

**EGNOS performance during ionospheric disturbances at high latitudes.  
Results from the Arctic Testbed project**

**Yngvild L. Andalsvik\*<sup>1</sup>, Anders M. Solberg<sup>1</sup>, Rune I. Hanssen<sup>1</sup>, Marco Porretta<sup>2</sup> and  
Per Erik Kvam<sup>3</sup>**

<sup>1</sup> Norwegian Mapping Authority, Geodetic Institute, Kartverksveien 21, 3511 Hønefoss, NORWAY.  
(E-mail: Yngvild.Linnea.Andalsvik@kartverket.no)

<sup>2</sup> ESA ESTEC, Keplerlaan 1, 2200 AG, Noordwijk, THE NETHERLANDS.

<sup>3</sup> Kongsberg Seatex AS, Havnegata 9, 7010 Trondheim, NORWAY.

**ABSTRACT**

This presentation will show preliminary results from the experiments conducted in the Arctic Test Bed (ATB) project. This is an ESA project which is developed in the framework of the European GNSS Evolution Program (EGEP). A significant reduction in EGNOS Safety-of-Life service availability is often seen at high latitudes during geomagnetic activity. The experiments investigate the effects that different changes in the EGNOS configuration during a period in 2014 with high ionospheric activity could have on performance at high latitudes.

**Key words:** EGNOS, SBAS, Ionosphere, High latitudes.

**Introduction**

The Arctic Testbed project is an ESA project aiming at improvements to EGNOS service at high latitudes. This is one of the main R&D activities investigated in the framework of the European GNSS Evolution Program (EGEP). The project utilizes a SPEED platform (Support Platform for EGNOS Evolution and Demonstration) for simulating EGNOS. The SPEED platform used is second generation, supporting EGNOS evolutions e.g. supporting dual constellation, correction data adapted to dual frequency users and additional processing for maritime users. It uses EGNOS operational algorithms, but has the flexibility to adjust a number of parameters for experimentation purposes. This flexibility is a key element for the proposed investigation.

The experimentation in the Arctic Testbed project focuses on several aspects of the arctic, for instance different types of dissemination means due to the low elevation of the GEOs. However, for this presentation we will focus on the experiments regarding ionospheric disturbances during the geomagnetic storm on 27th of February 2014 and whether the effects on EGNOS could have been reduced.



## **Summary**

This presentation will show results from experiments performed in spring 2016 in connection with the ESA Arctic Testbed project. The results will focus on the changes of EGNOS service at high latitudes during a geomagnetic storm in 2014.

## **Acknowledgements**

The authors would like to thank ESA and all the ATB partners, Kongsberg Seatex (prime contractor), GMV Aerospace and Defence, Thales Alenia Space France, Logica, Terma, Technical University of Denmark, Septentrio, University of Calgary and Norwegian Mapping Authority (NMA) for collaboration and discussions.

## **References**

[1] Pintor P., Roldan R, Gómez J., de la Casa C., Fidalgo R. M. (2015). The impact of the high ionospheric activity in the EGNOS performance. Volume XI, Issue 3.