Maritime Galileo Application
SEA GATE test environment, Rostock Port, Germany using EuroPak-15ab receivers

Galileo Status

The first GIOVE-A test satellite has been in orbit since December 2005 and the second GIOVE test satellite (GIOVE-B) was launched in April 2008. Galileo is expected to be fully operational in 2013 with up to 30 satellites orbiting the earth. It is designed for both civilian and government purposes with civil management.

NovAtel has devised an approach which allows independent tracking of the ‘PRN’ codes associated with Galileo E5a and E5b signals. The PRN code is a unique satellite identification reference that enables receivers to find the very low level satellite signal within background thermal noise.

EuroPak-15ab Overview

The EuroPak-15ab is a high-performance GPS, Galileo and GEO receiver capable of receiving and tracking 32 GPS L1, GPS L5, Galileo L1, Galileo E5a and Galileo E5b signals. Alternatively, four of the signals can be Satellite Based Augmentation System (SBAS) GEO L1 and SBAS GEO L5 signals. The EuroPak-15ab also frames the navigation signals.

SEA GATE Overview

SEA GATE is a test environment in the port of Rostock, Germany for developing and testing maritime Galileo applications. Six terrestrial Galileo transmitters, that broadcast a Galileo-like signal, are located around the port of Rostock. A mobile user operating in the broadcast area is able to calculate their position by using these signals. SEA GATE is set up under a contract from the German Aerospace Agency (DLR).

In the port of Rostock there are three critical areas: the sea channel between the harbor and the Baltic Sea, the turn-around area for ships, and the docking stations for ferries. The accuracy for docking maneuvers should be better than 0.2 m for any future automatic solution. GPS alone offers an accuracy of ~4 m. SEA GATE, using NovAtel EuroPak-15ab receivers and 704-X wideband antennas, achieves an accuracy of 0.5 m. The performance of SEA GATE has been proven on-board the Scandlines ferry Mecklenburg-Vorpommern, see Figure 3.

Test Setup

SEA GATE provides pseudolite signals which resemble the final Galileo signals as far as possible to allow for a realistic scenario.
Summary

This case study presents a maritime application using NovAtel's EuroPak-15ab receivers and 704-X wideband antennas in Germany.

The SEA GATE port project met its accuracy requirements using the EuroPak-15ab. As a result, the SEA GATE project is fully operational and open to interested users who intend to develop their own applications in the maritime Galileo test environment.

This case study shows that people, organisations and companies can trust NovAtel's receiver and antenna performance for testing and implementation of important commercial applications.

The ferry travels between Trelleberg, Sweden and Rostock and has to turn $180^\circ$ as it docks backwards