided openly and is freely accessible without any direct charge by different user communities and in particular rail users.

Further inputs

More information on EGNOS performance and services status can be found in the EGNOS User Support website.

Questions on EGNOS can be addressed to the EGNOS Helpdesk via e-mail: egnos-helpdesk@essp-sas.eu, telephone (24/7): +34 911 236 555 or website.