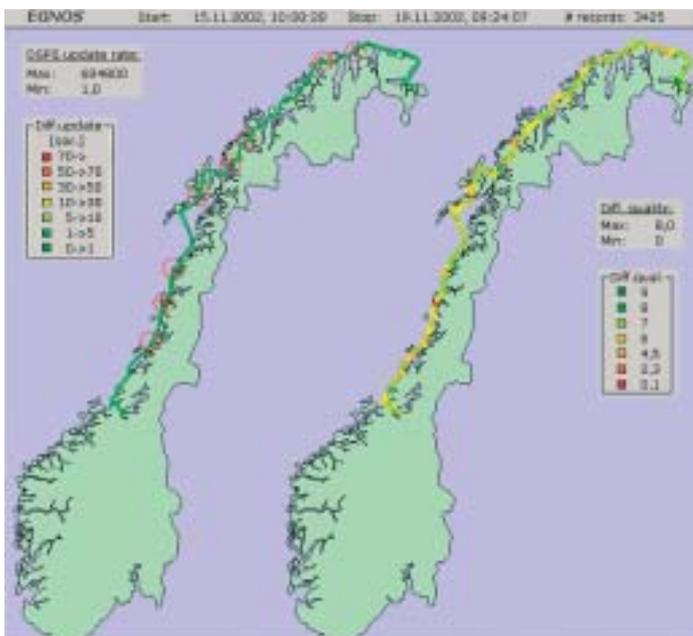


The use of AIS (Automatic Identification System) as a local augmentation system for EGNOS in a maritime environment

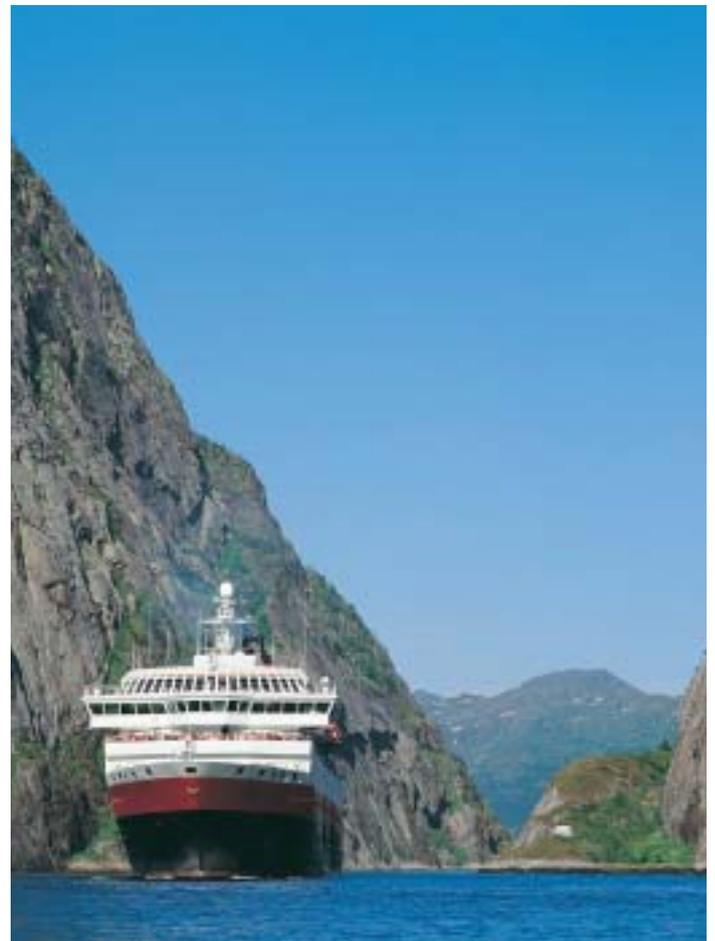
The EGNOS signal will provide maritime users with an improved navigation accuracy compared to stand alone GPS navigation. EGNOS will also provide an integrity signal giving the users a timely warning in case of a GPS system failure. These additional features make EGNOS suitable for safety critical maritime operations currently not possible when using stand alone GPS.

EGNOS is currently being implemented as a standard feature in more and more GNSS receivers, also in low cost receivers. Since the EGNOS signal is broadcasted from geostationary satellites, the user might experience reduced availability in some areas, in particular areas with physical obstructions (houses, mountains etc.) in southern direction. This problem increases at high latitudes due to the lower elevation of the geostationary satellites in these areas. The European Space Agency (ESA) has sponsored the development of techniques which will overcome this limitation.



ESTB coverage along EGNOS TRAN sailing route

Kongsberg Seatex has in the EGNOS TRAN (Terrestrial Regional Augmentation Networks) project, demonstrated



a system where the EGNOS signal is retransmitted to maritime users by use of the Automatic Identification System (AIS).

The EGNOS signal is received by an EGNOS receiver integrated in an AIS Base Stations on shore. Parts of the EGNOS message received are then converted into an AIS message type #17 defined by the AIS standard. This message is retransmitted from the AIS Base Station to all AIS Mobile Units within the coverage area in order to improve the navigation accuracy and integrity calculated by the AIS Mobile Units. In addition, the differential corrections and integrity data can optionally be output as

standard RTCM messages on a serial port for use by other external positioning systems on board the vessel giving these systems access to EGNOS accuracy.

Results from sea trials along the Norwegian coast during the winter season 2002/2003 show the advantages of this system. The sea trials were performed by utilising the EGNOS System Test Bed (ESTB) Signal in Space. The equipment used during the sea trials includes an EGNOS datalogger and an AIS Mobile Unit installed on board the coastal express vessel MS Nordlys. This vessel is in continuous traffic between Bergen on the Norwegian west coast and Kirkenes close to the border of Russia in the north, and the data logged during the sea trials give a good overview of the high latitude coverage that EGNOS is expected to provide when operational.

The sea trials use two AIS Base Station installations in the Trondheim fjord. These stations ensure full EGNOS coverage in the coastal express operation area in the fjord, either provided by the EGNOS Signal in Space itself or by the EGNOS TRAN solution.



AIS Base Station at Kopparen

The AIS system is mandatory for many vessels and AIS will play a major role in many aspects of maritime safety and security in the coming years. Installation of AIS mobile units onboard vessels started in July 2002 and within 2004 about 70,000 installations should be completed. This means that the additional navigation performance provided by the EGNOS TRAN project can be utilised by already existing equipment at no or minimal additional cost to the user.



EGNOS TRAN vessel in Trondheim harbour

AIS base stations are currently being deployed by several nations worldwide. The major task of these networks of stations is to help national authorities such as police, customs, immigration, military, search and rescue centres to monitor the maritime traffic in their territorial waters. AIS base stations with EGNOS redistribution capability will represent a valuable added safety feature in high traffic and difficult navigation environments and will definitely increase the usability of EGNOS for maritime navigation.



Seatex AIS 100 MKD and Display

For additional information:

<http://www.kongsberg-seatex.no/etran.html>

<http://www.esa.int>



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