Agenda item B2

61th Meeting of the Nordic Hydrographic Commission
6 - 8 Marts 2017
Elsinore, Denmark,

Hydrographic National Report of Denmark

February 2017

Executive summary
This report gives a summary of the main activities within the Danish Hydrographic Office since the last report given at the NHC meeting in Stavanger April 2016.

1. Hydrographic Office
The present report outlines and sums up the activities carried out by the Danish Geodata Agency (DGA), with special focus on its hydrographic activities since last NHC meeting.

The Danish Geodata Agency is part of the Danish Ministry of Energy, Utilities and Climate. The Ministry consists of the Department, the Geological Survey of Denmark and Greenland, the Danish Meteorological Institute, the Danish Energy Agency, the Danish Geodata Agency, the Danish Energy Regulatory Authority and Energinet.dk and the Agency for Data Supply and Efficiency.

New location from November 2016
DGA has been situated in Aalborg from November 2016 and have approximately 120 employees; the agency is responsible for cadastre and hydrography including the role as the Danish Hydrographic Offices. The remaining tasks have been transferred to the Agency for Data Supply and Efficiency.

The relocation of DGA to Aalborg has affected the work as the majority of employees have left the organisation. As a consequent DGA is now focusing on employing and educating new staff Issuing Chart Corrections and also to prioritise the production of paper carts and electronic charts.

New internal structure in the Danish Geodata Agency January 2016

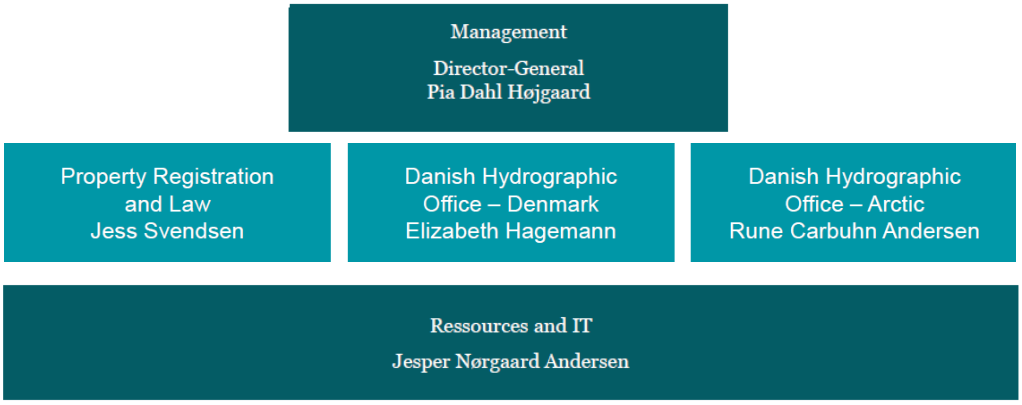


Figure 1. The internal structure of the Danish Geodata Agency

The Danish Geodata Agency in its role as Hydrographic Office has responsibility for hydrographic surveys and charting in Denmark. It is responsible for the production of nautical charts of the waters surrounding Denmark, the Faroe Islands and Greenland, just as the Danish Geodata Agency is responsible for the implementation of the Danish MSDI and also represents Denmark internationally within the marine geodata field (MSDI). The Danish Geodata Agency is responsible for charting, and issuing Chart Corrections and related nautical publications such as INT 1 and pilots (sailing directions) and for technical support to delimitation of the Danish maritime boundaries.

The practical work of hydrographic surveys is still done with personnel and ships from the Royal Danish Navy. Survey personnel from the Navy are part of the organization of the Danish Geodata Agency.

The Danish Geodata Agency works closely together with the Danish Maritime Authority, which is responsible for issuing of Notices to Mariners, List of Lights. Tide tables and operational tide gauges are the responsibility of Danish Meteorological Institute.

2. Surveys

Coverage of new surveys

The Danish hydrographic survey operations have been carried out in the following areas in 2016:

1. Danish waters inside the Skaw according to the HELCOM RE-SURVEY plan of the Baltic routes and areas.
2. The west coast of Greenland.

Danish waters:

The hydrographic surveys inside the Skaw are carried out in accordance with the HELCOM Copenhagen Declaration, adopted on 10 September 2001 by the HELCOM Ministerial Meeting. In addition, survey of areas with intense traffic in the North Sea has been initiated.

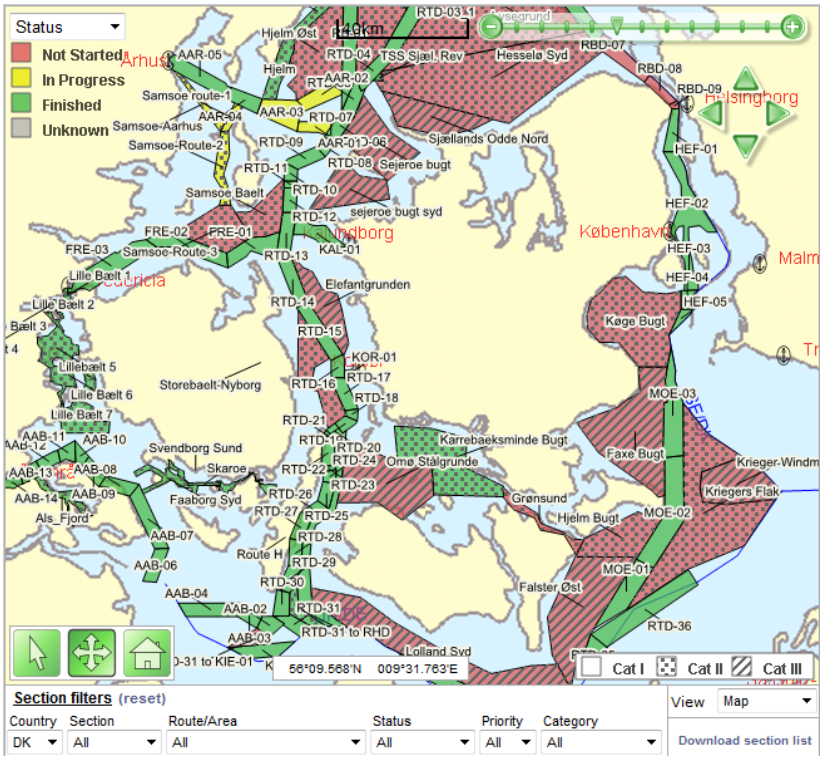


Figure 2. Part of the HELCOM re-survey plan

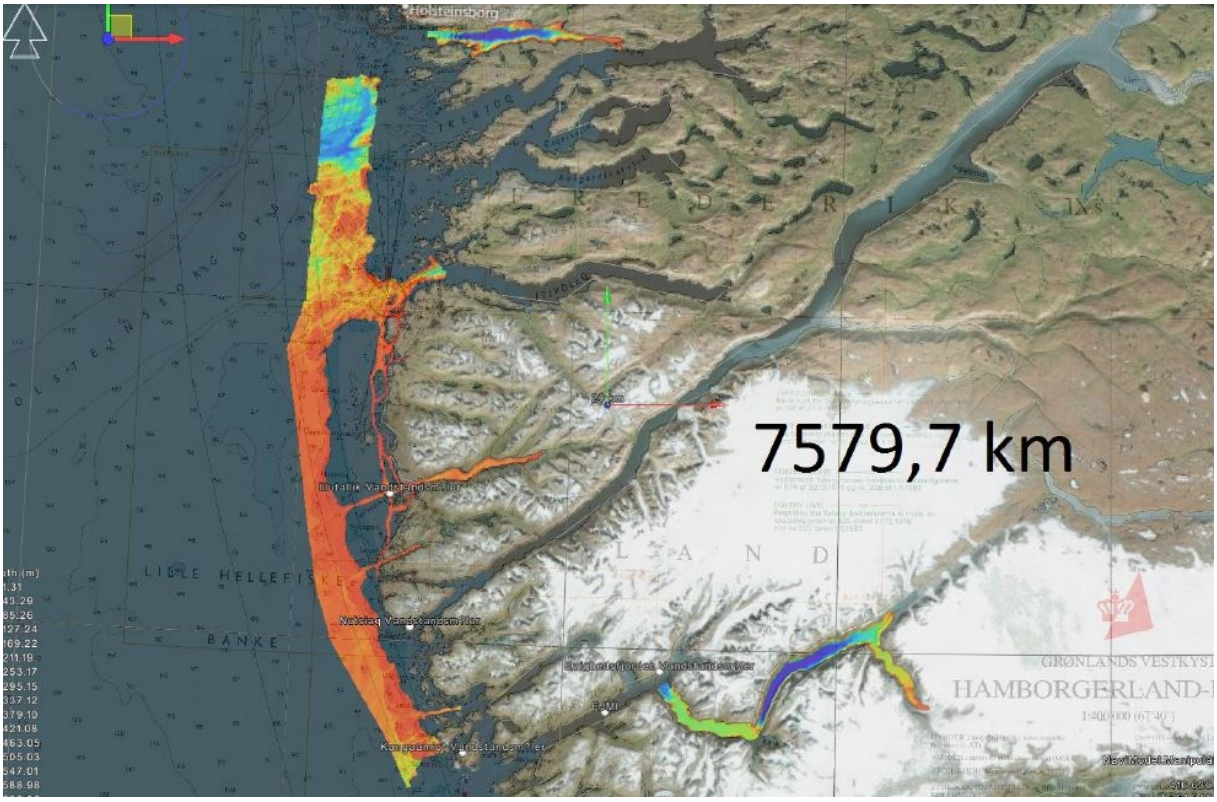
In accordance with the Declaration a coordinated survey plan has been made for re surveying the Baltic Sea area. Therefore, the main survey effort has been placed on the primary shipping routes through the Danish waters and other areas of interest for navigation. The routes and areas will be re-surveyed to meet the standards of "Special Order" or "Order 1" as set in the International Hydrographic Organisation "Special Publication No 44".

The Surveys in 2017 will be a continuation of the revised coordinated re-survey plan for the Baltic area. See the HELCOM web site for details: https://helcomresurvey.sjofartsverket.se/helcomresurveysite . In addition to the original HELCOM resurvey plan, Denmark and Sweden is preparing a revision of the routes from Skagen through the Kattegat. Some of the proposed changes will be re-surveyed in 2017.

Greenland waters:
The surveys on the West Coast of Greenland were carried out in the archipelago and near coastal zone, in order to allow safe access to major ports and to locate sheltered coastal fairways. A prioritized program for the resurvey of Greenland waters is in force. The main emphasis is placed on the most populated areas on the West Coast.

All surveys were carried out with Multibeam echo sounder systems.

The surveys in the Greenland waters in 2017 will be a continuation of the re-surveying program of the inshore routes between ports in Greenland. Some near shore areas and fjords are being surveyed for the safety of cruise ships operating on the west coast.



Survey areas in Greenland 2016

New ships
No new ships were commissioned in 2016

3. New charts & updates
Charts (paper as well as electronic navigational charts (ENC)) covering the Danish, Faroese and Greenlandic waters are produced and updated by the Danish Geodata Agency.

ENC
The Danish waters have been covered by ENCs in various navigational bands since June 2000.
All the agency's ENCs are updated on a weekly basis.

ENC distribution method
In 2016, all the Danish-produced ENCs and updates (ERs) were distributed through a network of IC-ENC authorized distributors.

Charts
21 new Danish editions were published in 2016

National paper charts
The chart portfolio of the Danish waters comprises 63 charts, all produced according to international standards.

The chart index showing the Danish waters is available at:
http://www.danskehavnelods.dk/indexkort/danskesoekort.html

The chart index showing the Greenlandic waters is available at:
http://www.danskehavnelods.dk/indexkort_gronland/gronlandskesoekort.html

Geometric rectification of the Greenlandic charts
The geometric rectification of the Greenlandic charts has reached 32 charts. The line of production is now based on the principle "data and ENC first" which means that data are being enriched to ENC standard before paper chart are being produced. The ENC distribution is now only slightly behind the paper chart distribution. Within the first quarter of 2017 all 32 charts are distributed as ENCs.

Faroese waters
All the Faroese paper charts were converted to ENCs and released in 2012.

Challenges
2016 has been a transition period for the Hydrographic Office. A lot of our experienced employees have left the office for other jobs and we are trying to start up a new organisation with less experience and new employees. As a result of this, the number of New Editions of Paper Charts in Denmark will be less in 2017 and the production unit for Greenlandic charts is not expected to finalize and distribute new products in 2017 over Greenlandic waters. The Greenlandic chart production team will continue to re-establish the needed knowledge base for chart production and will focus on selected data processes and the capability to produce paper charts and updates to ENC and paper charts in 2017.

4. New publications & updates

New publications
- No new publications

Updated publications
The Danish Maritime Safety Authority updates the following publications and reports online:
- Navigation through Danish Waters
- Tide tables for Danish, Faroese and Greenland waters

The Danish Geodata Agency's online publications:
- Charts and publications catalogue (in Danish)
- Kort 1/INT 1 (bilingual)
- Søkortrettelser/Chart Corrections (bilingual)
- Bag om søkortet/Behind the Nautical Chart (in Danish/in English)
- The Mariner´s Handbook – Danish Waters (in Danish)
- The Danish Harbour Pilot (in Danish)
- The Greenlandic Pilot - East Greenlandic Waters (in Danish/in English)
- The Greenlandic Harbour Pilot (in Danish)
- The Mariner´s Handbook – East Greenlandic Waters (in Danish/in English)
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The Danish Geodata Agency's printed publications:
- Charts and publications catalogue (in Danish)
- Kort 1/INT 1 (bilingual)
- The Danish Pilot (in Danish)
- The Danish Harbour Pilot – Commercial Ports (in Danish)
- The Greenlandic Pilot - West Greenlandic Waters (in Danish)
- The Faroese Pilot (in Danish)
- The Faroese Harbour Pilot (in Danish)

5. MSI
NAV Warnings, Information to mariners and oceanographic forecasts are available in English on the following web pages:

Navigational warnings Denmark:
http://www.dma.dk/SikkerhedTilSoes/Sejladsinformation/nautisk_information/Sider/nautisk_information.aspx

Meteorological warnings and forecasts Denmark:
http://www.dmi.dk/en/vejr/
http://ocean.dmi.dk/anim/index.uk.php
http://ifm.fcoo.dk

Meteorological warnings and forecasts Faroe Islands:
http://www.dmi.dk/en/faeroeerne/
http://ocean.dmi.dk/anim/index.uk.php
http://ifm.fcoo.dk

Meteorological warnings and forecasts Greenland:
http://www.dmi.dk/en/groenland/
http://ocean.dmi.dk/anim/index.uk.php
http://ifm.fcoo.dk

6.
C-55
State of surveys updated February 2017

Area	A1	A2	B1	B2	C1	C2	Comment
Denmark south	95	100	5	0	0	0	Contributes to the HELCOM harmonised re-survey programme.
Denmark Faeroes	100	100	0	0	0	0	Revision of ports and resurveys ongoing
Denmark Greenland	25	20	25	10	50	70	The coastline of Greenland is very com-plex and the total sea area of the EEZ is ca. 2.000.000 square kilometres. Due to perma-nent ice cover, the limit for navigable waters has been set to 75 degrees northern latitude. Thus the percentages are rough approxima-tions. The East coast is sparsely populated and only surveyed near populated areas. A prioritised programme is in force to resurvey navigable routes to and between populated areas on the West Coast of Greenland, to modern standards.

7. Capacity Building

FAMOS

DGA is participating in the EU-project FAMOS together with most of Hydrographic Offices in the Baltic Sea countries. The purpose of the project is to increase both the survey capacity for the national waters and the capacity for the following data processing. The FAMOS project is for DGA a possibility to increase the data processing capacity though slightly increased number of staff and developing new and more efficient data processes for production of ENC and chart.
So far FAMOS has resulted in a new conceptual design of the IT-infrastructure for the bathymetric databases, improvements of selected processes of the dataflow for "ping to DB" and implementation of a new tool for generating depth contours and selecting soundings.

EfficienSea 2

DGA participate in the European project Efficient, Safe and Sustainable Traffic at Sea - EfficienSea 2.0. The aim of EfficienSea 2 project is to improve navigational safety and efficiency as well as emergency response, to decrease administrative burdens and improve environmental monitoring and enforcement. The development of a Maritime Cloud – a communication framework for both e-Navigation and e-maritime – is central, as is the maturing of emerging communication technologies improving ships connectivity. The project will showcase e-navigation services in the Baltic and in the Arctic while contributing to upgrade of international maritime safety regimes. The project has 32 partners from twelve countries including eight Baltic Sea region countries.

The focus is to co-create and deploy innovative solutions for safer and more efficient waterborne operations encompassing excellent technical and human factor competences, equipment, system- and service providers as well as authorities, with expert domain and regulatory knowledge and influence.

New technologies and/or equipment

All ships in the Danish survey fleet are equipped with Reson 7125 200/400 KHz SW2 multibeam systems. Test trials have been conducted in 2015 with the aim to survey directly on a LAT-model of the waters around Greenland. This method will, in time, make tide gauges redundant for surveys in the south of Greenland.

8. Oceanographic activities

Tide gauge network

The Danish Meteorological Institute and other governmental bodies, maintain a network of water level stations spread across Denmark. The data is used in several ways, primarily for safety of navigation, but are also an integral part of the national storm surge monitoring and prediction system. Data updated are transferred from each station to the oceanographic database every ten minutes.

Online observations and fore-casts are available in Danish and English on several web sites such as:
http://fcoo.dk/

Tidal prediction

Tides are predicted and presented for a range of Greenland cities.
Tidal predictions are available on line at the Danish Meteorological office as tables www.dmi.dk and as a graphic interface at http://fcoo.dk/ The tidal pages from FCOO are awailable in English.

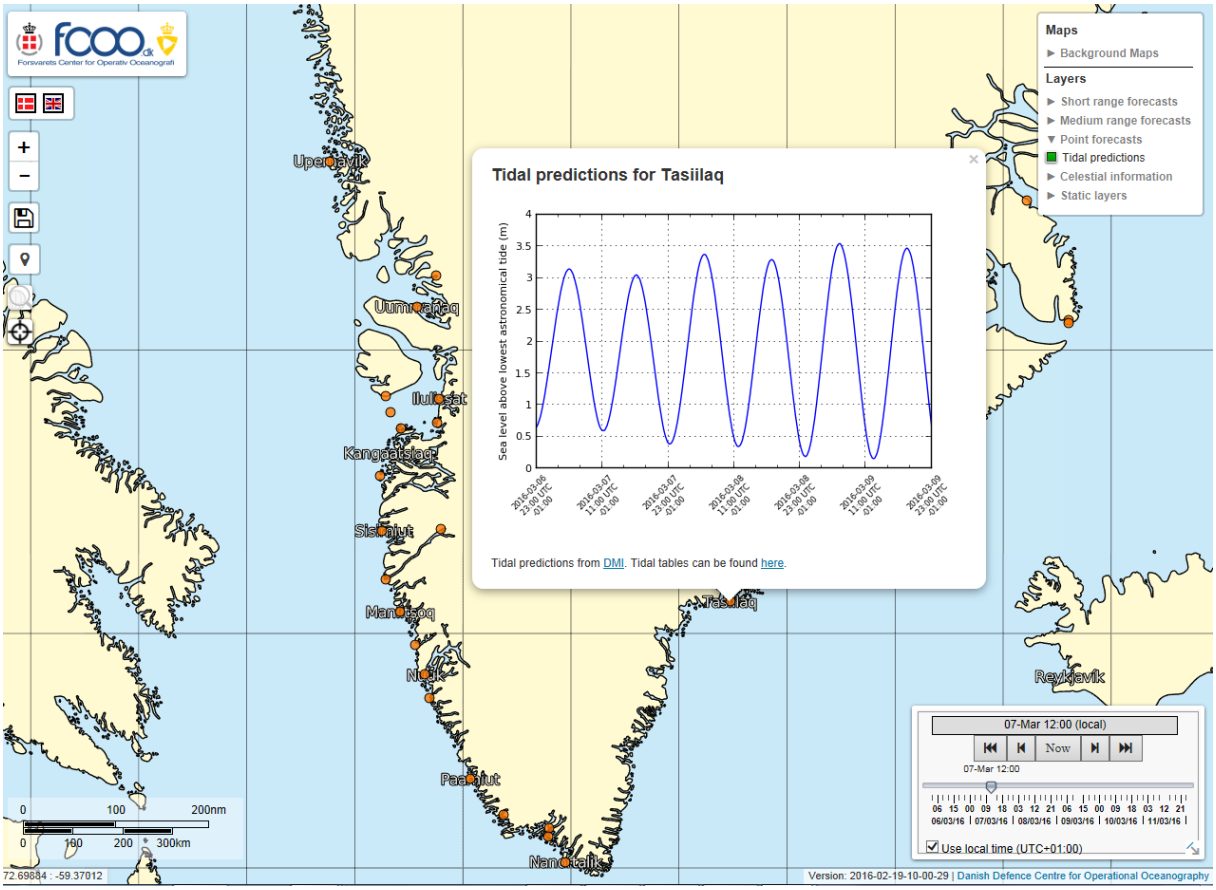

Figure 5. Tidal prediction in Greenland

Greenland LAT-oide project

During the 2016 survey season, the Danish Geodata Agency continued a pilot project, with the aim of testing the feasibility of surveying directly on the spheroid in Greenland. The project involves, setting up numerous tidegauges ashore with the purpose of tying the local LAT levels to a general LAT model developed by the Danish space agency. The general LAT model is claimed to be valid from open sea and until 5 miles from the shore. The project which aims at trying the off shore model to the more shallow coastal areas is not yet finalised. Preliminary reports are promising. The project is expected to continue in the 2017 survey season.

UNCLOS

The Danish Geodata Agency is actively involved in the work of The United Nations Convention on the Law of the Sea (UNCLOS) in the waters around Greenland and the Faroe Islands.

The Danish Geodata Agency is responsible for the data quality assessment on existing bathymetric data and planning and technical specifications for new surveys. There have been no new UNCLOS surveys in 2016 in the Danish area of interest.

9. Other activities

Participation in IHO Working Groups

The Danish Geodata Agency has the chairmanship for the IHO MSDI Working Group and the Baltic Sea and North Sea MSDI Working Group (BS-NSMSDIWG).

The Danish Geodata Agency has been involved in the work done by CSPCWG, SNPWG, DQWG, EUWG and HSSC.

National
Denmark
A MSDI-forum for collaboration has been established, to ensure an efficient and coordinated development and use of maritime data. MSDI-forum membership is based on those authorities that are a part of the collaboration for a Danish MSDI. The MSDI-forum is administrated by a secretariat, established in the Danish Geodata Agency. Other institutions, e.g. within research, can, based on permission from the MSDI-forum, utilise the MSDI to exhibit relevant MSDI data, but are not a part of the MSDI collaboration, and therefore not represented in the MSDI-forum. However, they will have an affiliation via a relevant authority in the MSDI collaboration.
Authorities that want services within the MSDI, pay an annual fee in accordance to a financial model. This applies regardless if a participant provides data or not. Other institutions, such as universities, which, based on agreement with the MSDI-forum, contributes with relevant data to the MSDI, but do not use services from the MSDI, can do this outside of the financial agreement.
For a portion of the data that is a part of the MSDI, it is applicable that they are subject to the INSPIRE Directive. For INSPIRE data, it is amongst the requirements to establish metadata, data will be available in standardised form and there will be established services, so data can be shown and downloaded.
For some dataset, which will be included in the MSDI, applies that they are priced, such as nautical chart data. It is the individual data owners that set the guidelines for use of their data including access criteria, payment models and international exchange.

International
The Danish Geodata Agency is also active in the HELCOM Monitoring Working Group and participates in the newly established OGC Domain WG and the Arctic MSDIWG.

Websites
The Danish Geodata Agency:
http://www.gst.dk/English/
navigation-gl.gst.dk/English/

The Danish Maritime Authority:
http://www.dma.dk/

Danish Meteorological Institute:
http://www.dmi.dk