



Danish Geodata
Agency



ARHC14 2024

NATIONAL REPORT OF DENMARK

This document
provides an overview of the key activities
undertaken by the Danish Geodata Agency's Hydrographic Office
since the last report presented at RHC meetings where
Denmark is represented.

1. HYDROGRAPHIC OFFICE

1.1. DANISH HYDROGRAPHIC OFFICE

As part of the Danish Geodata Agency (DGA), a government agency under the Ministry for Climate, Energy and Utilities, the Danish Hydrographic Office has responsibility for hydrographic surveys, the production of nautical publications and charts of the waters surrounding Denmark and Greenland as well as for the Danish MSDI.

The Danish Hydrographic Office works closely with surveyors from the Royal Danish Navy, who conduct the hydrographic surveys aboard Navy ships.

Furthermore, as a representative of the Kingdom of Denmark, the agency assumes hydrographic responsibilities in foreign affairs, security, and defense policy-related matters for the Faroese waters. This entails tasks such as charting boundaries, INT-charts, negotiating international agreements, and actively participating in the International Hydrographic Organization (IHO) and its affiliated working groups.

By working closely with the Danish Maritime Authority, responsible for navigation aids like Notices to Mariners and List of Lights, and the Danish Meteorological Institute overseeing tide tables and operational tide gauges, the Danish Geodata Agency ensures seamless maritime governance, fostering safety and efficiency in navigation.

1.2. FAROESE HYDROGRAPHIC OFFICE

The Faroese Hydrographic Office (part of the Faroese Environment Agency, Umhvørvisstovan) is responsible for surveying and charting the waters around the Faroe Islands.

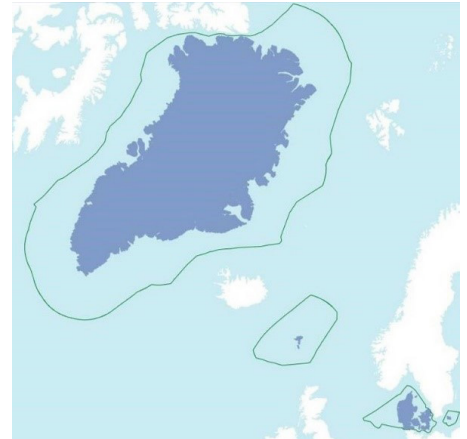


Figure 1. Kingdom of Denmark



Figure 2. Organization in the Danish Hydrographic Office.



2. SURVEYS

2.1 DENMARK 2023

Surveying initiatives in Danish waters are defined in the Survey Directive which aligns with agreements established during the HELCOM Ministerial Council meetings in September 2001 and October 2013. These agreements prioritize the resurveying of main navigation routes and other significant areas vital for Baltic Sea shipping. Additionally, the incorporation of CAT III areas into the survey plan, as decided in the 2021 HELCOM ministerial meeting, further enhances navigational safety. In addition to the HELCOM prioritization, DK surveyed large parts of the inner route in the North Sea, leading traffic safely through the planned off shore windmill areas.

In 2023, the target for surveying Danish waters was set at 22 000 Km of survey lines, yet the actual accomplishment surpassed expectations, covering a total of 26 815.9 Km.

Vessels used for survey in Denmark:

I / F Poul Løwenørn (Danish Maritime Authority)

The surveying vessel FYRHOLM and BIRKHOLM (Danish Navy)

The survey boats SOM-1 and SOM-2 (Danish Navy)

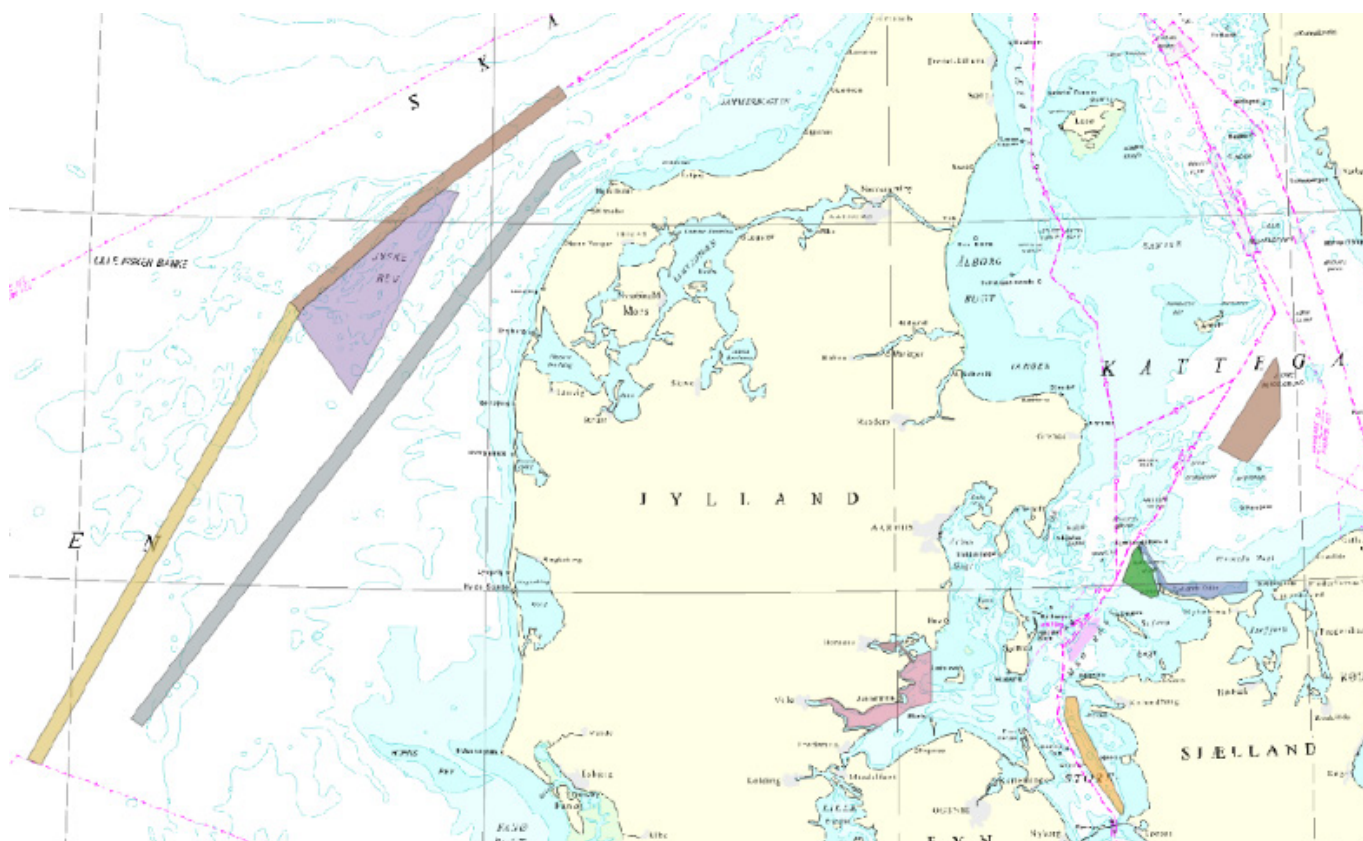


Figure 3: Survey Priorities in Danish waters.



2.2 GREENLAND

The Survey Directive for Greenland is based on the overarching priorities for hydrographic charting established in collaboration with the Government of Greenland. In 2023, these priorities were set out as follows:

PRIORITY 1.

The inland routes between the cities of Greenland's west coast from Nunap Isua (Cape Farewell) to Upernavik.

PRIORITY 2.

Survey of sailing routes in coastal areas on the west coast of Greenland, where the general water depth is less than 200 meters and the basis of survey is insufficient. Examples of priority 2 may be coastal areas where inshore sailing is not possible, due to ice conditions and geography and surveys are of older date or completely missing.

PRIORITY 3.

Surveying areas of particular interest for business and tourism development. Examples of priority 3 areas may be: Selected fjords with frequent visits of cruise ships and areas of impending mining where increased sailing with larger ships is expected.

In 2023, the goal for surveying in Greenland was to cover 6500 km of survey lines; however, only 4084 km were surveyed due to engine issues on a survey ship, causing a three-week delay. Despite this, two new routes were surveyed at the eastern entrance of Ikerasassuaq (Prince Christian Sound), and an offshore route was surveyed to navigate the western side of a hazardous area west of Nunap Isua (Cape Farewell).

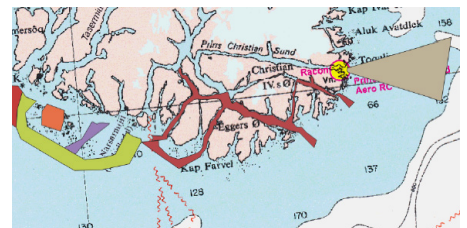


Figure 4: Actual Surveys in Greenland 2023. Nunap Isua area.

Surveys were carried out in Greenland waters in June and July, with:

LAUGE KOCH Arctic patrol vessel (Danish Navy)

The survey boat SAR-3 (Danish Navy)



Figure 5: GPS reference station. SAR-vessel used for in shore work and transportation.



Figure 6. The perks of surveying in Greenland!



2.3 FAROE ISLANDS

The Faroese Hydrographic Office continued to gather bathymetry data with the Faroese Marine Research vessel Jákup Sverri, mainly whilst the vessel is on research trips.

Data using a Kongsberg EM712 multibeam echo sounder based system were gathered during 7 of the Jákup Sverri tours. Resulting in approximately 888 hours of survey lines, covering a distance of approximately 5300 nautical miles.

Data were received from the British Antarctic Survey Research Vessel Sir David Attenborough. The data covered the area between Sandoyarbanki and Suðuroyarbanki, using a Kongsberg EM122 multibeam echo sounder based system.

A number of data files were received from Landsverk covering many of the ports and harbours on the Faroe Islands.

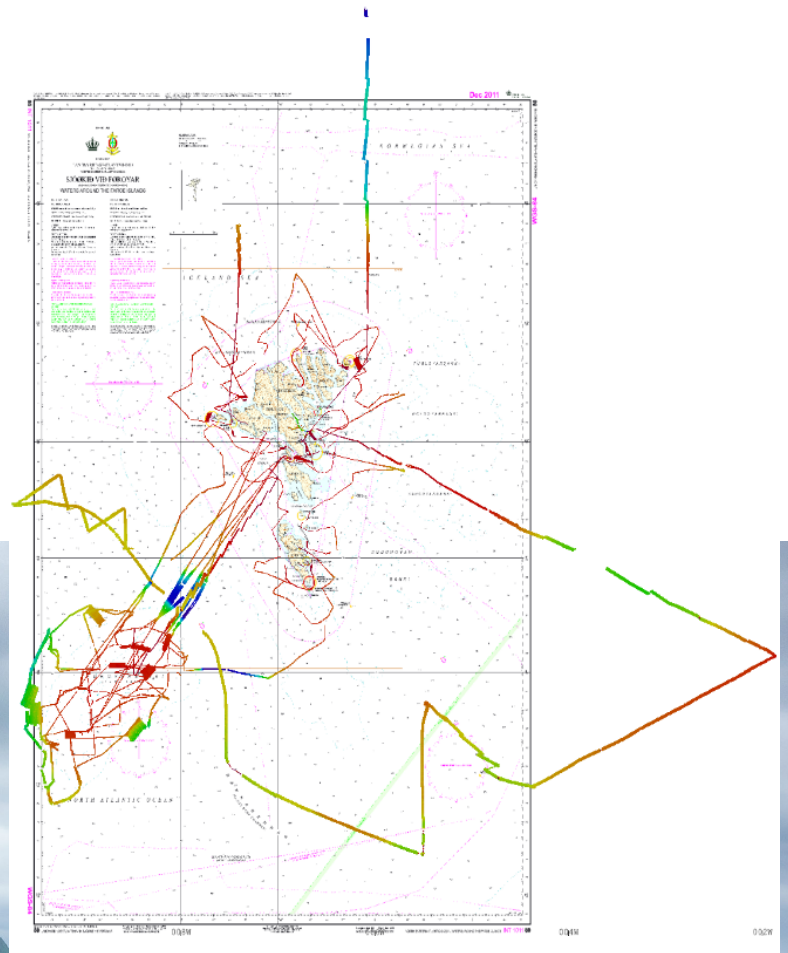
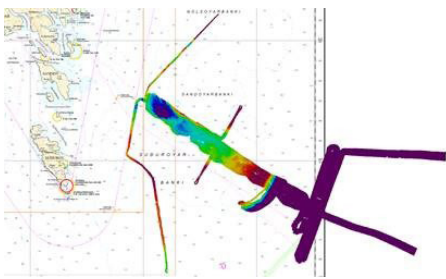


Figure 8 and 9. Provided by the Faroese Hydrographic Office.



3 NAUTICAL CHARTS

All paper charts as well as ENC's covering the Danish and Greenlandic waters were produced and updated by DGA. Paper charts and ENC's covering the Faroese waters were produced and updated by the Faroese Hydrographic Office.

3.1 ENCS

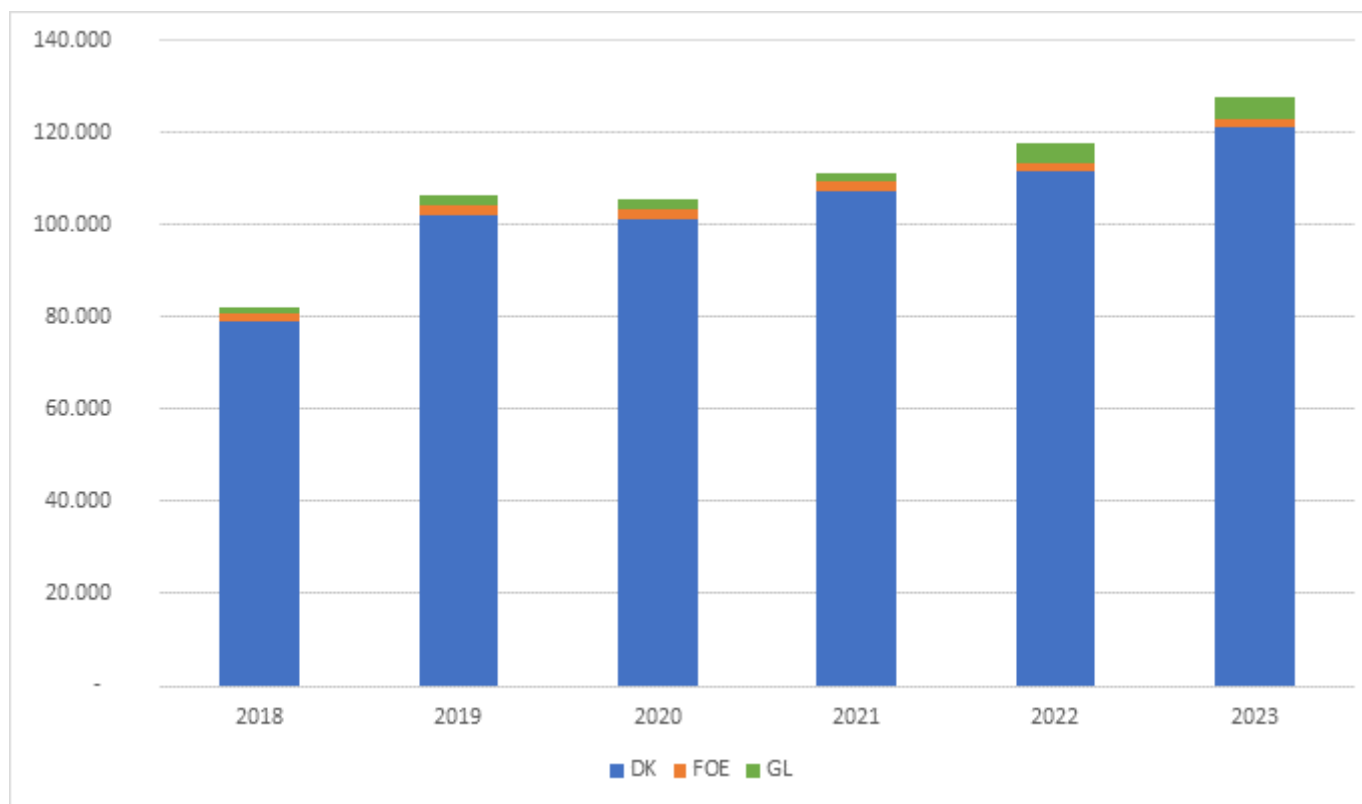


Figure 10: Sales through RENC (2018-2023). Y: Number of sold ENC's. X: Year:

The portfolio consists of 333 Danish ENC's, 231 Greenlandic ENC's and 10 Faroese ENC's.

Usage Band	Number of DK ENC's	Number of GL ENC's	Number of FO ENC's
1 Overview	1	5	0
2 General	9	0	1
3 Coastal	6	59	1
4 Approach	19	111	6
5 Harbour	298	56	2



3.2 PAPER CHARTS

The paper chart portfolio consists of 69 charts covering Danish waters, 109 charts covering Greenlandic waters and 8 charts covering Faroese waters.

Sales of paper charts through own distributor

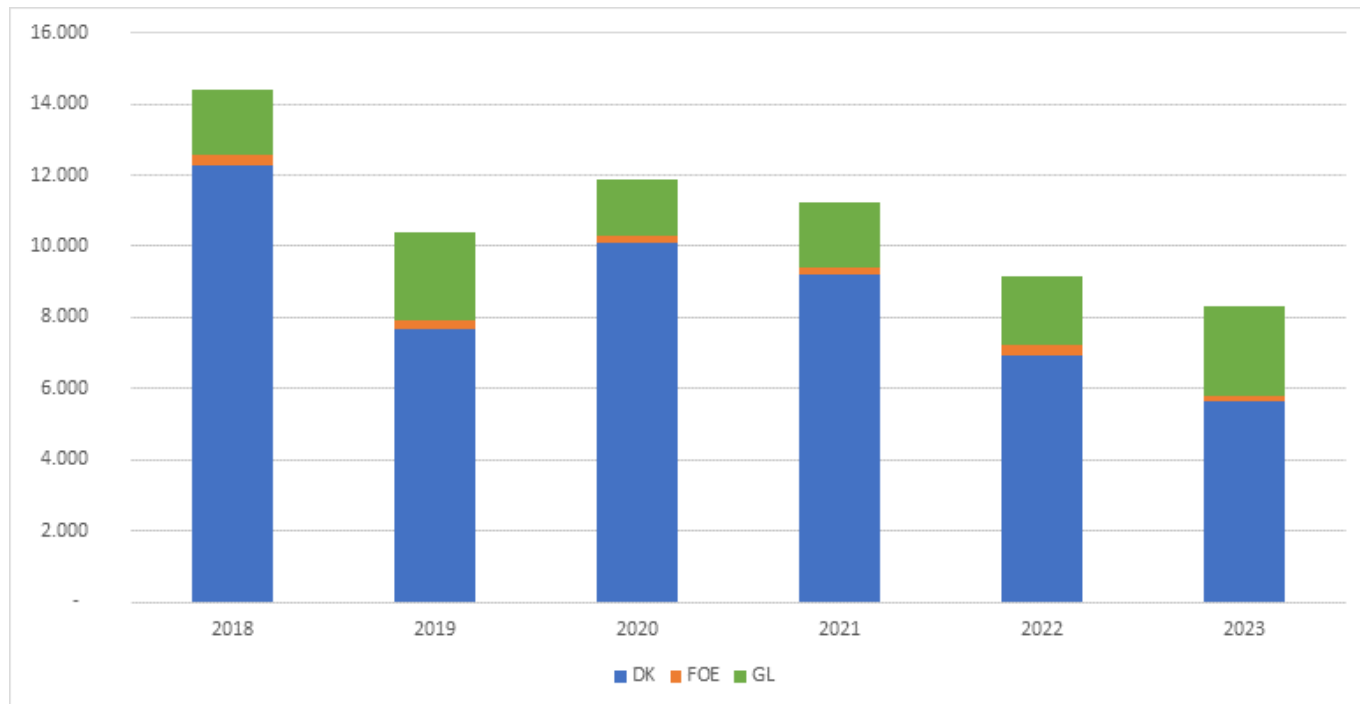


Figure 11: Paper charts total sales 2018-2023. Sales from bilateral agreement are not included. Y: Number of sold charts. X: Year



4 NEW PUBLICATIONS & UPDATES

4.1 NEW PUBLICATIONS

Since the last update, DGA has introduced a dedicated section on their website for Notices to Mariners (NtM), both P- and T-notices. This new feature aims to provide navigators with a comprehensive overview of preliminary and temporary notices regarding activities and projects within Danish and Greenlandic waters that GST has announced as updates to the Electronic Navigational Charts (ENC).

The table can be found here:

[P- og T-notices \(gst.dk\)](#)

4.2 UPDATED PUBLICATIONS

The Danish Notices to Mariners (EfS) are available on the website of The Danish Maritime Authority:

[Nautical information | Danish Maritime Authority \(dma.dk\)](#)

The Danish Meteorological Institute updates the tides tables:

[Tidevandstabeller \(dmi.dk\)](#)

The Danish Geodata Agency publishes a number of publications, which can be found at the DGA website:

[Nautical Publications \(gst.dk\)](#)

DGA also maintain the websites:

Greenland Harbour Pilot ([Greenland Harbour Pilot \(gronlandskehavnelods.dk\)](#))

Danish Harbour Pilot ([Den danske havnelods](#))

Mariners Routing Guide Baltic Sea ([Mariners' Routeing Guide Baltic Sea \(balticsearouteing.dk\)](#))

Navigation.gl ([Home \(navigation.gl\)](#))

Faroese publications (<https://www.us.fo/english/hydrographic-office-faroe-islands/>)



5 MSI

NAV Warnings are available in English on the following web page:

[Nautical information | Danish Maritime Authority \(dma.dk\)](https://www.dma.dk/en/nautical-information)

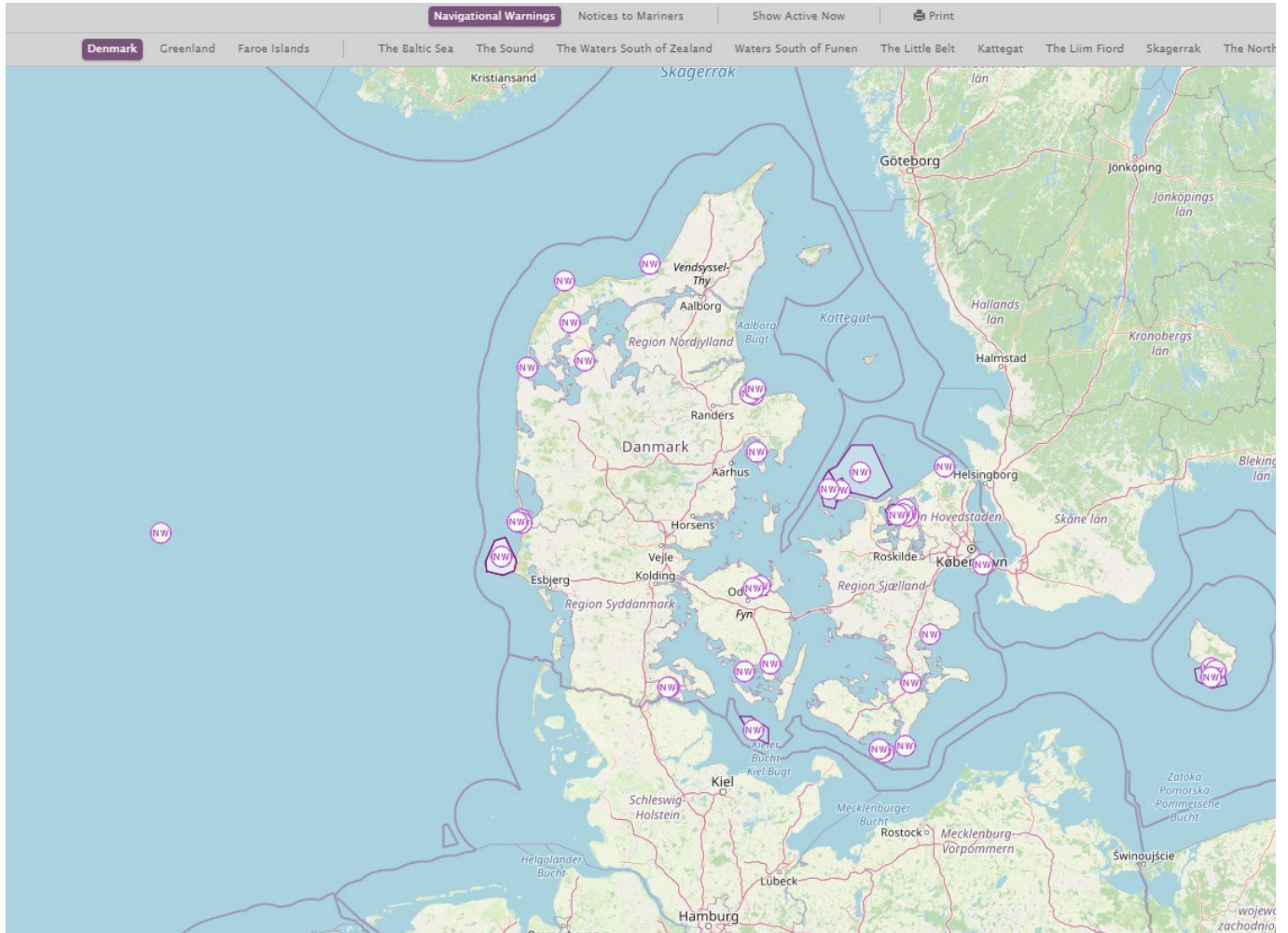


Figure 12. Navigational warnings in Danish waters.



6 C-55

The Danish Geodata Agency and the Faroese Hydrographic Office are currently reassessing their approach to C55, in light of advancements within the IRCC and CBSC framework. As a result of this comprehensive methodology review, updates to C55 may experience delays.

7 CAPACITY BUILDING

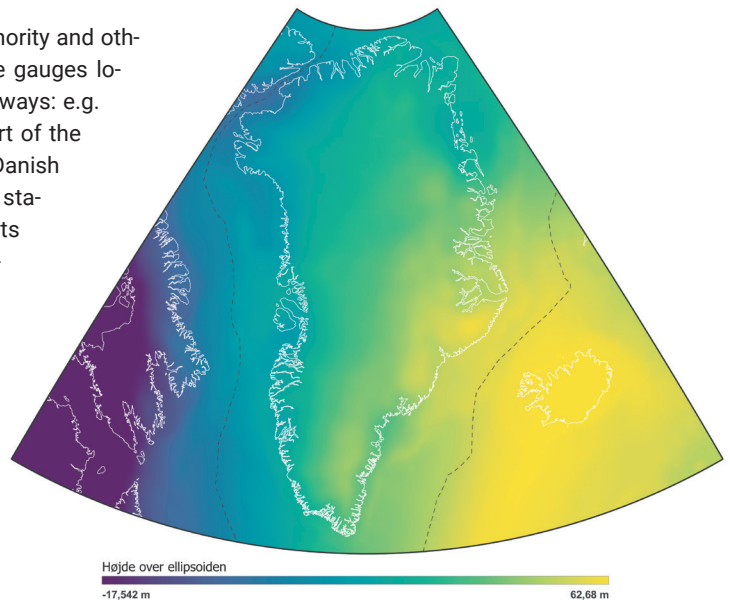
No dedicated activities in the period of this report.

8 OCEANOGRAPHIC ACTIVITIES + S-100 OCEANOGRAPHIC SERVICES

8.1 WATER LEVEL MEASUREMENTS AND NEW PUBLISHED VERTICAL REFERENCES

The Danish Meteorological Institute (DMI), Danish Coastal Authority and other governmental bodies maintain an extensive network of tide gauges located across Denmark. The collected data are used in several ways: e.g. for safety of navigation, but they also represent an integral part of the national storm surge monitoring and prediction system. The Danish Technical University maintains a limited number of tide gauge stations in Greenland and The Danish Hydrographic Service collects water level measurements during the yearly hydrographic survey campaign.

The Agency for Data Supply and Infrastructure (SDFI) has recently published a Lowest Astronomical Tide (LAT) separation model covering the whole Danish EEZ, named DKLAT. A Mean Sea Surface separation model, named DKMSL, has also been published by SDFI. Similarly, a LAT separation model, GLLAT, and a mean sea surface separation model, GLMSL, for Greenland's EEZ has been published by SDFI early summer 2024. All Danish and Greenlandic models are publicly available and are distributed by SDFI.



8.2 S-100 SERVICES

The Danish Hydrographic Office has taken initiative to establish a national S-100 coordinating working group together with the Danish Maritime Authority, the Danish Meteorological Institute and Joint GEOMETOC Support Centre, a division under The Danish Ministry of Defence Acquisition and Logistics Organisation.

The primary objective of the national coordinating working group is to foster collaboration among organizations for the development, maintenance, and distribution of S-100 services, such as S-101, S-102, S-104 and S-111.

9 MARINE SPATIAL DATA INFRASTRUCTURE IN DENMARK

DGA is responsible for the Danish Marine Spatial Data Infrastructure (MSDI) and supports various activities related to access to marine data and collaborations in the marine data field in Denmark.

Through the website “The Marine Map of Denmark,” DGA exhibits marine data from a wide range of public authorities and serves as a central entry point for more than 100 marine datasets in Denmark. In 2024, the map portal transitioned to a new ESRI platform, which offers new opportunities for displaying and combining data.

Regarding collaborations in the marine field, DGA seeks to influence various initiatives in the government, business, and research sectors to create better conditions for sharing and accessing marine data. Furthermore, the DGA’s MSDI supports the Denmark’s Maritime Spatial Plan by providing essential marine data, facilitating informed decisions on conservation, renewable energy, and fisheries, ensuring sustainable maritime development in alignment with national goals. Read more here: www.havplan.dk.

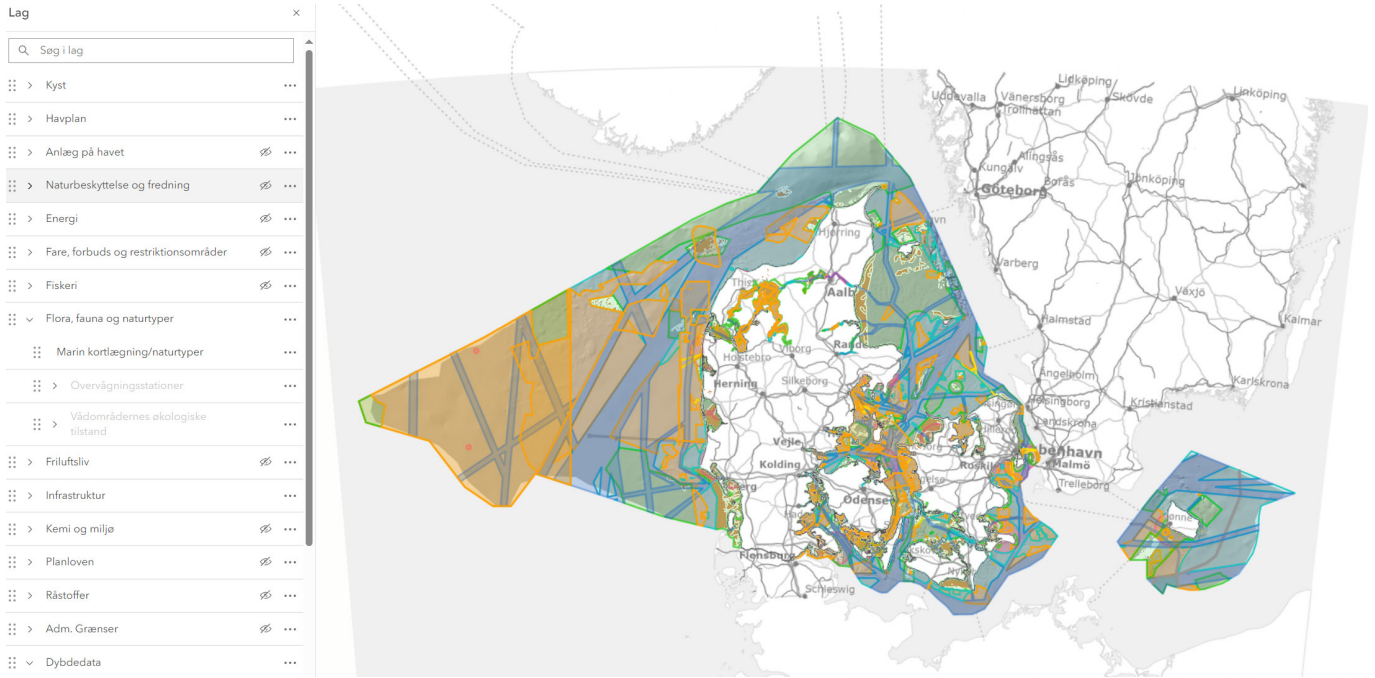


Figure 13. The Danish MSDI Map viewer.



10 INNOVATION

10.1 S-102 TEST PROJECT WITH DANPILOT

The Danish Geodata Agency and DanPilot, which is the largest company piloting ships through Danish waters, have in 2023 entered into a pilot project concerning the use of S-102 data. DanPilot experiences an increasing need and demand for high-resolution depth data from commercial shipping traffic. The pilot project aims to test whether the S-102 dataset developed by the Danish Geodata Agency can meet the need and demand for high-resolution depth data, as well as to provide the Danish Geodata Agency with user feedback on S-102 for further work towards 2026 when the first phase of S-100 is officially being rolled out.

10.2 SATELLITE MAPPING OF NEAR-COAST AREAS IN GREENLAND

The “Satellite Mapping of Near-Coast Areas in Greenland” project is a pivotal initiative aimed at enhancing maritime navigation and safety around Greenland’s coasts through the innovative use of satellite imagery. This project targets the implementation of satellite technology to accurately map coastlines, intertidal zones, and areas of navigational risk. By focusing on these critical regions, the project seeks to provide essential data for improved voyage planning, search-and-rescue operations, and the overall safety of maritime activities in the Arctic. With a budget allocation of 4.4 million DKK (590 000 €) and a timeline stretching from the first quarter of 2024 to mid-2025, the project encompasses a comprehensive approach to data collection, analysis, and application. It emphasizes collaboration with external partners for mapping services, training, and software development, aiming to build expertise and capacity for ongoing coastal mapping efforts within DGA. The expected outcomes include datasets that can significantly contribute to the understanding and management of Greenland’s coastal environments, facilitating safer navigation and protecting the region’s unique marine ecosystems.



Figure 14. Project inspiration.

10.3 DANISH DEPTH MODEL – VERSION 2

In 2022, DGA released the [Denmark's Depth Model \(DDM\)](#), a publicly available bathymetric model covering Danish waters. The model has a grid resolution of 50 meters and is based on a collection of hydrographic survey datasets and historical sources.

Following the first release, DGA has set forth to improve the DDM even further by greatly improving the coverage of near-coastal and shallow waters. To achieve this, DGA has joined forces with EOMAP, both partners of [EMODnet Bathymetry](#), thus using cutting edge satellite technology to provide better mapping of shallow waters.

It will improve not just the coverage of the DDM but also the contribution to EMODnet Bathymetry. In addition, DGA is also working on better handling of vertical datums, adding new data sources and much more. This will all be published in a version 2 of the DDM during 2024.

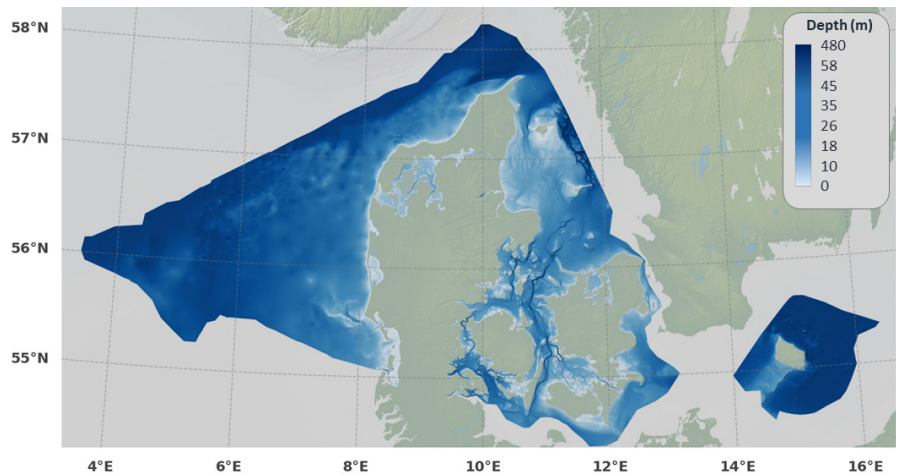


Figure 15: Depth Model in 50 Meter Grid resolution

10.4 MOBISPACES PROJECT: MACHINE LEARNING & CSB

DGA participates in the EU project “MobiSpaces - New data for green mobility”, which is a 3-year EU Horizon Europe project. Currently in its second year, the purpose of the project is to deliver an end-to-end mobility-aware and mobility-optimized data governance platform.



DGA is lead on a Use Case designed to validate how crowdsourced nautical sensor data can be processed directly onboard vessels, and qualified for improving navigational safety at sea. Using a decentralized data acquisition approach with machine learning, the objective is to collect bathymetric data and to evaluate the required level of prioritization for data transmission to DGA. In 2024, the focus will be on operationalizing this approach through a series sea trials and real-life testing.

10.5 LAKE VOLTA PROJECT: SATELLITE-AIDED IDENTIFICATION & CSB

Through collaboration with the Danish Maritime Authority and the Ghana Maritime Authority, the Danish Geodata Agency is engaged in a project aimed at improving navigational safety on Lake Volta in Ghana, the largest artificial reservoir in the world based on surface area. Leveraging a combination of satellite-aided identification and crowdsourced data collection, the Danish Geodata Agency assesses danger zones within predefined areas on Lake Volta, Ghana.

Additionally, in cooperation with an external maritime start-up, Sternula, the DGA has developed a prototype “Crowd-Sourced Data Box”. This box has been successfully installed on standard operating vessels on Lake Volta collecting relevant data of the vessels’ sailing routes.

The obtained data and results inform the creation of hazard maps of Lake Volta, empowering end-users with vital information regarding navigational risks and fostering capability enhancement. The outcomes furthermore allow DGA to better understand the limitations and benefits of crowdsourced data collection and satellite data analysis. More than halfway through the Lake-Volta project, the DGA is able to implement attained satellite competencies and resources in projects also targeting Greenlandic waters.

10.6 BALTIC SEA E-NAV

DGA participates in the new EU project, Baltic Sea e-Nav (funded by the Interreg Baltic Sea Region), together with many other Hydrographic Offices in the Baltic Sea countries. The shipping industry is facing a paradigm shift with the implementation of the new S-100 standard for digital navigational charts, and the purpose of the project is to create the next generation of navigational products and services, and ensure harmonized navigational data in the Baltic Sea.



During the project, DGA will focus mainly on testing the next-generation electronic navigational charts and defining new S-100 production processes. DGA has started to develop prototype S-101 and S-102 products within the test areas.

11.1 INTERNATIONAL ACTIVITIES

Working Group / Committee	Delegates from KoD
IHO Assembly	Pia Dahl Højgaard, Elizabeth Hagemann
IHO Council	Pia Dahl Højgaard, Hendrik Stang, Sophie Hohwü-Christensen
HSSC	Sophie Hohwü-Christensen
S-100WG	Elizabeth H. Haahessy, Jens Søe Christiansen
S-101PT	Elizabeth H. Haahessy
S-102PT	Giuseppe Masetti
ENCWG	Richard Fowle, Elizabeth H. Haahessy, Bruno Cardoso, Lisa Johansson (FO)
NCWG	Thomas Christensen, Benjamin McLauchlan, Lisa Johansson (FO)
NIPWG	Jens Søe Christiansen
TWCWG	Nicki Riber Andreasen, Kristian Villadsen Kristmar
HSWG	Giuseppe Masetti, Philip S. Christiansen
DQWG	Giuseppe Masetti
IRCC	Hendrik Stang
WENDWG	Sophie Hohwü-Christensen
MSDIWG	Christian Thellufsen
IENWG	Katrine Petersen, Hendrik Stang
CSBWG	Giuseppe Masetti, Ove Andersen
BSHC	Pia Dahl Højgaard, Elizabeth Hagemann, Hendrik Stang
BSICCWG	Nikolaj Møller, Kell Torp Jensen
CDWCWG	Nikolaj Møller, Kristian Villadsen Kristmar
MWG	Lars Hansen
BSDWG	Giuseppe Masetti
NSHC	Pia Dahl Højgaard, Elizabeth Hagemann, Hendrik Stang
NSICCWG	Nikolaj Møller, Kell Torp Jensen
TWG	Nicki Riber Andreasen, Kristian Villadsen Kristmar
RWG	Lars Hansen
NHC	Pia Dahl Højgaard, Elizabeth Hagemann, Hendrik Stang
NCPEG	Nikolaj Møller, Kell Torp Jensen, Lisa Johansson (FO)
NSEG	Yvonne Morville Petersen, Gethin Roberts (FO)
ARHC	Pia Dahl Højgaard, Elizabeth Hagemann, Hendrik Stang
OTWG	Nicki Riber Andreasen
AICCWG	Nikolaj Møller, Kell Torp Jensen
ARMSDIWG	Christian Thellufsen
PAME PT	Hendrik Stang
IC-ENC SC	Pia Dahl Højgaard, Sophie Hohwü-Christensen
IC-ENC TWG	Kell Torp Jensen, Bai Sinsuat
IC-ENC DWG	Sophie Hohwü-Christensen

11.2 OTHER PROJECTS

The Danish Geodata Agency supports the Danish Defence with access to nautical charts, marine geodata, and special geospatial products, along with advice aimed at assisting the Defence in addressing national and international tasks and fulfilling international obligations towards NATO, allies, and other partners.



Danish Geodata Agency

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