

# Improving the Geoid Model for Future GNSS-based Navigation in the Baltic Sea

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## SUMMARY

Current nautical charts of the Baltic Sea refer to a number of national or local datums derived from tide gauges. However, a common height reference frame for the whole Baltic Sea area is desired to allow for seamless transitions between areas. As proposed by the Chart Datum Working Group (CDWG), the Baltic Hydrographic Commission therefore decided to introduce the common Baltic Sea Chart Datum 2000 (BSCD2000) that is directly linked to the European Vertical Reference System (EVRS).

To make full use of the new common unified vertical datum in modern GNSS-based navigation, an accurate geoid model is needed for the region. Improving the geoid model for the Baltic Sea is one of the goals of Activity 2 within the project ‘Finalising the Baltic Motorways of the Sea’ (FAMOS). The FAMOS project is co-financed by the European Commission within the framework of the Connecting Europe Facility (CEF) funding program which supports trans-European networks and infrastructures in the sectors of transport, telecommunications and energy. The FAMOS project involves 15 organizations from 7 Baltic Sea countries under the project management of the Swedish Maritime Administration (SMA).

In FAMOS activity 2, shipborne gravity measurements are carried out in various parts of the Baltic Sea in order to check existing marine gravity data, collect new data, and calculate a new accurate geoid model covering the whole Baltic Sea by 2020. In addition, GNSS data are collected to test the possibilities for validating the geoid model accuracy at sea and various real time GNSS methods are also tested.

In this paper we concentrate on the dedicated marine gravity campaign Airisto 2015, which took place in the Bothnian Sea as part of FAMOS activity 2. The new gravity data is compared with the

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old datasets consisting of shipborne data and measurements made on ice. We show the data analysis and calculate the effect of the new data on the local geoid model.

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