Hydrographic National Report of Denmark

April 2008

1. Hydrographic Office

The present report outlines and summaries the activities carried out in 2007 by The Danish Maritime Safety Administration, and The National Survey and Cadastre.

The Danish, Faroese and Greenlandic hydrographic obligations are managed by two governmental organisations:

Farvandsvæsenet, The Danish Maritime Safety Administration (DaMSA) and Kort & Matrikelstyrelsen, The National Survey and Cadastre (KMS), Hydrographic Office.

The Danish Maritime Safety Administration is responsible for e.g. hydrographic surveying, issuing of Notices to Mariners, List of Lights and Tide Tables.

Hydrographic Office in The National Survey and Cadastre is responsible for e.g. technical support for delimitating the maritime boundary of the Danish waters, charting, issuing of Chart Corrections and related nautical publications such as INT 1 and Pilots (sailing directions).

In both organisations there have been some changes with regard to organisation and staff.

Royal Danish Administration of Navigation and Hydrography (RDANH) has changed name to Danish Maritime Safety Administration (DaMSA) since 1st of April 2008.

In DaMSA, Mrs. Charlotte Havsteen has succeeded Mr. Arne Nielsen as Head of Oceanographic Department. Commander Lars Hansen has returned to the position as head of Hydrographic Branch.

In KMS, Hydrographic Office, Senior Consultant Mrs. Hanne Berg has retired, and her fields of responsibility have been split up, and are taken care of by the staff in the Hydrographic Office.

2. Surveys

Coverage of new surveys

The hydrographic surveys are conducted by DaMSA and mainly carried out by the Royal Danish Navy but also by some private survey companies.

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

1. Danish waters inside the Skaw.
2. The west coast of Greenland.
3. World wide en route surveys in connection with the Galathea 3 expedition.

Danish waters:

The hydrographic surveys inside the Skaw are re-surveys carried out in accordance with the HELCOM Copenhagen Declaration adopted on 10 September 2001 by the HELCOM Extraordinary Ministerial Meeting.

In accordance with the Declaration a coordinated survey plan has been made for the Baltic. Therefore, the main survey effort has been placed on the primary shipping routes through the Danish waters and entrances to major ports. The routes will be re-surveyed to meet the standards of “Special Order” or “Order 1” as set in the International Hydrographic Organization “Special Publication No 44”.

The surveys in 2007 have been carried out as outlined in figure 1. (Dark blue areas)

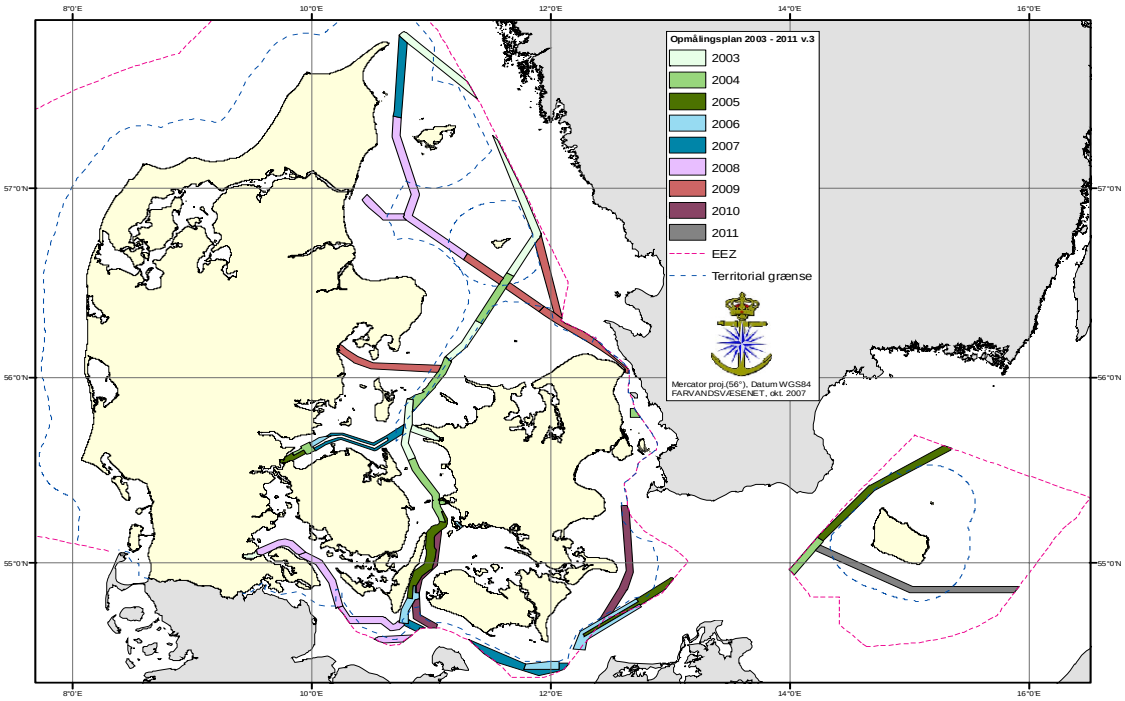


Figure 1. Survey plan 2003-2011

All surveys were carried out with multibeam echo sounder systems.

The Surveys in 2008 will be a continuation of the approved coordinated re-survey plan for the Baltic area.

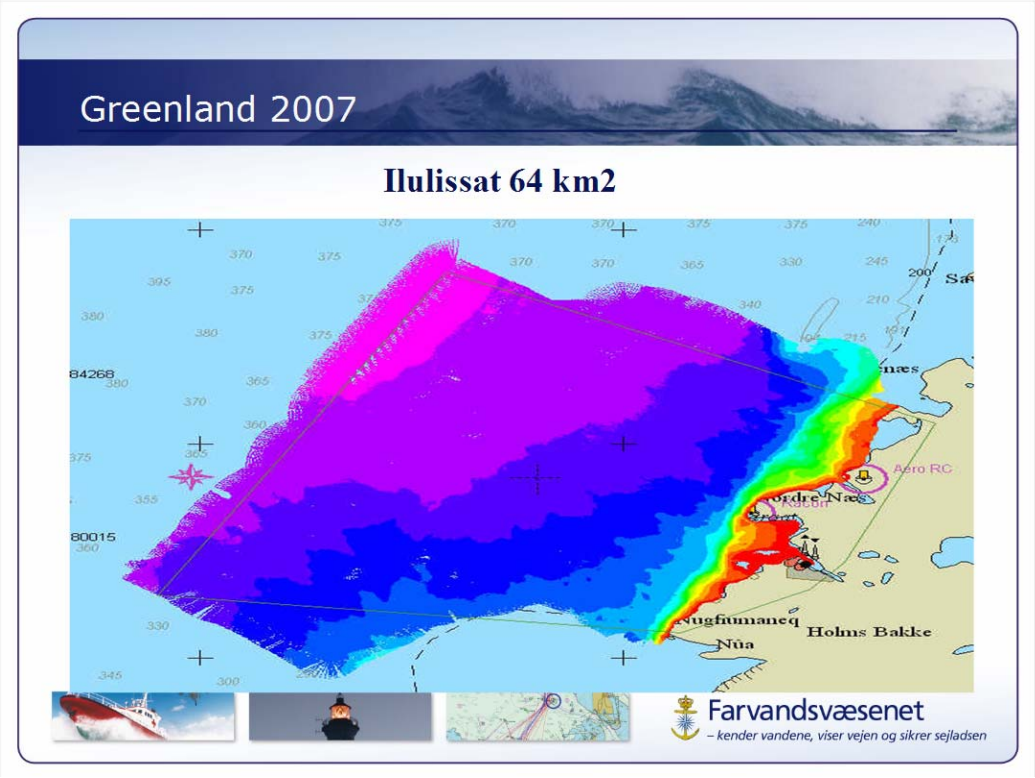
Greenland waters:

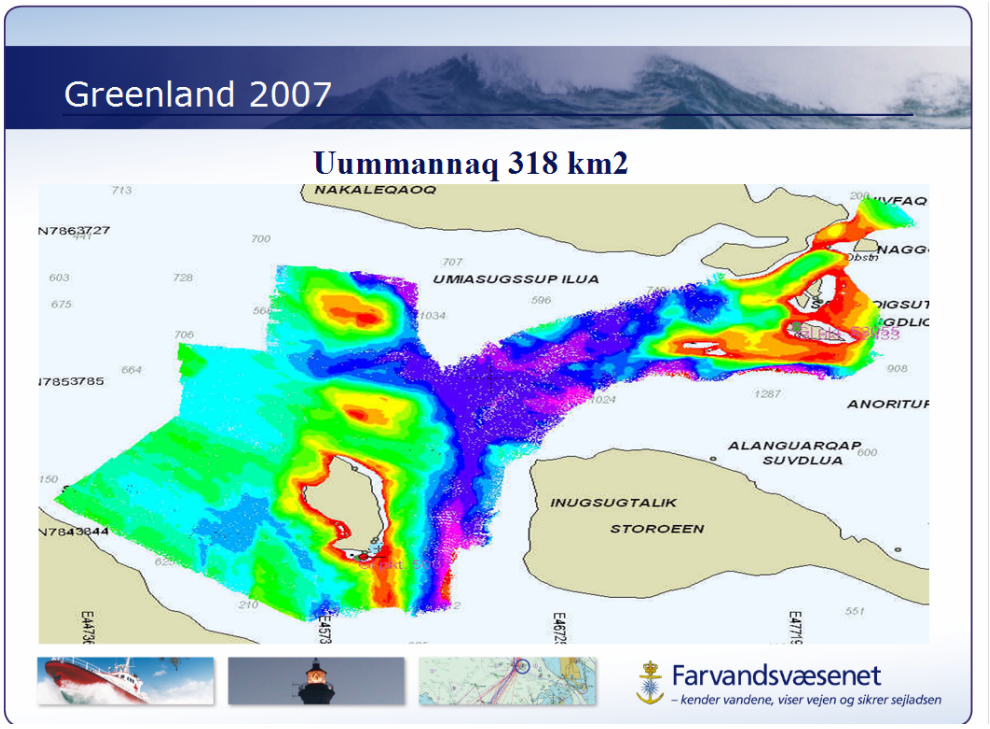
The surveys on the West Coast of Greenland were carried out in the archipelago in unsurveyed waters in order to allow safe access to harbours and to locate sheltered coastal fairways.

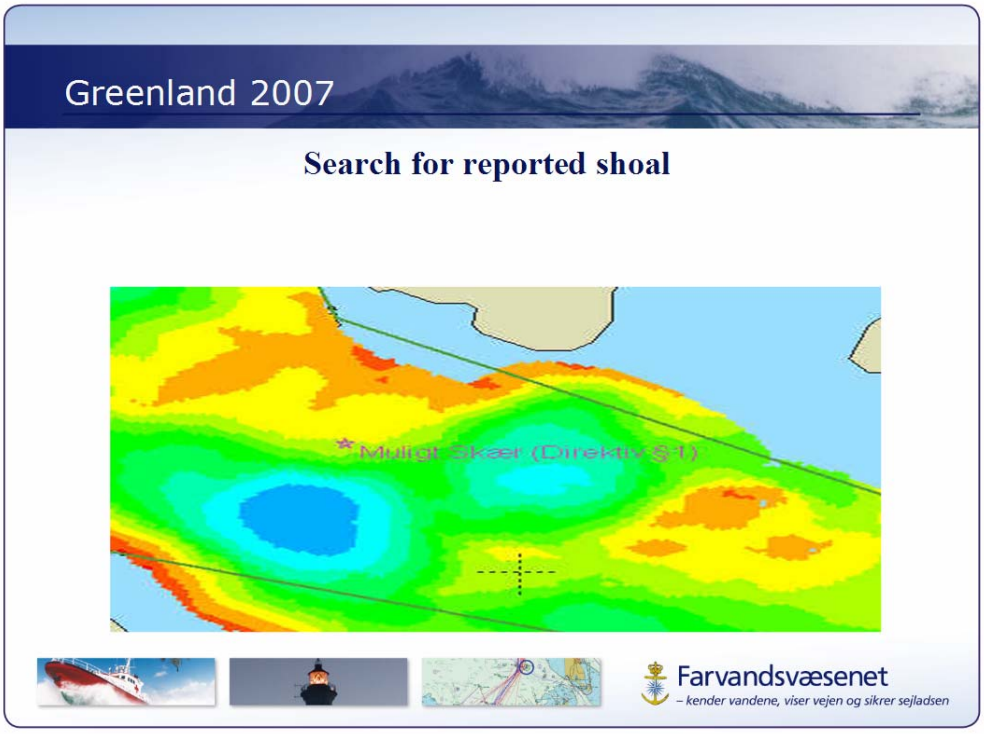
All surveys were carried out with multibeam echo sounder systems.

The plan for the surveys in the Greenlandic waters in 2008 is a continuation of the re-surveying programme of the entrances to the main ports and inshore routes between ports in Greenland.

The figures below show the surveys conducted in 2007.

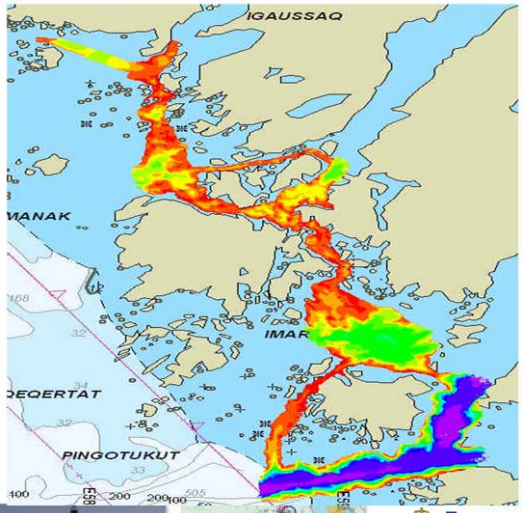



Greenland 2007
Uummannaq 318 km2
NAKALEQAOQ
UMIASUGSSUP ILUA
ANORITUP
ALANGUARQAP SUVDLUA
INUGSUGTALIK
STOROEEN
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen


Greenland 2007
Search for reported shoal
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen

Greenland 2007

Route from Paamiut to Narssalik. 126 km2

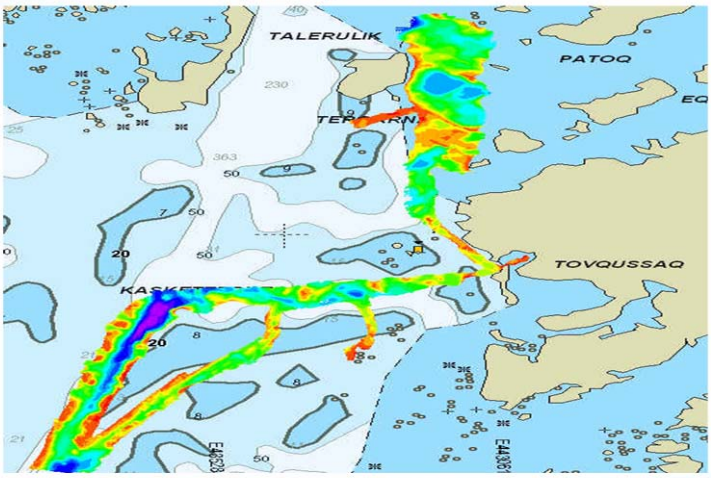




Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen

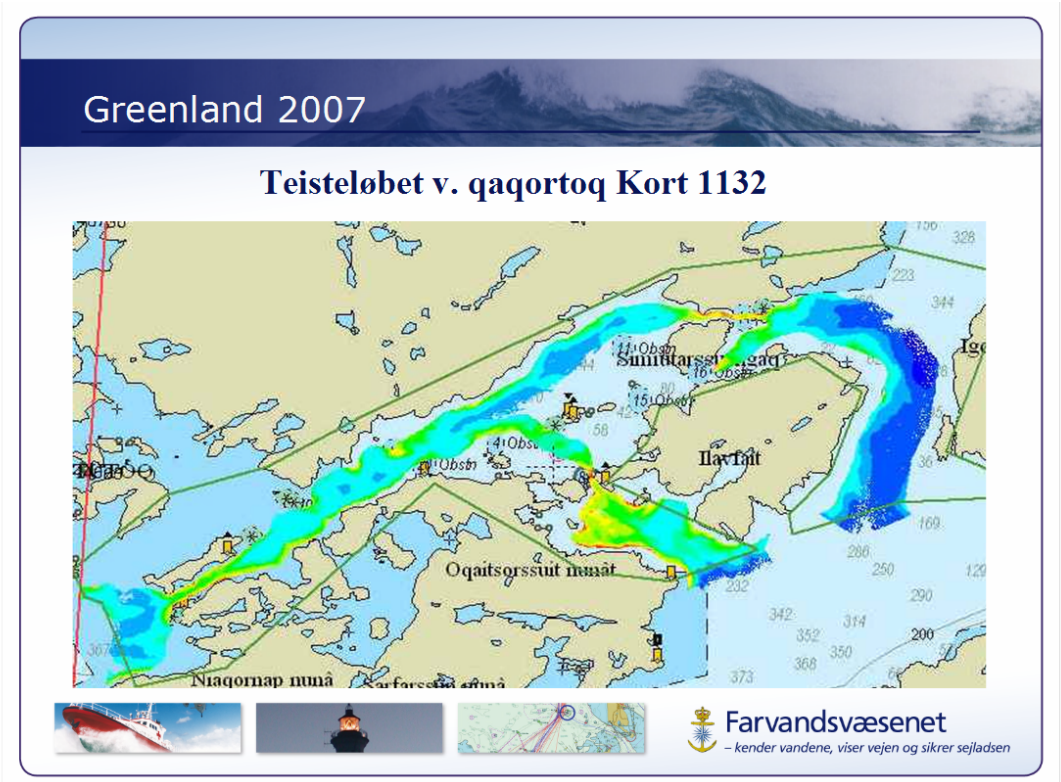
Greenland 2007

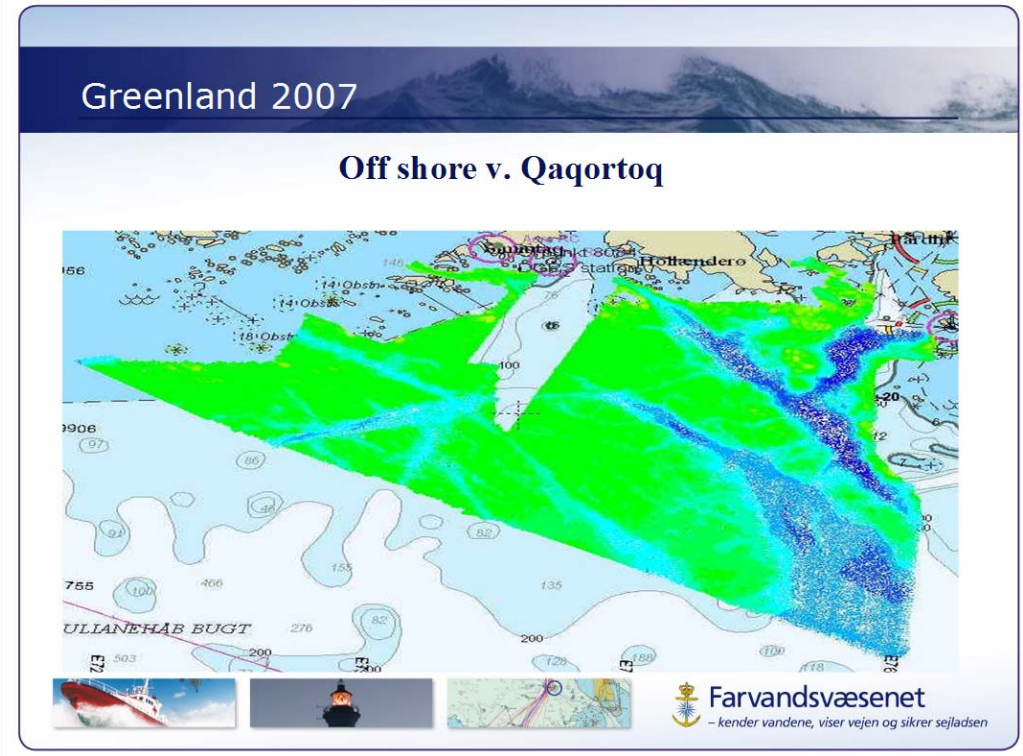
Route v. Tovqussaq Chart 1314 35 km2

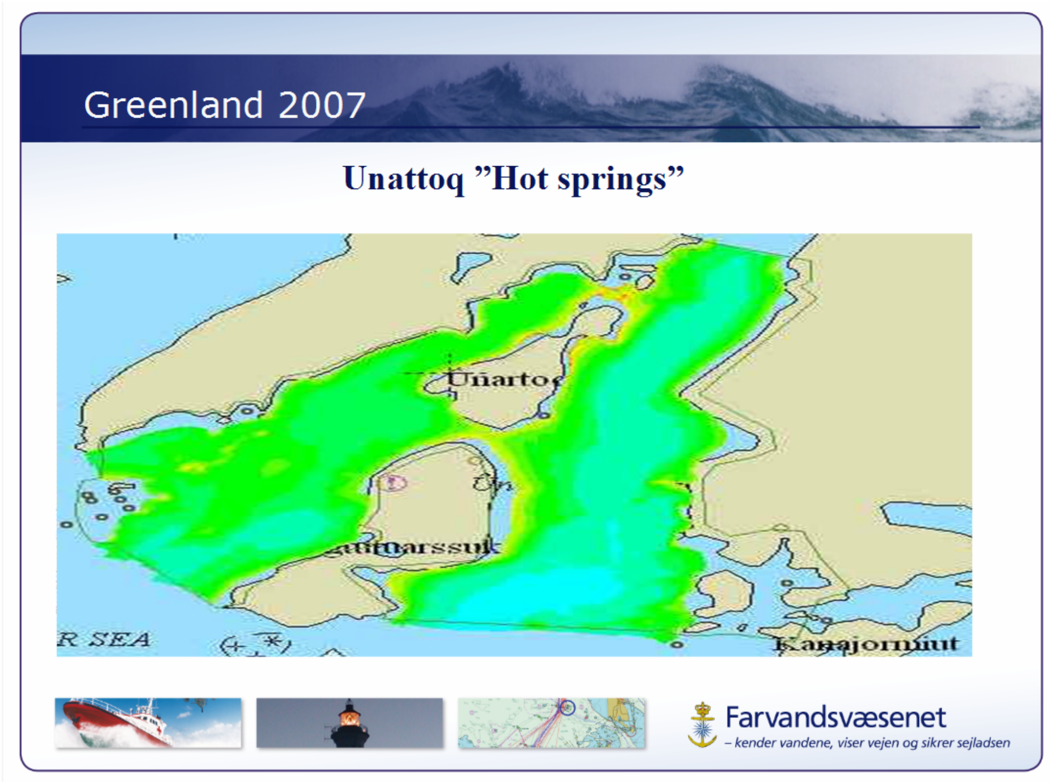


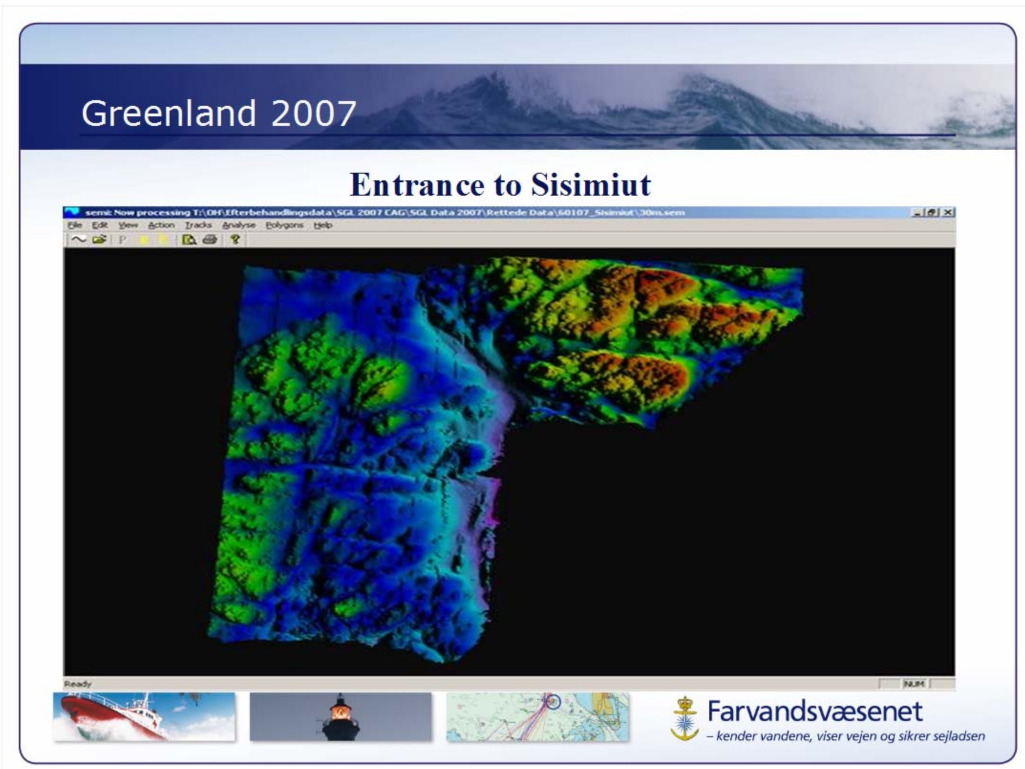


Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen


Greenland 2007
Teisteløbet v. qaqortoq Kort 1132
Oqaitsorssuit nunât
Niaqornap nunâ
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen


Greenland 2007
Off shore v. Qaqortoq
Hollændere
ULIANEHAB BUGT
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen


Greenland 2007
Unattoq "Hot springs"
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen


Greenland 2007
Entrance to Sisimiut
Farvandsvæsenet
– kender vandene, viser vejen og sikrer sejladsen

New ships

GRIBBEN, SKA 16, 2 O-boats, MSF MK1 BIRKHOLM and MSF MK1 FYRHOLM have operated in Danish waters in 2007. All the ships are equipped with modern multi beam survey instruments.

According to the present shipbuilding programme of the Royal Danish Navy, the survey ships SKA 15 and SKA 16 have been replaced with two new survey ships; BIRKHOLM in 2006 and FYRHOLM in 2007. The ship particulars are as follows:

Length over all	28.9 m
Beam	6.4 m
Designed draught	2.0 m
Speed	12 knots

The new ships are fitted with high end modern survey equipment. The area of operation is Danish coastal waters.

HDMS GRIBBEN is replaced by DaMSA ship “Jens Sørensen” in 2008

Problems encountered:

Some problems were encountered in the running up of the new survey ships. This resulted in a late start of the survey season. Lack of personnel resulted in limited use of the O-boats.

3. New charts & updates

Charts (paper as well as ENCs) covering the Danish, Faroese and Greenlandic waters are produced and updated by KMS.

ENC

The Danish waters have been covered with ENCs in various navigational bands since June 2000 and one ENC in the navigational approach band has been produced covering a very small part of the Greenlandic waters. All the ENCs are updated on a weekly basis.

In 2008 KMS intends to produce 6 ENCs of the Greenlandic waters: 2 ENCs in the harbour band and 4 ENCs in the approach band. KMS also intends to produce 1-2 Faroese ENCs.

ENC Distribution method

All the Danish produced ENCs and updates (ERs) are distributed through a network of Primar authorized distributors.

Other activities

The Formal Safety Assessment (FSA) “Study on ECDIS - ENC coverage” that was mentioned in the report from last year has been completed and presented at the NAV 53 meeting in July 2007.

INT charts

16 Danish INT charts have been updated.

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 on this internet site:

http://www.danskehavnelods.dk/indexkort/danskesoekort.html

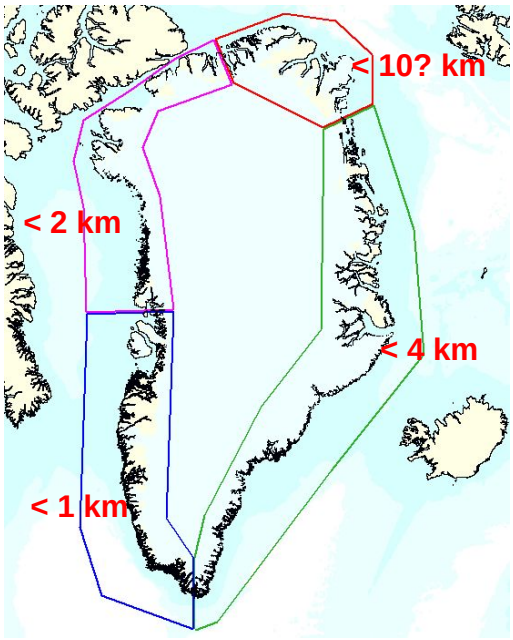
Since the last report was given, KMS has issued 16 new editions and 17 updated reprints.

Geometric rectification of the Greenlandic charts

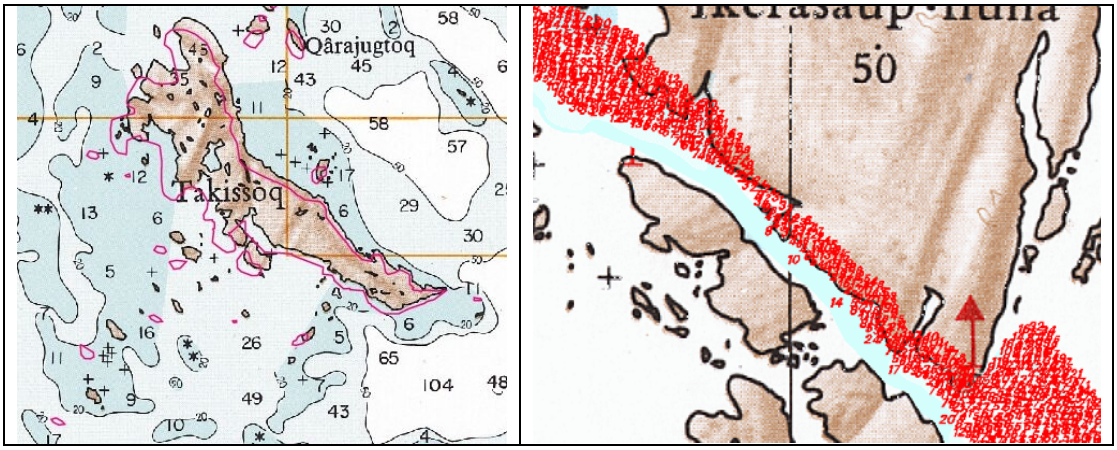
Only a very small number of the Greenlandic charts are produced in accordance with internationally agreed standards. The majority of the charts do not have an accuracy that allows for the use of GPS positioning, when sailing inshore or close to the islands.

However, as stated in the former National Report, KMS has initiated a new project in order to improve the accuracy of the charts.

The geometrical accuracy of the Greenlandic charts is varying and the errors are some places of a rather large extension up to 10 km. The errors are only partly systematic; they are very locally.



The above map of Greenland shows the variation of the geometrical accuracy in kilometers.



The left map illustrates an example of the difference between the coast line from V-map (a worldwide military map in 1:250.000) and chart 1212 (1:80.000). The right map shows a small section of the same chart and newly measured multi-beam data from DaMSA.

KMS has contracted with a Danish company, who helps KMS in the rectification process.

The used method:
Aerial photos from 1980s in the scale of 1:150.000 have been used for a photogrammetric measuring of the coastline, lakes, rivers and glaciers, 25 meter height contour lines and a 100 meter Digital Height Model (DHM) grid. Orthophotos have been made from the same aerial photos.

The existing charts have been used for vectorising the depth contour, soundings, geographical names, rocks and the coastline.

The orthophoto has been used as reference in order to establish transformation points between the photogrammetric measured coastline and the chart, for the geometric rectification.

The photogrammetric objects and the vectorised objects have been merged together, and compiled to end up as new charts. The old charts are from the 1950ties and 1960ties, and in the newly compiled charts the symbolisation and colour have been changed to fulfil the international standards. The datum has also been changed from Qornoq 1927 to WGS1984.

The geometric rectification will be spot checked with newly measured multibeam data from DaMSA, supplied with on point measurement of the coastline from The Defense Command Greenland, The Greenland Police and The Geological Survey of Denmark and Greenland (GEUS).

The chosen method will be used for 65 Greenlandic charts covering the South western part of Greenland.

The first rectified chart 1212, based solely on vector data, is planned to be published May 2008. It is planned that 5 more charts are rectified and published 2008.

4. New publications & updates

New publications

A number of Danish authorities have conducted a study on “Safety of navigation in Greenlandic Waters”. The resulting report is available on The Danish Maritime Authority’s homepage in Danish: http://www.dma.dk/

In 2008 KMS plan to publish important information on KMS´ homepage in Danish and English for mariners navigating the Greenlandic waters.

A new edition of Kort 1/INT 1 Symbols, abbreviations and terms used on charts has been published in 2007, as a bilingual publication.

Updated publications
KMS are currently updating the publications which are available from the internet.

The current internet based publications are:
Kort 1/INT 1 (bilingual)
Søkortrettelser/Chart Corrections (bilingual)
Bag om søkortet (in Danish) / Behind the nautical chart (in English)
Den danske Lods, generelle oplysninger (in Danish)
Den danske havnelods (in Danish)

KMS have the following printed publications (sailing directions) available in Danish only:
Den grønlandske Lods I
Den grønlandske Lods II
Den grønlandske Havnelods
Den færøske Lods
Havneoplysninger for Færøerne
These publications are to be made available via the internet.

5. MSI
Information to mariners and oceanographic forecasts is available on:
http://www.frv.dk/en/ifm/index.htm

6. S-55

State of surveys updated September 2007

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 are ongoing
Denmark Greenland	25	20	25	10	50	70	The coastline of Greenland is very complex and the total sea area of the EEZ is ca. 2.000.000 square kilometres. Due to permanent ice cover, the limit for navigable waters has been set to 75 degrees northern latitude. Thus the percentages are rough approximations. 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

Status of national, bilateral, multilateral or regional development projects with hydrographic component (In progress, planned, under evaluation or study)
Bilateral cooperation between Denmark and Germany on survey of the Kadetrende has been initiated. Some surveys were finished in 2007.

New technologies and/or equipment
The Hydrographic Office in KMS is preparing an EU-tender for a new hydrographic production system.

The Hydrographic Office in KMS is preparing an EU-tender for a new distribution and marketing agreement for the paper charts.

The Hydrographic Office in KMS is having a project, concerning implementing Lean in the Hydrographic Office.

8. Oceanographic activities

Tide gauge network
The DaMSA maintains 9 water level stations spread across Denmark. The data are used in several ways, primarily for navigation safety, but the data are also an integral part of the national storm surge monitoring and prediction system. The data are transferred by telephone from each site to the oceanographic database every ten minutes. The DaMSA has not encountered serious problems with the new system.

In addition, the DaMSA has in the past measured water levels in Greenland from 1990 until 2004 for the purpose of obtaining sufficient data to enable the prediction of tide levels for the coming many years. The DaMSA also maintains three stations measuring temperature, salinity and currents within the water column. These three stations are located at Drogden and at two sites in Storebælt (the Great Belt). These data are also transferred to the database every 30 minutes. Online observations and forecasts are available in English on:
http://www.frv.dk/en/ifm/index.htm

Galathea 3
The DaMSA is supporting the Danish world wide ocean research program “Galathea 3” which started out on an eight month cruise round the world on 11 August 2006. The DaMSA contribution is focused on installation and operation of a deep water multi beam echo sounder en route. Personnel form DaMSA have been onboard the expedition ship “Vædderen” during its scientific cruise round the world. The data collected will be given to The General Bathymetric Chart of the Oceans (GEBCO) and involved nations on request.

UNCLOS
Both the DaMSA and KMS are actively involved in the work for The United Nations Convention on the Law of the Sea (UNCLOS) in the waters around Greenland and the Faroe Islands.

The DaMSA is responsible for the data quality assessment on existing bathymetric data and planning and technical specifications for new surveys. In 2007 DaMSA conducted bathymetric work during an expedition to the east coast of Greenland.

9. Other activities

Participation in IHO Working Groups

DaMSA has participated in the WG on S-44 5th edition

KMS has the chairmanship for the Baltic Sea ENC Harmonisation Working Group (BSEHWG)

KMS is actively involved in the work done by MSDIWG, CSPCWG, SNPWG, TSMAD and CHRIS.

International
KMS is together with the Hydrographic Offices in Norway, Sweden and Finland preparing new bilateral arrangements with the United Kingdom Hydrographic Office.

KMS has actively taken part in the work done by the IMO Correspondence Group on e-Navigation and in the IALA e-Navigation Committee.

DaMSA and KMS are both actively participating in work done by the HELCOM Monitoring Working Group.

The Ministry of the Environment has nominated KMS as the Danish governmental INSPIRE authority.

Websites
Farvandsvæsenet, the Danish Maritime Safety Administration (DaMSA):
http://www.frv.dk/en/index.php

Kort & Matrikelstyrelsen, the National Survey and Cadastre (KMS):
http://www.kms.dk/English/

Søfartsstyrelsen, the Danish Maritime Authority (DMA):
http://www.dma.dk/