

 Kartverket	SAIHC 12th Meeting Dar-es-Salaam, Tanzania, 21-23 September 2015	SAIHC National Report NORWAY
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NATIONAL REPORT NORWAY

Executive Summary

This report gives the summary of the activities and events that has taken place within the Norwegian Hydrographic Service (NHS) since the last report given at the SAIHC11 meeting in Maputo 2014. Some highlights:

- *OD project launched*
- *Moved to new premises*
- *New multibeam data processing software implemented*
- *The final report of the LiDAR pilot project (Topobaty) delivered*
- *Continued high activity in the Mareano project*
- *Cooperation project with Albania*
- *EU Coastal Mapping project*

1. Hydrographic Office

NHS moved to new premises outside Stavanger city center in June 2015. We are now co-located with the Petroleum Directorate and the Petroleum Safety Authority. A part of the University of Stavanger (UiS), and some research institutions affiliated to UiS, are located in the same area.

The Norwegian mapping Authority (NMA) has over the last year discussed goals and strategy based on international trends, expectations from our “owner” and internal goals. A project called *Destination 2025* involved all divisions of NMA. Related to the outcome of the project NHS has initiated an Organizational Development (OD) activity, aiming at adjusting the organization to underpin the main strategic goals.

2. Hydrographic Surveys

Internal conducted surveying 2014/2015

During 2014 and first half of 2015, the R/V Hydrograf and its two survey launches have been working in the coastal waters of Norway and Svalbard (high north). In addition, R/V Hydrograf surveyed at open sea for the MAREANO project.

Norwegian coast

In the period early 2014 to March 2015, several improvements in equipment and software have taken place. The takeover, equipment installation, testing and calibration of the new

survey launches took place in 2014 and the last part of the new multibeam data processing software was delivered in 2015. The renewals has increased the efficiency considerably and improved the quality of the data. In favourable conditions, the survey launches conduct the surveying up to 12 knots speed.

External conducted surveying 2014/2015

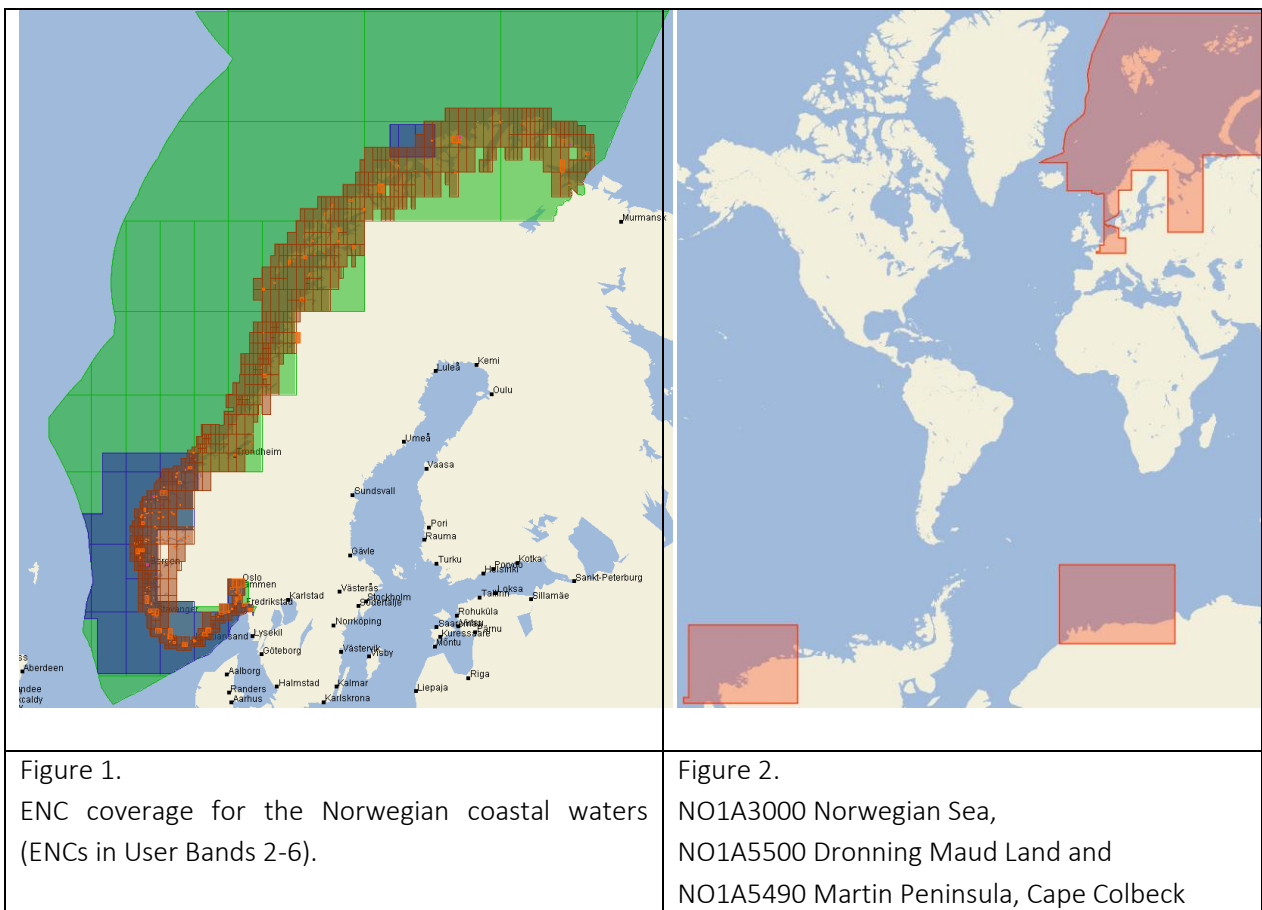
For 2014 and 2015 the German company Fugro OSAE was awarded the contract for surveying for the MAREANO project (more information in paragraph 9.3).

3. Nautical Charts

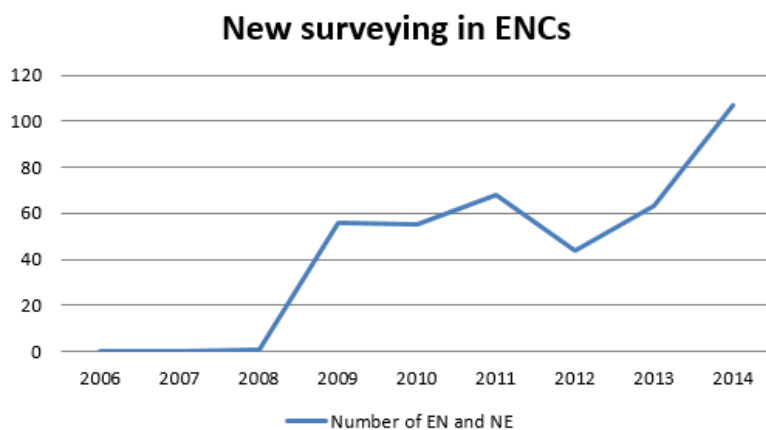
3.1. ENC production

In 2014, 13 ENCs in the Approach and Harbour user bands and 8 in the Coastal user band were produced for the Norwegian coast. In addition, 8 existing ENCs in the General user band were upgraded at the same time. See Figure 1.

In the Antarctica, a new ENC in Overview user band corresponding with INT 909 was produced, see Figure 2.



Totally 107 ENCs in the user bands 2-6 have been upgraded with new multibeam survey data in limited areas, and published as New Editions (NE) or new ENCs (EN). Six of these are new ENCs produced in accordance with pilot sketches. The graph below shows an increasing trend of this task in recent years.



The total number of ENC's produced by NHS was 1117 at the end of June 2015.

3.2. Paper chart production

Totally 27 charts were published as new charts or new editions in 2014 for areas with updated survey data available: 4 harbour charts, 14 main charts, 1 coastal chart, 7 charts for Svalbard (high north) and 1 chart in the Antarctica. In addition, 31 charts were revised and reprinted

Print On Demand (POD):

At the end of 2014, 204 charts were offered as POD out of a total portfolio of 236 Charts.

All 143 charts in the main chart series, 43 Harbour charts and 18 charts from the main chart series of Svalbard are available for the POD service.

The POD service will include all paper charts by the end of 2015. No printing of charts has taken place after March 2015. New editions are available only as POD-charts.

4. Nautical Publications

The Norwegian Pilots Guide «Den norske los» is to be revised and more customized for the professional users. Until the revised editions are available, the current updated pdf versions of the Pilots can be downloaded from The Norwegian Hydrographic Service's homepage: www.kartverket.no. The Pilots are updated twice per year (May and November). Important changes are reported in the Notice to Mariners.

Notices to Mariners

Totally 24 editions were published in 2014. The publication was available both as printed version and in pdf-format for distribution by e-mail during the year. An official digital version of Notice to Mariners was launched 12 June 2014 kartverket.no/efs. The printed version is no longer available.

As a supplement to the NtM a digital tracings service is fully operationally on the same website.

5. MSI

The Norwegian Maritime Directorate is the responsible body for MSI in Norway.

6. C-55

Update of C-55 was sent to IHB in March 2013. A new update is in progress.

7. Capacity building

Norway participated in the annual meeting of the IHO Capacity Building Sub-Committee in May 2015. The IRCC and the CBSC encourage Member States from the most developed regions to be involved in capacity building by assisting CBSC activities or by other means.

NHS entered into a cooperation with Albania in September 2014. The project will last until the end of 2017. The main goals are related to building competence and capacity. Formal education and training in hydrography is planned for three persons and for one in marine cartography. A multibeam echo sounder system and a chart production system will be acquired. The Norwegian Ministry of Foreign Affairs finances the project. The budget is NOK 9.85 mil.

8. Oceanographic activities

New web-pages with tidal information were launched in 2012, <http://sehavniva.no>, and response from the users are important in improving the pages. Based on 24 permanent tide gauges and discrete tidal zoning the users can search for a location and get tidal predictions and water level from most of the Norwegian coast. A figure with different tidal levels relative to Chart Datum and levels with return periods up to 1000 years are also shown for each location. An English version was launched in March 2015 together with an API that makes it easier for frequent users to download data without going via the web-page.

A permanent gauge was established at the remote island Jan Mayen in 2014. Data are transmitted to the office normally once per day.

In addition to observed water level and predicted tides, we present a 5 days water level forecast from models run by the Norwegian Meteorological Institute (NMI). Near real time water level observations are transferred from NHS to NMI and are used to adjust the output from the model.

We have done several short term measurements, one month or more, of water level. The pressure gauges are spread around the coast and used for reduction of soundings, improving the tidal zones information and transferring land-levelling datum to islands. The data will also be important for establishing a CD-surface relative to a common reference surface (the ellipsoid). We are working on better methods to control the accuracy, and have started to use two pressure gauges at each site. One gauge is mounted around Mean Sea Level at a known height relative to TGBM. With such a system, we have better control of drift in the sensors and can correct for density variations.

With our new program for processing, storing and distributing water level measurements we are able to analyse more series than we used to when part of the process was manual.

9. Other activities

9.1 TopoBathy pilot

The NHS conducted a pilot test in 2014 using latest generation of a Riegl shallow water topo-bathy lidar system. The main goal was to verify that a topo bathy lidar system is capable of performing a seamless data acquisition in the depth range from land down to approximately 5 meter depth. The final report was available in March 2015. The Topobaty project will be presented as a separate item at SAIHC12.

9.2 The PLECO Project

The NHS has carried out a project to replace the existing multibeam data processing tool. NHS chose Caris as the vendor of the system. The new tools are an extended version of the Caris' HIPS/SIPS. The final version was delivered in January 2015. The system will be used for both the data processing and data management on the survey platforms as well as at the data handling at the office. Implementation and training took place in the period January-March 2015.

9.3. The MAREANO Programme

Background: MAREANO is a multidisciplinary marine mapping and documentation programme aiming at providing the foundation for ecosystem based sustainable management of the Norwegian coastal and sea areas. The primary focus has been The Management plan for the Barents Sea and the management plan for the Norwegian Sea (see figure 3 below). The aim is to bridge the knowledge gap in poorly mapped but very sensitive areas. High quality multibeam bathymetry is regarded as a premise for further geological and biological investigations. The NHS is responsible for bathymetric data acquisition (including backscatter and water column data), and effective data management and distribution of survey data, derived products and services. An important facet of the programme is the web-based geodata distribution, and distributed data management as part of a National Spatial Geodata Infrastructure (NSDI)

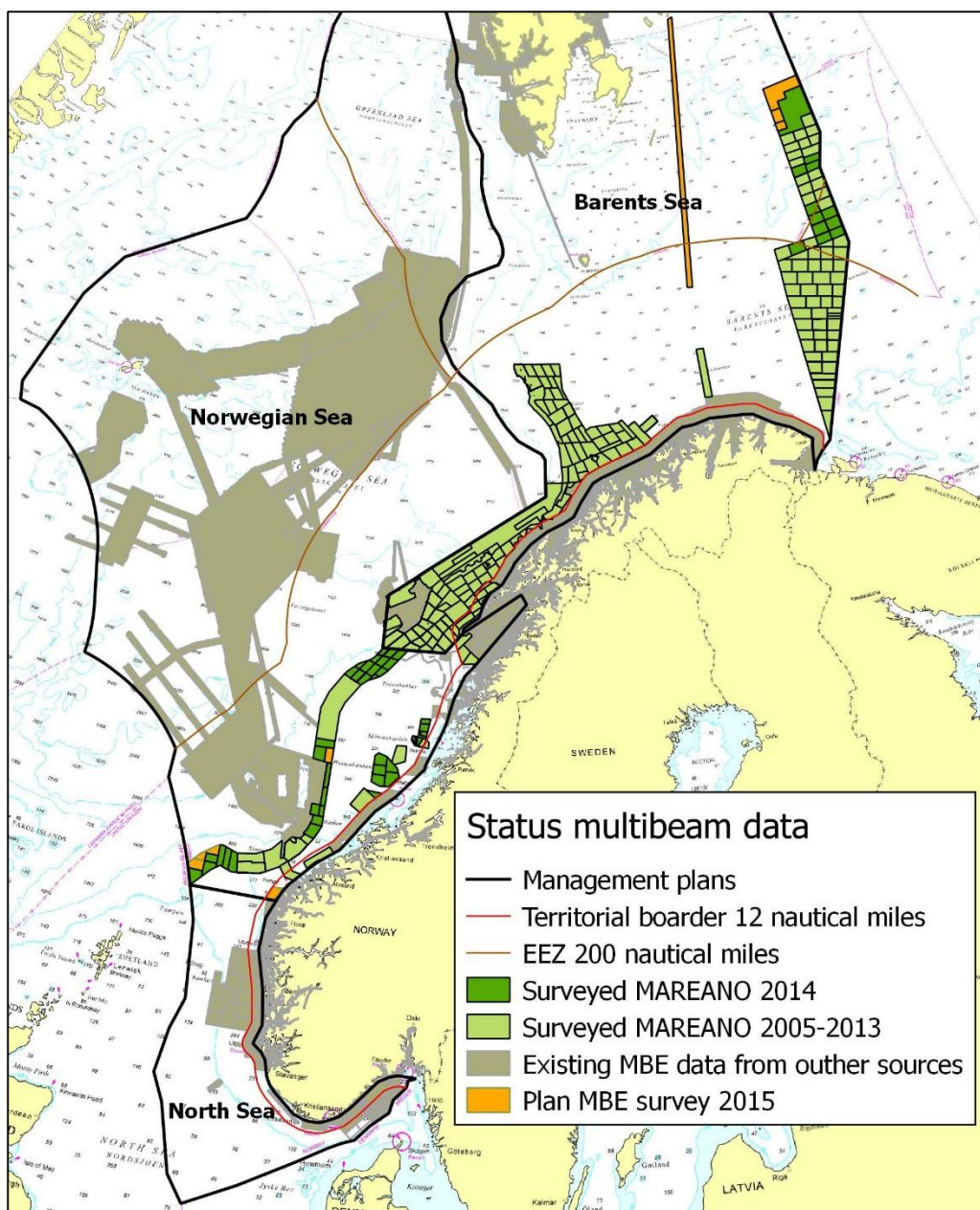


Figure 3. The Management plan areas and coverage of multi beam echo sounder data.

Organization: The NHS is a programme partner with the Institute of Marine Research (IMR, programme management) and the Geological Survey of Norway (NGU).

Results 2014: The MAREANO program received NOK 91.7 mill in total through earmarked funding. NHS received NOK 39.2 mill. 27 900 km² was surveyed in 2014.

Data distribution: The multibeam data has been modeled in grids of various resolutions, and visualized through shaded relief maps as a Web Map Service and included in the map services on the MAREANO webpage www.mareno.no.

NSDI: According to the MAREANO data policy all geodata from the MAREANO programme will be published in the Norwegian spatial data infrastructure; *Norge Digitalt* www.geonorge.no .

MAREANO will be a major undertaking for the NHS in the years to come, and is mainly aimed at non-navigational purposes.

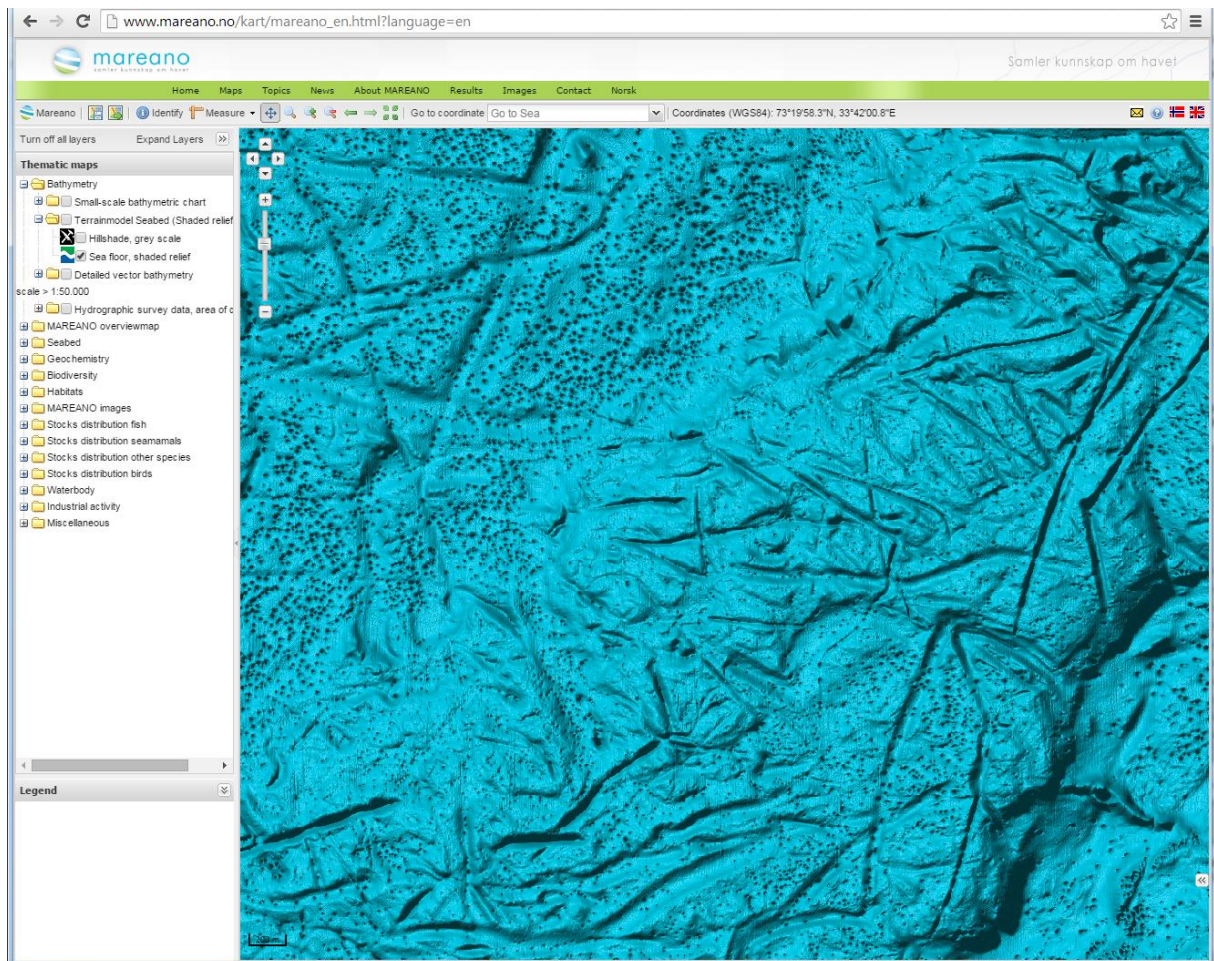


Figure 4. An example from the WMS shadow relief map service showing seabed with pockmarks and iceberg plough marks in the Barents Sea (screendump from map service on www.mareano.no)

9.4 BarentsWatch

The Norwegian Mapping Authority are participating in an intergovernmental cooperation on developing and establishing a general Information and surveillance system, covering the High North and the Norwegian coastal and sea areas. BarentsWatch aims to offer integrated knowledge and information services to the public, and will also support efficient coordination between governmental services through a common information picture. A core part of the system consists of map services, based on geographic information services from official sources. Marine Spatial Planning became a separate activity in 2014. NHS participate in this

work. So far, the cooperation counts 30 national partners. Ref.:

<http://www.barentswatch.no/en/om/>

9.5 EU Coastal Mapping project

NHS have been an active member in the IHO-EU Network Working Group. This WG has been involved in cooperation with the European Union' DG Mare. SHOM, with several partners (a Consortium is established), responded to a tender for a Coastal Mapping project. The Consortium was rewarded the project in June 2015. The project will last for 3 years with SHOM as the lead partner.

The project's strategic objective is to develop an innovative analysis of the needs and means in Europe for the acquisition of marine data in coastal areas, as well as concrete propositions for the development of European strategy for marine data acquisition.

To address these objectives, the project **Work Plan** has been drawn up around **3 Work Packages (WP)**. In the framework of **WP1 (Digital Mapping)**, the project will develop propositions concerning an infrastructure enabling partners to prepare, update, aggregate and disseminate data produced by them. The WP will also develop tools to prepare and optimize data, provide high performance services disseminating the prepared layers with respect to INSPIRE recommendations, propose an ergonomic web portal and provide training to potential users. In the framework of **WP2 (Share experience, standards and best practice)**, the project will assess consistency of the existing vertical datum, list and summarize past experiences and best practices, develop and test an algorithm for choosing the most appropriate surveying method, and build a technical and economic strategy. Finally, in **WP3 (Future programme)**, the project will develop a method to draw a Joint European Coastal Mapping Programme in shallow waters for bathymetric data.

9.6 International activities

The NHS is involved in several Working Groups, Committees and Commissions related to IHO. Norway has representatives in the following Working Groups: S-100, DQ, ENC, NC, NIP, TWC, CSPC, IEN, MSDI and WEND. We have participated in the HSSC and the IRCC meetings in 2014. Norway is actively participating in 5 Hydrographic Commissions: ARHC, HCA, NHC, NSHC and SAIHC.

As operator of Primar we participate in all related meetings.

During the last few years, we have contributed with a substantial part of high resolution bathymetric data, obtained through the Mareano project, to the GEBCO (and IBCAO) database. We have delivered data with resolution 50x50 meter for a greater part of our coastal waters to the EU project EMODnet.