| Kartverket | **ARHC 11th Conference**<br>**Virtual 10-11 November 2021** | **ARHC**<br>**National Report**<br>**NORWAY** |
|---|---|---|

# *NATIONAL REPORT*
# *NORWAY*

## **Executive Summery** (Evert/Torstein)

This report gives the summary of the activities and events that have taken place within the Norwegian Hydrographic Service (NHS) since the last report given at the ARHC10 Conference. Some highlights:

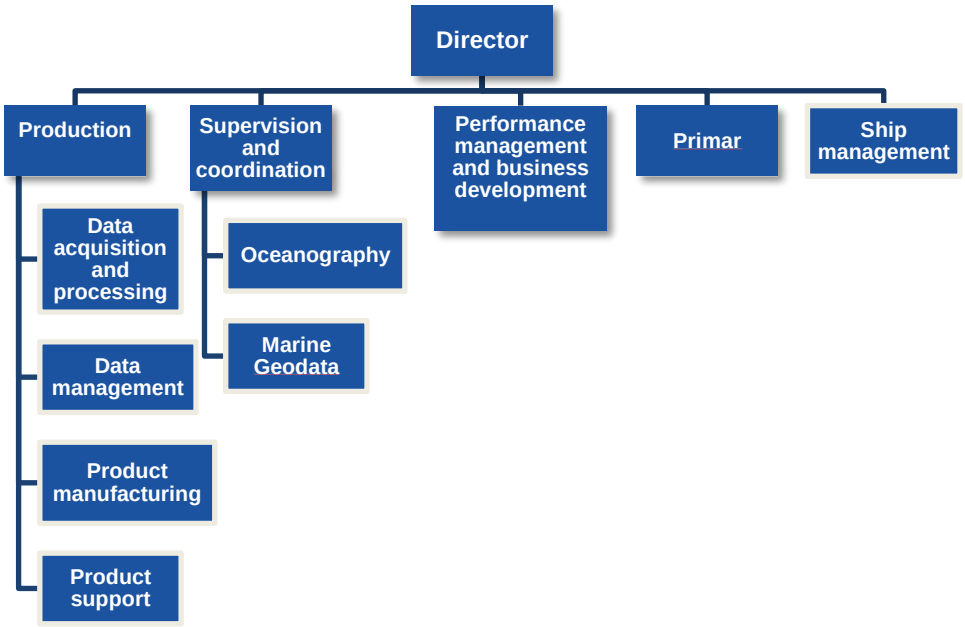
- *Standardization of Port Data*
- *New Hydrographic Infrastructure project Nautilus*
- *Testing of condensed depth curves*
- *Pilot project for Marine Base Maps in Norway*
- *Continued high activity in the Mareano project in both coastal and open sea arctic areas*

### 1. Hydrographic Office

- **Organisational changes**

The latest organizational changes have mainly been initiated because of two factors: firstly the positive experiences we have had with the Nautical Charting Authority department have led us to also consolidate the roles managing the requirements related to bathymetric data and marine spatial infrastructure into a new department. In this new department we have located all roles managing requirements and user input to all of NHS's products and services, and this will further ensure that the NHS focuses its resources were they give the highest benefits to society. It will also take some of the burden off the production line, as they will have clear requirements governing their everyday tasks.

Secondly, we are preparing our production for the technological changes that will follow in the wake of the New Hydrographical Infrastructure project (Nautilus). The emergence of new technology will challenge the way we have organized the production line today, and some of these changes will demand a lot from all employees at the NHS. In order to manage the transitions in the best possible way, we have merged all of our production into one department.




As of April 2021, all departments managers have been appointed, the departments have been staffed, and we are working on implementing the new structure. Responsibilities have to be appointed, procedures have to be updated and offices moved.

- **Covid economic support package**

As a part of our government's relief plan for Norwegian businesses, the NMA received NOK 12 million earmarked for purchase of services from private industry affected by the national shut down. In the NHS we used these funds to expand and improve the contents and services in the new Pilot guide for Norwegian waters. In close cooperation with harbors, private survey and consulting industry and NMA regional offices, we have launched a harbor-surveying project. Ten different harbors across all of Norway have been selected for this project. Private contractors have surveyed the harbors, both onshore with Lidar and photography, and offshore with multibeam echo sounders. This gives a unique and complete picture of all features relating to harbors that are important to all parties involved in maritime operations. We are planning to make the data available to the public as high definition charts and services.

## Hydrographic Surveys

### 2.1 Internal conducted surveying oct 2020 – oct 2021

R/V Hydrograf and its two survey launches have been working in the coastal waters of Norway and Svalbard.

**Norwegian coast**

The primary survey areas during this period have been fairway surveys along the southern part of Norway between Bergen and Trøndelag

In addition, some areas north-east of Tromsø (Skjervøy-Kvænangen) were surveyed as a part of the coastal marine mapping program.

The total area surveyed along the Norwegian coast during this period was 635.8 km². *Figure 1* presents the coverage of internal surveying within the territorial waters.

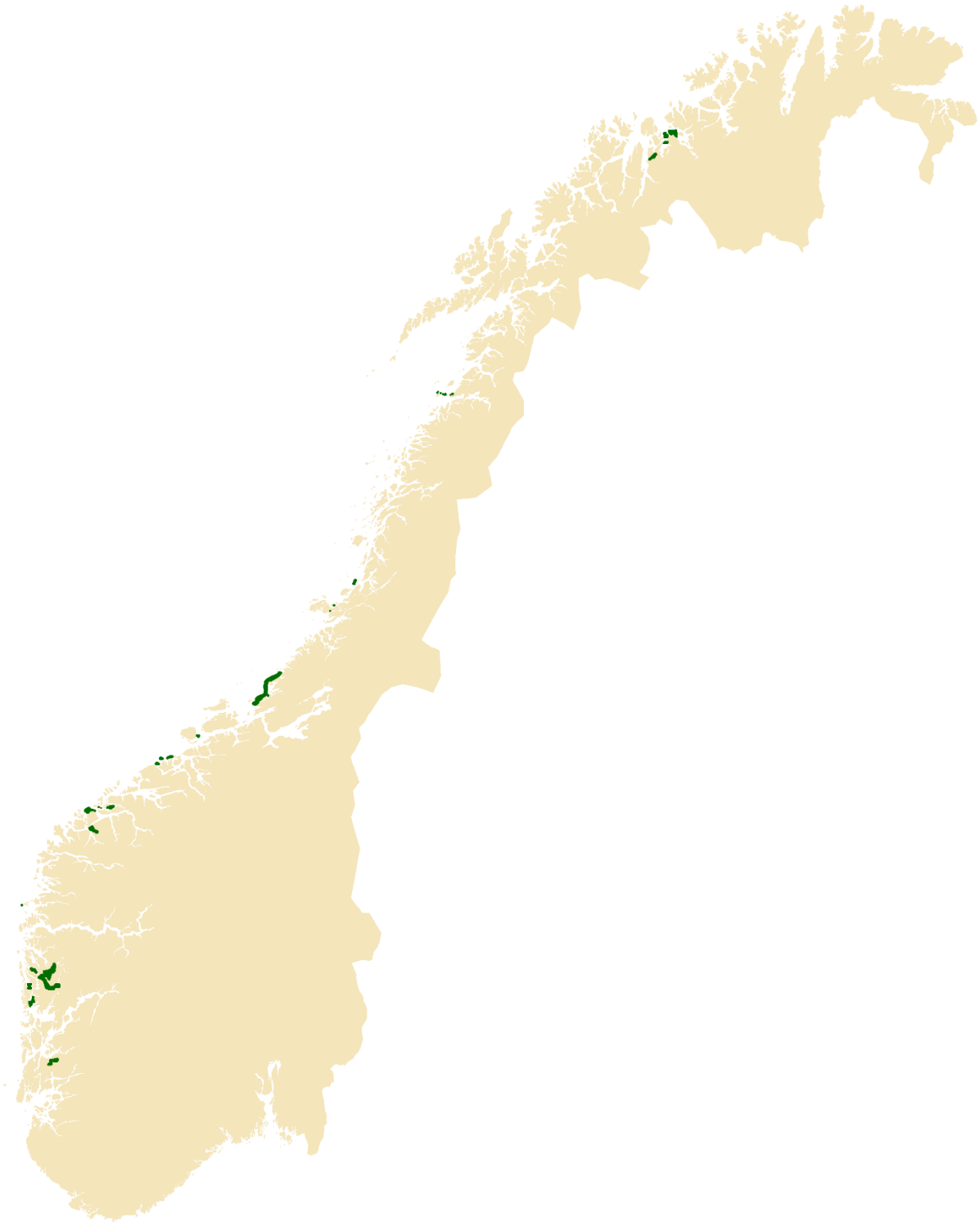


*Figure 1 Area surveyed in territorial waters during the actual period. Please note that the area sizes are exaggerated to make the smaller areas visible on the plot.*

**Svalbard**
The 2021 surveying at Svalbard was focussed on improved coverage in Storfjorden. A total of 1499.3 km² were surveyed during this period. The coverage is shown in the figure below.

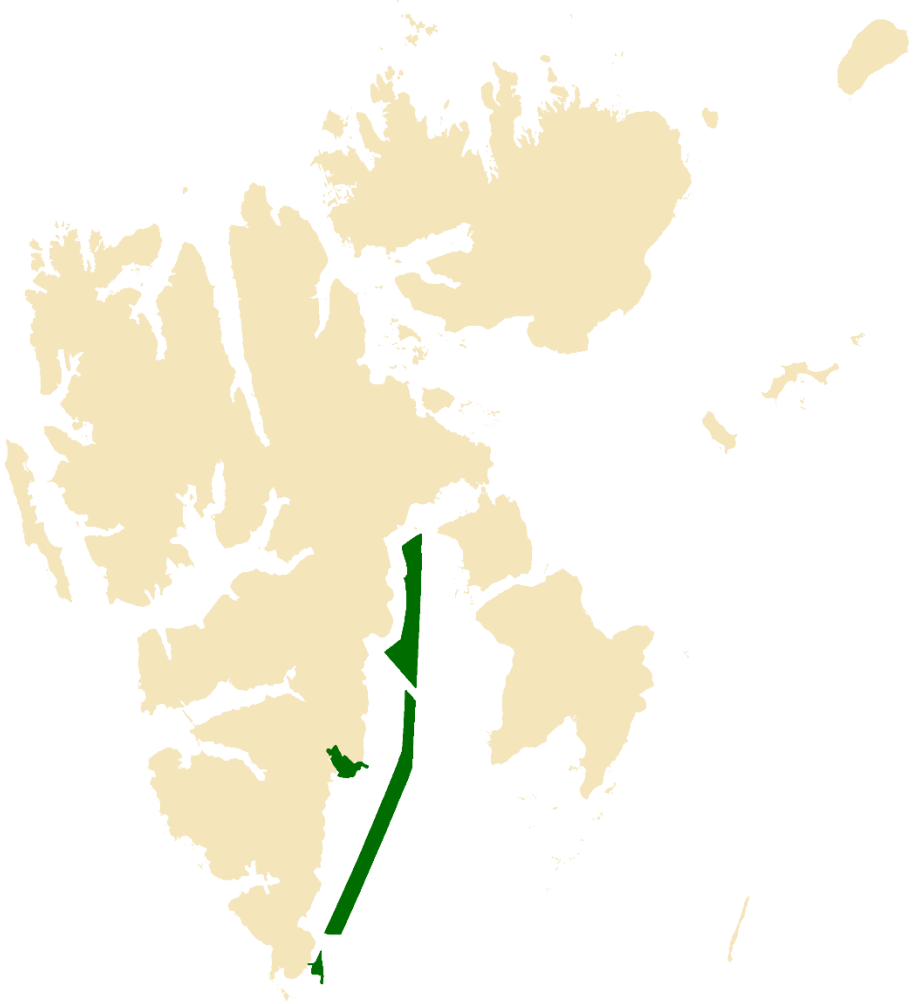


*Figure 2 Survey areas at Svalbard in 2021*

## 2.2 External conducted surveying 2020 / 2021

Only surveys within the MAREANO program were contracted to external companies. The 2020 MAREANO surveys were conducted by Fugro Germany Marine on Spitsbergen bank in the Barents Sea. The 2021 MAREANO surveys were conducted by Arctia Meritaito Oy.

## 2.3 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 areas. High quality multibeam bathymetry is regarded as a premise for further geological, biological and chemical 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)

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

**Results 2020:** The MAREANO program received NOK 98,4 mill in total through earmarked funding. NHS received NOK 48.0 mill. 3 708 $km^2$ was surveyed in 2020. In 2020 MAREANO included surveying in transit to contribute to crowd sourcing bathymetry.

**Data distribution:** The multibeam data has been modeled in digital terrain models with grids of various resolutions. The terrain is visualized through shaded relief maps as a Web Map Service included in the map services on the MAREANO webpage www.mareano.no.
**NSDI:** According to the MAREANO data policy all geodata from the MAREANO programme will be published in the Norwegian spatial data infrastructure; *Geonorge* www.geonorge.no and www.dybdedata.no .

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

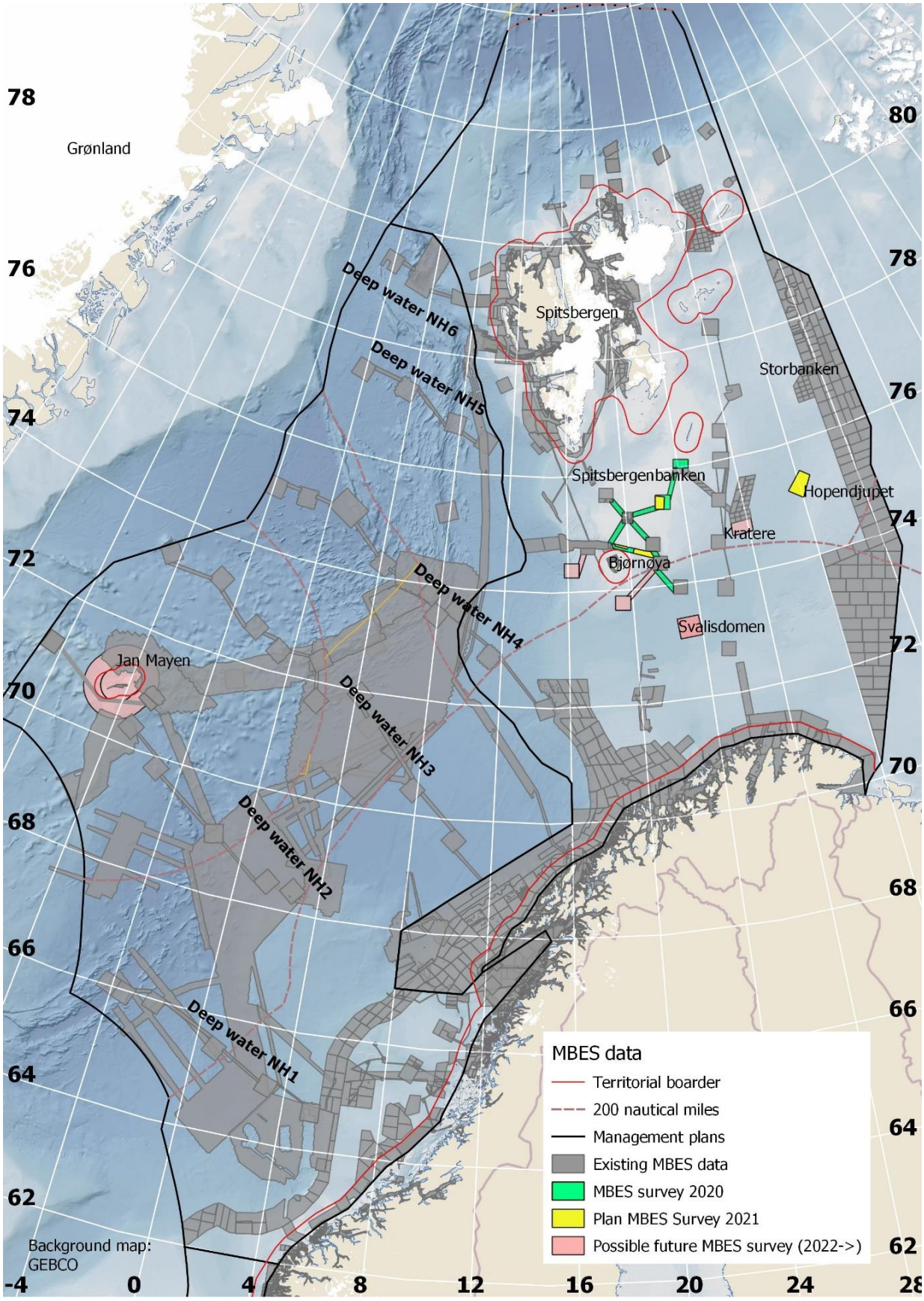



Figure 3. The Management plan areas and coverage of multi beam echo sounder data.

## 2.4 Marine Base Maps in Norway (Njål / Hanne)

Marine base maps in Norway is all about gathering detailed information and boosting the knowledge of the sea bed and marine coastal systems along Norway's coast. The aim is to provide new business opportunities, stimulating and/or optimising the growth of industries, better public administration and effective coastal zone management. Marine base maps in Norway will (i) map on a large scale the sea beds physical, biological and chemical environments (ii) analyse the data and (iii) distribute a set of standardised products in formats that would cater to the different needs of end users. The marine data collected can be distributed as stand-alone or combined with other datasets to create "Marine Base Maps".
It is a cooperation project with 3 partners; The Norwegian Hydrographic Service (leading the project), Geological Survey of Norwayand the Institute of Marine Research. This cooperation will allow for a streamlined process from data collection to distribution. It also has the added advantage of better coordination and management of resources.

We are running a pilot project in three pilot areas along the coast for a 3 year period 2020-2022. The budget for the 3-year pilot is NOK 84 mill. The pilot projects will investigate and test new technology for data collection and processing and, in addition, develop a cost-effective model for the implementation of a Marine base maps in Norway program.

Workshops have been held in three pilot areas with planning staff of municipalities and provinces, government agencies and industry / commercial actors. We have identified and documented planning processes in a way that shows what type of marine geospatial information is needed, what the requirements are (level of detail, quality, update frequency) and what are the requirements for distribution of the data. In addition we aim to identify datasets that can become part of our official national geographical information baselayer (in Norwegian: DOK: det offentlige kartgrunnlaget) containing all official datasets required for planning and building processes in Norway. Once a geospatial information dataset is part of "DOK", it

- meets specific ISO-standards,
- is INSPIRE compliant
- is available in WMS, WFS and WCS, pluss has atom feed
- can be harvested from our national geoportal "Geonorge"

## 2.5 FAIR-principles

The FAIR-principles provide guidelines to improve
the **F**indability, **A**ccessibility, **I**nteroperability, and **R**euse of digital assets.

**The Mareano programme** and **Marine Base Maps in Norway** have decided that the FAIR principles should be applied to over 60 datasets collected and processed by the collaborating partners and be distributed to the relevant national infrastructures via Geonorge and NMDC (Norwegian Marine Data Center). The aim is to ensure that information pertaining to the seabed is made easily available to all who will benefit from its use including those engaged in research, management and business ventures.

## 3. Nautical Charts

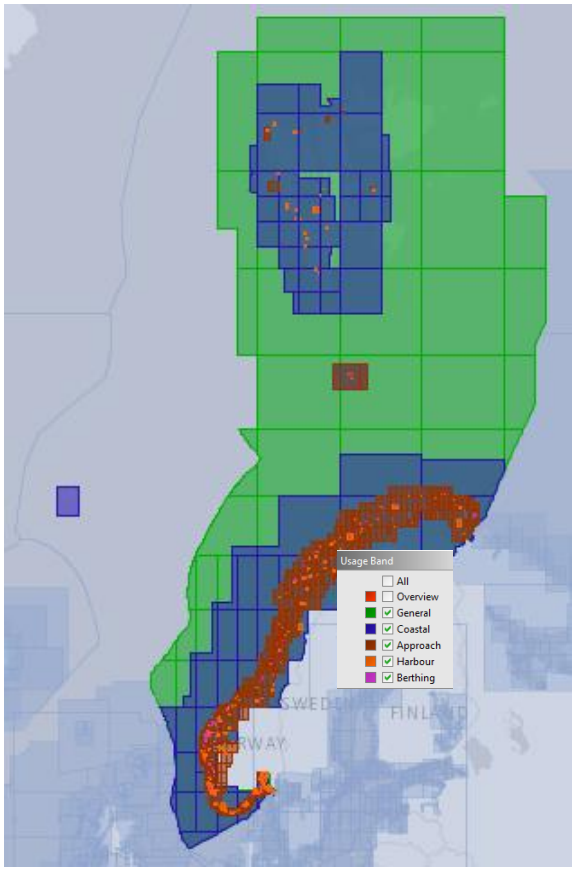
NHS has covered the Norwegian coast with ENCs and modernised paper charts. In the Arctic and Antarctic waters, there are still areas without any coverage. The NHS production department has been concentrating on replacing areas with old survey data with new data. NHS prioritize these areas based on safety of navigation and economic benefit to society.

### ENC coverage, gaps and overlaps

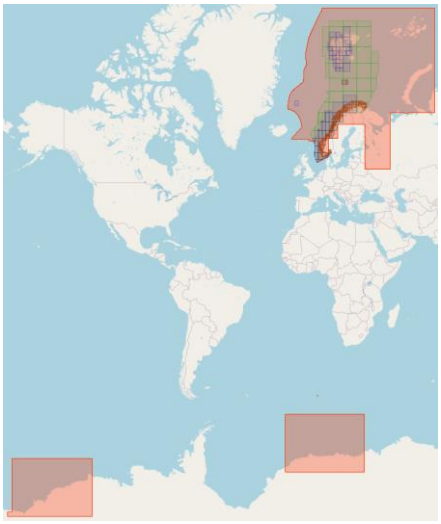
We have a total of 1209 ENCs per medio October 2021.

| | Usage Band | Compilation scale | No of ENCs |
|---|---|---|---|
| 1 | Overview | < 1:1 499 999 | 3 |
| 2 | General | 1:350 000 – 1:1 499 999 | 70 |
| 3 | Coastal | 1:90 000 – 1:349 999 | 84 |
| 4 | Approach | 1:22 000 – 1:89 999 | 764 |
| 5 | Harbour | 1:4 000 – 1:21 999 | 219 |
| 6 | Berthing | > 1: 4 000 | 69 |

**Table above: Number of ENCs in each usage band per 22 Oct. 2021.**




*Figur 4 ENC coverage for the Norwegian coastal waters (ENCs in User Bands 2-6).*



*Figur 5 ENC coverage in User Bands 1.*

In 2020 to October 2021, existing ENCs in several major- and most important fairways from Skagerak to Rogaland are updated with multibeam survey (Iddefjorden, Sandefjord, Larvik, Porsgrunn, Kragerø, Arendal, Kristiansand, Mandal, Stavanger, Haugesund – Ryvarden, Årdal, Sauda, Saudafjorden). Also in small parts of other existing ENCs along the Norwegian coast old bathymetry have been replaced with new survey based on request from users.

In addition, new Coastal ENCs between 69°N, 4°E and 73°N, 34°E are produced. We have hereby achieved full coverage in the Coastal usage band along the Norwegian coast after completing a project that started in 2009. General ENCs in the same area are also updated resulting in full consistency between all usage bands.

In Svalbard sparse bathymetry with poor quality is replaced with multibeam in parts of existing ENCs in Storfjorden, Freemannsundet (areas surveyed in 2019) and Widjefjorden/east of Moffen. Work is now being done to replace old survey data in existing ENCs in Forlandssundet and Kongsfjorden.

In 2020 a total of 2117 ER files and NE were issued as part of the continuous maintenance of the ENCs. In October 2020, NHS stopped publishing ENC updates in accordance with the Notices to Mariners (NtM). We went over to publish all reported corrections based on priority. Now all important updates are released within 7 days. Included Temporary (T) and Preliminary (P) notices.

**RNCs**

The Norwegian Hydrographic Office is not producing Raster navigational charts.

**INT Charts**

Norway has 21 INT-charts in the chart portfolio. Most of them are small-scale charts (general and coastal charts). In March 2021 a new INT-chart was issued as New Chart. This was NO 312 / INT 9315 Andenes – Lopphavet. Later this year (2021) we plan to add 2 more coastal charts to our portfolio. That will complete our Coastal Chart Series in Scale 1:350 000.

A total of 1 new editions of INT charts were issued in 2019 due to updates from new surveys. 1 coastal charts.

**INT charts, new editions with new survey data published 2020 – Oct 2021**

| Chart No. | Title | Scale |
|---|---|---|
| 1. 311 | INT 9314 / Støtt – Andenes | 1:350 000 |

## National Paper Charts

One national Chart was issued as New Chart: Chart No. 538 Wijdefjorden at Svalbard on May 2020.

A total of 53 new editions of national charts were issued in 2020 - Oct 2021 due to updates from new surveys. 15 harbour charts, 31 main charts, 1 coastal chart and 4 charts for Svalbard. Two Charts were issued twice.

**National charts, new editions with new survey data published 2019**

| Chart No. | Title | Scale |
|---|---|---|
| 1. 1 | Oslofjorden. Færder – Hvaler – Halden | 1:50 000 |
| 2. 2 | Torbjørnskjær - Fulehuk - Rakkebåene | 1:50 000 |
| 3. 5 | Svenner – Porsgrunn – Jomfruland | 1:50 000 |
| 4. 6 | Jomfruland – Risør | 1:50 000 |
| 5. 7 | Risør – Arendal | 1:50 000 |
| 6. 8 | Arendal – Lillesand | 1:50 000 |
| 7. 9 | Lillesand – Ny-Hellesund | 1:50 000 |
| 8. 10 | Ny-Hellesund – Lindesnes | 1:50 000 |
| 9. 11 | Lindesnes – Lista | 1:50 000 |
| 10. 15 | Ryfylkefjordane. Sjernarøyane – Sauda | 1:50 000 |
| 11. 16 | Tananger – Stavanger – Skudenes | 1:50 000 |
| 12. 17 | Karmsundet - Ryvarden - Skjoldafjorden | 1:50 000 |
| 13. 19 | Ryvarden – Selbjørnsfjorden | 1:50 000 |
| 14. 24 | Fensfjorden – Sognesjøen | 1:50 000 |
| 15. 25 | Sognesjøen – Stavenes | 1:50 000 |
| 16. 26 | Håsteinen – Batalden | 1:50 000 |
| 17. 27 | Sunnfjord | 1:50 000 |
| 18. 34 | Romsdalsfjorden. Molde – Åndalsnes | 1:50 000 |
| 19. 38 | Trondheimsleia. Terningen – Kyrksæterøra – Ørlandet | 1:50 000 |
| 20. 38 | Trondheimsleia. Terningen – Kyrksæterøra – Ørlandet | 1:50 000 |
| 21. 43 | Agdenes – Lauvøya | 1:50 000 |
| 22. 65 | Fleinvær – Bodø – Landegode | 1:50 000 |
| 23. 72 | Lofotodden – Stamsund | 1:50 000 |
| 24. 77 | Tjeldsundet – Harstad – Lavangen | 1:50 000 |
| 25. 92 | Karlsøy – Flatværet – Gåsan | 1:50 000 |
| 26. 100 | Ytre Sørøya | 1:50 000 |
| 27. 103 | Måsøya – Nordkapp – Honningsvåg | 1:50 000 |

| Chart No. | Title | Scale |
|---|---|---|
| 28. 104 | Nordkapp – Lille-Thamsøya – Sværholt | 1:50 000 |
| 29. 111 | Berlevåg – Båtsfjord | 1:50 000 |
| 30. 121 | Ytre Sognefjorden | 1:75 000 |
| 31. 136 | Beiarn – Saltfjorden | 1:50 000 |
| 32. 142 | Narvik – Skjomen – Rombaken | 1:50 000 |
| 33. 305 | Skagerrak | 1:350 000 |
| 34. 453 | Arendal havn med innseilinger | 1:20 000 |
| 35. 455 | Stavanger havn med innseilinger | 1:25 000 |
| 36. 456 | Ålesund havn | 1:20 000 |
| 37. 457 | Mandal havn | 1:20 000 |
| 38. 459 | Kristiansand havn | 1:10 000 |
| 39. 459 | Kristiansand havn | 1:10 000 |
| 40. 461 | Narvik havn | 1:10 000 |
| 41. 466 | Tromsøysundet – Sandnessundet med Tromsø havn | 1:20 000 |
| 42. 470 | Singlefjorden, Iddefjorden med Halden havn | 1: 25 000 |
| 43. 473 | Langesund – Herøya | 1:20 000 |
| 44. 474 | Porsgrunn – Skien | 1:20 000 |
| 45. 476 | Bodø havn | 1:10 000 |
| 46. 477 | Farsund havn med innseilinger | 1:10 000 |
| 47. 480 | Larvik havn. Sandefjord havn | 1:10 000 |
| 48. 484 | Molde havn | 1:10 000 |
| 49. 487 | Harstad havn | 1:10 000 |
| 50. 513 | Svalbard havner: Sveagruva, Forlandsrevet, Adventfjorden og Ny Ålesund | 1:15 000 – 1:50 000 |
| 51. 532 | Storfjorden. Kvalpynten – Agardhbukta | 1:100 000 |
| 52. 533 | Storfjorden Nord. Freemansundet – Heleysundet – Sørporten | 1:100 000 |
| 53. 540 | Hinlopenrenna. Moffen – Lågøya | 1:100 000 |

**Other charts, e.g. for pleasure craft**

NHS do not produce any other charts than the official paper charts and ENCs for navigation, but are distributing S-57-cells (derived from the official ENCs) for use in charts and maps e.g. for the leisure boat marked.

**Challenges and achievements**

This year (2021) NHS achieved full coverage of the Coastal usage band ENCs along the Norwegian coast. Primary and secondary fairways up to western Norway have been updated with multibeam surveys. On Svalbard, existing ENCs in eastern part (Storfjorden, Freemannsundet and Widjefjorden) were updated in 2020 with new surveys. This year (2021) charts in western part of Svalbard (Forlandssundet and Kongsfjorden) are being updating. We cooperate with the Norwegian Coastal Administration to make sure that all primary and secondary fairways are covered with adequate quality bathymetry.

The production department is still looking into use of dense depth contours in ENCs (high density ENCs). The first goal is to make a high density-ENC (HD-ENC) covering part of Bergen harbour to gain experience in setting up an adjusted production line. This project is a

response to requests from the end users. A major challenge in working with high-density bathymetry is the current Norwegian cøassification regime. We are soon expecting a change of this regime and expect a release of detailed depth information inside the 0-30m depth area.

## 4. Nautical Publications

By digitizing the Norwegian pilot we had to develop a new national port standard. In 2020 the standard was used to collect port data from 17 ports in Norway. The digital port data is stored in a common map database. A registration document has been prepared in Norwegian, so that all ports can register data themselves. The standard is available in Norwegian and English. The registration document is currently only in Norwegian, but will be translated into English in first half of 2022.

There is currently ongoing standardization work with the port standard. Based on experiences and feedback from last year's survey (and adaptations to the international port standard that are being developed by IHO/NIPWG) there has been revisions and improvement to the standard.

There has been great interest in port data from many parties, both private business, the ports themselves and other public or governmental agencies. There has been written a user needs report, with an analysis of the need and interest to the various stakeholders present in a port. This report will be used in the work forward, with regards to further adaptations to the standard.  This work is expected to be completed first half of 2022.

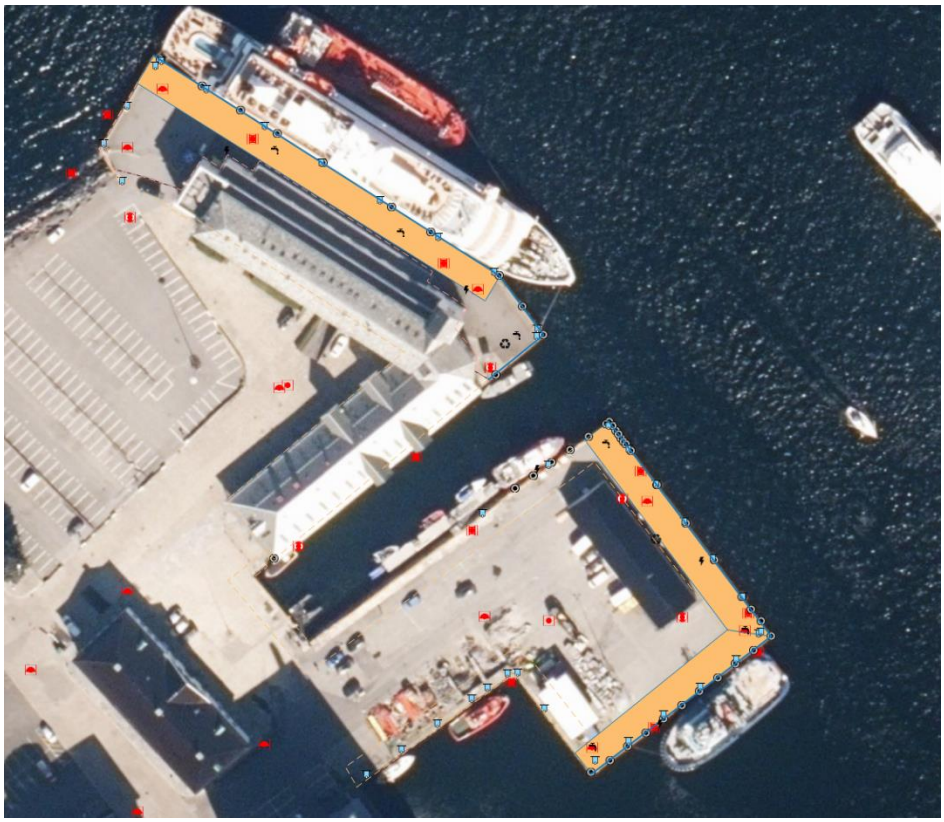


*Figure 6 Example updated drawing rules (Port of Bergen)*

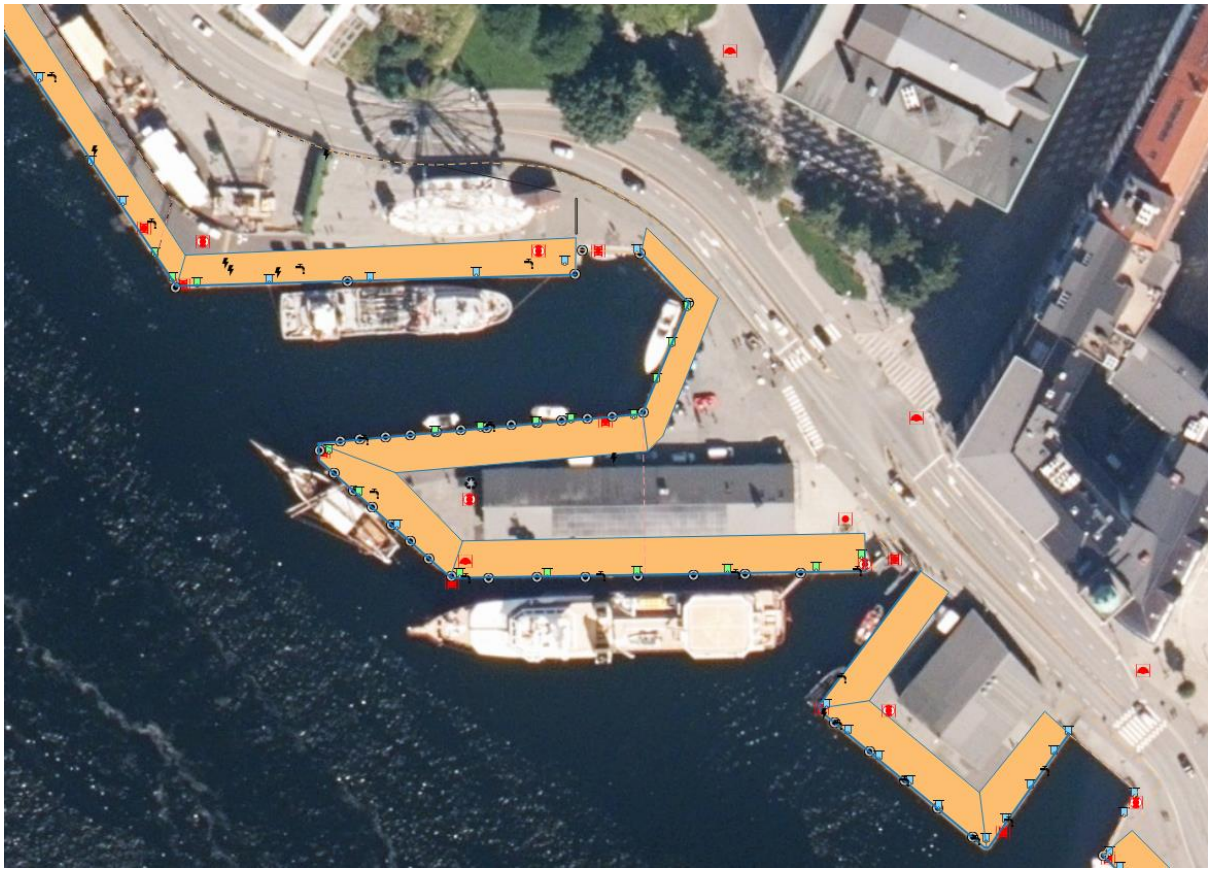


*Figure 7 Example updated drawing rules (Port of Bergen)*

Drawing rules have been made and new symbols are being prepared.

Efforts are being made to get more ports to register the data themselves. The goal is that the ports keep their port data updated and quality check their data. This can be done through plug-in developed for the open source GIS-application QGIS, for easy access directly in the database hosted by the Norwegian Mapping Authority.

The data will be displayed in the Norwegian pilot guide, but can also be downloaded as a dataset in our national geoportal, Geonorge. By compiling the data into a common map database based on port information, we will have all the information in one place, which means that all information is correct and continuously updated. It is also desirable to expand the database with more port data from several more ports in Norway.

In 2021 a project which is a collaboration between 9 major ports in Norway started up. The port of Oslo is project owner, and the Norwegian Mapping Authority is project leader. Accurate port data is a key component for success of this project. Port data can be used to develop tools for more efficient and easier management and planning of the daily operations in the port.

## 5. MSI

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

## 6. C-55

The last update of C-55 was sent to IHB in January 2020

## 7. Capacity building (Evert)

Norway participated in the annual meeting of the IHO Capacity Building Sub-Committee in May 2021. 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. Norway is finalizing its capacity building project with the Albanian Hydrographic Service.

## 8. Oceanographic activities (Aksel / Oda)

The tide gauge network in Norway consist of 24 gauges including one in Ny-Ålesund at Spitsbergen. We do short-term water level measurements at locations between the permanent gauges. These are used to construct the tidal zones used to provide water level data and information for most places along the Norwegian coast. Professional users can download data from an API directly. Our website Se havnivå provides tide tables, observed water level and water level forecast for 5 days (from a model run by the Norwegian Meteorological Institute). We also present figures showing different tide levels, land levelling datum and return periods (up to 1000 years). The information in the figures are very important in coastal planning.

To increase the use of water level observations and water forecasts instead of only tidal predictions, the official Norwegian tide tables will from 2022 no longer be published as a separate publication. All necessary information will be available in the web pages.

In 2021 national models describing the relation between the different datums; Chart Datum, the land levelling datum, Mean Sea Level and the ellipsoid were published. These models facilitate, among others ellipsoidally referenced surveying. The models are available at Geonorge.

In 2021 we also launched a new project which aims to improve the basis of existing and future products and services. This will be achieved through an increase of permanent tide gauges, a modernized solution for short-term water level measurements and collaboration with private companies and governmental institutions that perform water level measurements. The new tide gauges will consist of radar sensors for water level monitoring and geodetic sensors for land movement monitoring and will be installed in closed collaboration with the Geodetic institute. The project is currently planning the first installation, and plans to install around 10 new stations over the next 3-4 years. The figure 8 (next page) shows the locations that have been identified so far, but both locations and the number of new permanent tide gauges might change over the duration of the project.


*Figure 8 Map showing location of existing permanent tide gauges along the Norwegian coast (red dots) and the areas that are identified as of interest for new permanent tide gauges.*

We have delegates in the IHO-working groups "North Sea Hydrographic Commission Tidal Working Group (NSHC-TWG)", "Tides, Water Level and Current Working Group (TWCWG)" and an observer in “Baltic Sea Hydrographic Commision - Chart Datum Working Group” (BSHC CDWG). In addition we participate in the GLOSS Group of Experts and the EuroGOOS Tide gauge task team.

## 9. Spatial Data Infrastructures

MSDI is an integrated component of the national SDI in Norway. The cooperation Norway digital counts for more than 600 organizations, where over 50% are involved in coastal and/or offshore activities. NHS is a key player in the development of relevant collaboration arenas between data owners, service providers and end-users to improve the user-value of marine and maritime geospatial services to society.

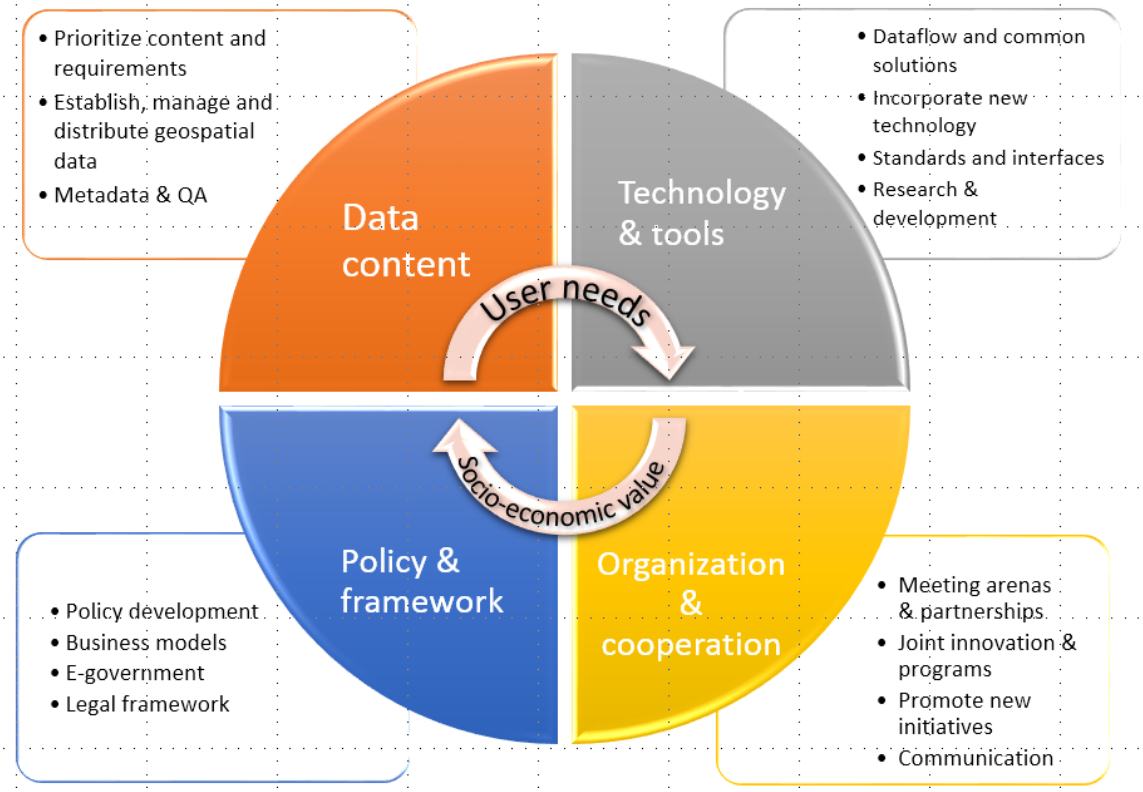



*Fig.9 Norwegian SDI approach*

A national governmental geospatial strategy, "Everything happens somewhere", has the ambition to improve the value of geospatial information and its usefulness to society in Norway. The primary objectives for this strategy is to:

- Offer a national knowledge base of geospatial information that meets important societal needs and user-priorities
- Incorporate technological tools and improve interoperability to increase interaction, efficiency and innovation
- Improve and further develop cross-sectorial cooperation and collaboration arenas between both public and private sector
- Adapt policies and framework conditions to meet the challenges within geospatial infrastructure, e-governmental services and the digital society in general

A yearly revised national action plan supports this strategy with more detailed descriptions on where and how to improve the national SDI.

## 10. Innovation

### NAUTILUS - New Hydrographic Infrastructure

NHS needs to renew its management, storage and processing system for bathymetric and misc. marine geo data in order to:

- more effectively serve existing and future users
- support new data formats, standards and products
- meet future requirements for automation, machine learning, quality and lead time

NHS have therefore established a project “Nautilus” (earlier named *New Hydrographic Infrastructure*) with the aim and goal to renew our Hydrographic management systems/solution.

Norwegian governmental strategies set clear expectations to the solution and support an effective dissemination of different Marine Geodata and, at the same time, answer well to user needs and grow their values.

Expected changes to the data classification act, for bathymetric data and bottom objects, is understood to allow and define production and dissemination of new high-resolution geodata for the public, which also set requirements to the need for a greater degree of automation. NHS’s nautical product users expect navigation-critical data to be released faster and more efficiently. International commitments along with the need to support new nautical standards will also come in effect in the coming years.

Requirements and processes for current management and production system for bathymetric data are largely based on and defined by nautical production and products. This will change to a more data and service generic solution, whilst maintaining a high quality nautical products portfolio.

The new system is expected to be an integrated and complete management solution supporting effective preparation and dissemination of a broad range of marine geodata, including also bathymetric and derived bathymetric products. The solution must still ensure an effective production of authorized nautical products.

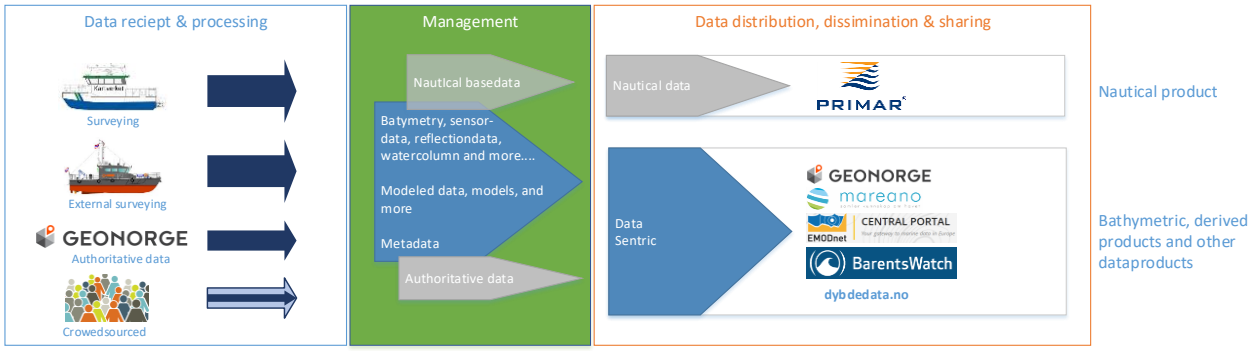



*Fig.12. Concept of Nautilus*

The new solution will be based on a modern technological platform that supports:

- an efficient and integrated nautical production
- different digitization and data sharing solutions
- fast data access and effective bathymetric production (short processing time / increased automation)

- layered services and functional structure (allowing algorithmic, AI/ML, production etc. processes to run on top off the data)
- an integrated metadata management
- management of complete and original data (no or minimum generalization required)
- integrated product and data sharing solutions (machine-to-machine, APIs, etc.).

NHS has identified the following processes that will be supported in the new solution, whereas processes within the yellow frame are given priority within Nautilus program:

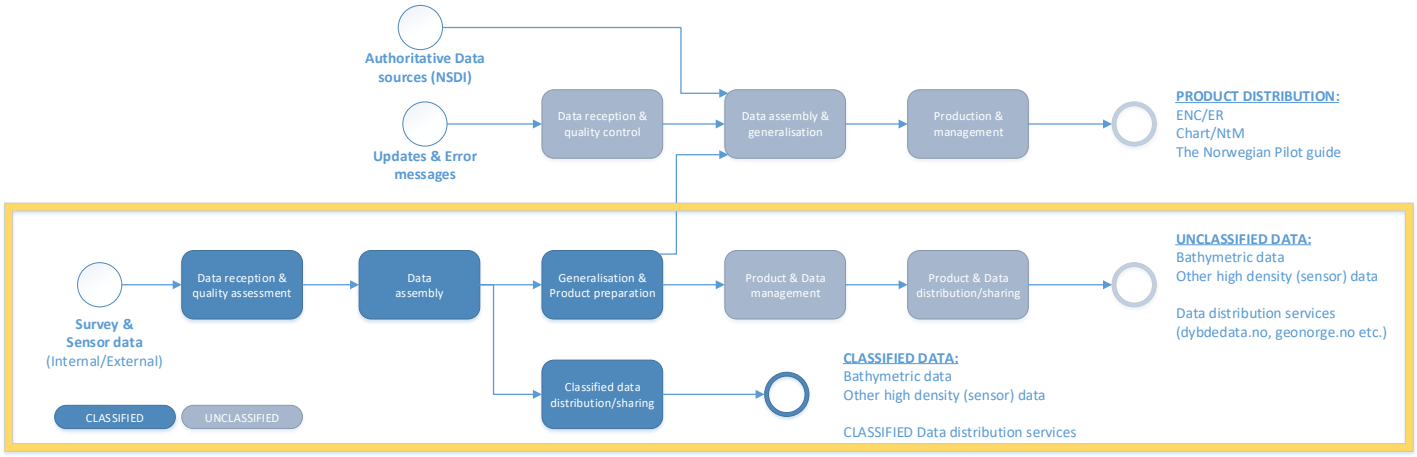



*Fig.10 New Hydrographic Infrastructure, the Nautilus project*

The Nautilus project (as scoped) is planned to take 5 years to complete (period 2022 – 2026), has an estimated total cost of appr. €13.5 Mill. EUR and has received full funding over the national budget from 2022. The project will include organizational as well as technological changes.

## 11. Other activities

### International activities

The NHS is involved in several Working Groups, Committees and Commissions related to IHO. Norway has representatives in the following Sub-Committees and Working Groups: IHO Council, S-100, DQ, ENC, NC, NIP, TWC, IEN, MSDI, CSB and WEND. We have participated in the HSSC and the IRCC meetings in 2021. Norway is actively participating in 5 Hydrographic Commissions: ARHC, HCA, NHC, NSHC and SAIHC.

The NHS is a member of the UN-GGIM Working Group on Marine Geospatial Information, actively contributes to the Seabed 2030 project and chairs the GEBCO Guidance Committee, the CBSC and the DQWG

As operator of Primar we participate in all related meetings.

NHS is an active partner in EMODNet.