

Baltic Sea Hydrographic Commission 24th Meeting

Agenda Item C6

FAMOS project status report

2019-08-26

1 Summary

- The second phase of the FAMOS project has been finalized as of 30/06/2019.
- FAMOS Odin (2016-2018) receives almost 11 MEUR of EU co-financing from the CEF Transport programme.
- Operative work in all project activities has been on-going since 2014.
- FAMOS Odin includes 15 project partners,
- The project was delayed by six months due to events occurring outside the control of the project.

2 What has happened, results?

2.1 Project structure

The FAMOS project is split into several phases, covering the time from 2014 to 2020. The first phase, FAMOS Freja, is finalized and covers 2014-2016. The second phase, FAMOS Odin, has just ended and covers the period 2016-2018.

Presently, the project consortium includes the Hydrographic Offices of all Baltic Sea countries except Poland and Russia, as well as national geodetic authorities and institutes and one private company:

- Swedish Maritime Administration (coordinator, SMA)
- Danish Geodata Agency (GST)
- Estonian Maritime Administration (EMA)
- Finnish Transport Agency (FTA)
- German Federal Agency for Cartography and Geodesy (BKG)
- German Federal Maritime and Hydrographic Agency (BSH)
- German Research Centre for Geosciences (GFZ)
- Lantmäteriet (the Swedish mapping, cadastral and land registration authority, LM)
- Lithuanian Maritime Safety Administration (LMSA, new partner in FAMOS Odin)
- Maritime Administration of Latvia (MAL)
- National Land Survey of Finland / Finnish Geospatial Research Institute (FGI, new partner in FAMOS Odin)
- SSPA Sweden AB (new partner in FAMOS Odin)
- Swedish Meteorological and Hydrological Institute (SMHI, new partner in FAMOS Odin)
- Tallinn University of Technology (TUT, new partner in FAMOS Odin)
- Technical University of Denmark (DTU)

For the project partners that already joined the first phase, FAMOS Freja, most activities during 2016 were part of the first project. The new partners in FAMOS Odin started their work in 2016 under FAMOS Odin. From 2017 onwards all activities take place under FAMOS Odin.

2.2 Project activities

The FAMOS project focuses on surveying areas relevant for commercial shipping in the Baltic Sea according to the BSHC-HELCOM re-survey scheme. Furthermore, it serves as a platform for implementing the common Baltic Sea chart datum as proposed by the BSHC Chart Datum Working Group. See also the FAMOS web site at <http://www.famosproject.eu/>. Specifically, the project activities are as follows:

Activity 1: Hydrographic surveying

Hydrographic surveying of approx. 96 000 km² of areas important for commercial shipping in the Baltic Sea, and corresponding production of nautical charts. For the participating BSHC member states, the surveys follow the BSHC-HELCOM harmonised re-survey scheme as decided (latest) at the HELCOM Copenhagen Ministerial Meeting 2013. The BSHC-HELCOM scheme is available online at <http://www.sjofartsverket.se/helcom>.

Activity 2: Harmonizing vertical datum / Vessel navigation for the future

- (1) Implementing a common geodetic vertical Baltic Sea chart reference level in line with the BSHC Chart Datum Working Group goals (BSCD 2000). This includes measurements of gravity during hydrographic surveys, verification of existing gravity data, and the computation of a new, more accurate geoid model.
- (2) Studies related to precision GNSS positioning at sea, with the aim of better UKC control and optimisation.

Activity 3: Surveying infrastructure

Improvements of the surveying infrastructure in terms of survey boats and hydrographic equipment for the Baltic countries. The improved capacities are needed for these partners to achieve the goals set in the BSHC-HELCOM Scheme during later phases of the project.

Activity 4: Data workflow from sounding to chart

Improve and streamline the workflow from Hydrographic survey of depth information to distribution of final nautical products. This includes the redesign of depth databases, procurement of new Chart Production Systems, studies of new IHO standards and the design of a Nautical SDI.

Activity 5: Coordination and communication

Project coordination, communication and outreach.

2.3 EU co-financing from the CEF Transport programme

The first phase of the project, FAMOS Freja, received EU co-financing of up to 11.9 MEUR from the CEF Transport programme (successor to the TEN-T programme). This is roughly one-third of the overall project costs of 33.9 MEUR for FAMOS Freja.

The second phase of the project, FAMOS Odin, will receive further up to 10.8 MEUR in co-financing during 2016-2018, for estimated total costs of 28,9 MEUR.

The project activities, exact goals, time line and detailed budget are agreed upon with the European Commission in "grant agreements". The grant agreement for FAMOS Odin was signed in October 2016.

2.4 Operative work 2016-2019

Activity 1 (hydrographic surveying): The survey have been completed successfully with surveys of 27 850 km² under FAMOS Odin by both project internal and externally procured resources. The total surveyed area

for FAMOS Freja 2014-2016 amounts to 31733 km², which is slightly below the target figure but well within the approved span for the goal.

Activity 2 (vertical datum):

In FAMOS Freja sub-activity 2.1, eight gravity surveys haven been conducted

In FAMOS Odin a total of 17 shipborne and 1 airborne gravity surveys have been conducted:

Work with databases, geoid modelling and Mean Sea Surface modelling has been finalized as well as GNSS data processing. The chart datum change in Sweden, started in the Northern Bay of Bothnia. Currently the project is delayed, as a consequence of the production system change also performed in FAMOS Freja. Finland has started their chart datum change as well.

Lantmäteriet's procurement of a marine gravimeter for use primarily by the Swedish state has been successful and the instrument has been delivered.

Activity 3 (surveying infrastructure): After some delays the procurement of major upgrades for the Lithuanian survey vessel *Varuna* has been concluded with a signed contract as well as the delivery and installation of the upgrades. The Estonian procurements of a multibeam echosounder and software have been successful.

Activity 4 (data workflow): Various workflow and software upgrades have been performed by the relevant project partners. Most notably, the new Swedish Chart Production System (CARIS HPD) has been delivered and implemented. ENC production has taken place in the new system since autumn 2016, and the existing paper chart cartography has been migrated to the new system.

Activity 5 (coordination and communications): The project has been presented at relevant EU and maritime forums. The project website is available at <http://www.famosproject.eu/>. The final report for FAMOS Odin is currently being worked on. There have been personnel changes in SMA's project management. Since 2017-08-01 the primarily responsible project leader has been Andreas Andersson, while Benjamin Hell continues to work in the FAMOS project management at part time.

3 What happens next

FAMOS Odin has ended at the end of June 2019, and project management focuses on the Final Report for the European Commission (technical and financial), with submission deadline at the end Q1 2019.

The Future of FAMOS

The third and last period of FAMOS is aimed to start in 2020. The project concept is currently being designed and new stakeholders and potential partners are signing up in the process. So far, four work packages has been defined.

1. COMPLETION OF HELCOM-BSHC Baltic Sea Re-survey Scheme

The work of future FAMOS will continue with the collection of high quality bathymetry data by synchronized surveying methods and further explore the data's potential.

2. BALTIC SEA PRECISE POSITIONING

Based on the outcome of the hydrographic surveys, the common vertical reference system of the Baltic Sea will be fully implemented, creating conditions for further development of the geoid model. A precise and quality checked geoid model will help FAMOS to reach the goal: determination of a ship's vertical position by five

centimeters, compared to today's approximately 50 centimeters. Deliverables could also be S-104 and S-111 product prototype.

3. UKC LOAD –UKC GO

The simulations made in FAMOS Odin regarding fuel savings when taking bathymetry into account in route optimization, shall be developed further. Preconditions for Under Keel Clearance Navigation in the Baltic will be established, based on the principles UKC Load and UKC Go.

UKC Load suggests that by a precise determination of a vessel's vertical position it is possible to decrease the uncertainty margins that exist today, thus it would be possible to maximize the loading of the ship when maneuvering or navigating in ports and shallow fairways. This in its turn lessens the fuel consumption per ton freighted cargo.

UKC Go on the other hand, focusses on how a vessel's draft interacts with water depth to affect fuel consumption. When vessel draft is not a limiting factor in choosing a route, frictional forces may still apply to a ship's underwater body at up to five times the ship's draft. On a voyage where the vessel is not limited by its draft, being able to choose to travel over such depths where the hull is not affected by frictional forces may optimize fuel consumption.

4. BALTIC SEA MODEL REGION

The IHO are developing new standards for bathymetry and navigational products at sea. The new standards will have a great impact on the production and presentation of navigational products. In the future continuation of FAMOS, the aim is to establish a testbed in the Baltic Sea and contribute to the development of the standards. At the same time, FAMOS will utilize a more active involvement by their partners in the international working groups developing the standards. This work is important as it ensures the FAMOS partner countries have a unified view regarding hydrographical data and products as well as creating a testing environment for the standards. By contributing to the development of the new standards and then testing them, future valuable products and services for the blue industry may be discovered! Test bed areas could be The Sound, Great Belt, Kadettrennen, Irbe Strait and The Quark.

The meeting is invited to

- Take note of this report.



Co-financed by the European Union
Connecting Europe Facility