Agenda Item for Consideration by ARHC

ARHC2-6A

2nd Arctic Regional Hydrographic Commission Meeting
Copenhagen, Denmark, September 28-29, 2011

Establishment of a Mariners Routeing Guide for the Arctic – Status report.

Submitted by:	*Denmark in consultation with United States*
Executive Summary:	*Status report from* ARHCRGWG
Related Documents:	*A Web-based Arctic Mariners Routeing Guide submitted by Canada*
Related Projects:	*None*

Introduction / Background
At its 1st Conference the ARHC recognised the need to initiate a study of a possible Mariners Routeing Guide for the Arctic.

Therefore the ARHC 1st Conference established the ARHCRGWG with the task to study and establish a Mariners Routeing Guide for the Arctic.

Analysis/Discussion
The prototype of a Arctic mariners' routing guide should provide mariners with essential information for safe navigation in the Arctic region. The guide should be easy to use and permit users to instantly access necessary information. All of the relevant information for the guide is already in use within the individual Arctic countries (USA, Canada, Denmark, Norway, Finland and Russia), and this initiative should foster the compilation of this information in a standardized, cross-boundary format

The Working Group's tasks are:

- Identify and analyse relevant information produced from individual Member States (MS) and other relevant organisations for the Arctic area.
- Analyse how the Arctic Hydrographic Offices can contribute their maritime information and the necessary updates, so information can easily be collated to a current overall picture for the region.
- Identify and analyse the current need for information in the Arctic from an end user perspective.
- Focus on how ARHC in the future can benefit from a regional approach.
- Identify and decide which information to be presented in the Mariners Routeing Guide for the Arctic.
- Identify and decide the best way or ways to present the information in the Mariners Routeing Guide for the Arctic.

- Create a demo version of a Mariners Routeing Guide for the Arctic.
- Create a printed version of the Mariners Routeing Guide for the Arctic.
- Present a report to the ARHC. This report should include a description of the current status, recommendations on how to proceed with the Mariners Routeing Guide for the Arctic and, if deemed necessary, an action plan with a specified time schedule for future ARHC actions.

Description on the current status:
In order to present a report to the 2nd ARHC Conference, a questionnaire was sent to all of the Arctic MS. See the attached questionnaire. This questionnaire is the first step towards creating a prototype Arctic mariners' routing guide.

The questionnaire is divided into seven areas:

- **Geographical breakdown**
  Should there be a geographical breakdown, and, if yes, how should this been done?
  (it seems there is a need for several routing guids)
- **Content**
  What types of information should be included in each Arctic mariners' routing guide?
  Should information additional to the S-49 guidelines be included due to the particular nature of navigation in the Arctic?
- **Presentation of the routing guide contents**
  How should the information in each routing guide be structured?
- **Updates**
  How often should we update the routing guides?
- **Format**
  What format(s) should be used for publishing the routing guides?
- **Contractual relationship.**
  We still have to establish a framework for the production and update of the routing guides
- **Production plan**
  How should we plan the production?

KMS has received many important and vital inputs to the questionnaire and the topics concerning routing guides. The main topic/findings from the Questionnaire will be presented at the ARHC conference.

Recommendations on how to proceed with the Mariners Routeing Guides for the Arctic
Since we have received at lot of information covering many different aspects and different views on how to precede, we believe that there is a need for coordination in the future. In order to establish the foundation for the work and to complete the task for the WG, We suggest that there be arranged a workshop in 2012.
The aim would be to discuss and coordinate the topics from the questionnaire, the demo version and inputs from the 2nd ARHC Conference, and other related items.

The main topics should be to agree on the belowe points.

- Geographical breakdown
- Content
- Presentation of the routing guide contents

- Updates
- Format
- Contractual relationship
- Production plan

The collated replies will be used by the US partner to adjust the prototype of an Arctic mariners' routing guide. A first draft of the prototype will be presented to the ARHC at the next meeting.

The prototype will be sent to all partners for comments and remarks. If deemed appropriate, each country may involve other national authorities and maritime users in their evaluation.

After we have held the workshop, we will present a paper and a final prototype of a mariners' routing guide for the Arctic to the ARHC for approval.

Participans:

Canada	Chris Hemmingway	Chris.Hemmingway@dfo-mpo.gc.ca
	Martin, Richard	Richard.Martin@dfo-mpo.gc.ca
Denmark	Jens Peter Hartmann	JEPHA@KMS.dk
	Flemming Sørensen	FSS@FRV.dk
Norway	Jan Torstein K. Ådland	torstein.adland@statkart.no
Russia	Capt. Leonid G.Shalnov	main@gunio.ru
	Mr. Oleg Dyomin	navarea13@gunio.ru
USA	Tomas Loeper	Thomas.Loeper@noaa.gov
	Peter M. Doherty	Peter.M.Doherty@nga.mil

Action Required of ARHC:
The ARHC 2th Conference is requested to take note of this status report and to take proper action.

Questionnaire on the establishment of an Arctic mariners' routing guide

Including all comments received:

CHS has considered the questions and replied accordingly in the attached document. In our minds the coverage area proposed is vast and the navigation in the Arctic (Canadian at least) in some regards does not conform to the traditional requirements of a Routeing Guide. The Arctic however, may be considered complex in other ways and with increasing use of the Arctic by mariners it may be that many mariners will be new to the unique navigational needs of the Arctic region.

CHS has done some thinking on what to include in this product and how to disseminate the information and is coming to the conclusion that a web-based version has potential benefits. As such we will be prepared to share our ideas on this through a presentation at ARHC2. Our early thoughts on this are included in the questionnaire.

Department of Navigation and Oceanography of the Russian Federation Ministry of Defense (DNO) believes necessary to note that water areas of the Arctic Ocean which will be covered with The Mariners Routing Guide for the Arctic should not include The Northern Seaway Routes for the reason of existence of operating Mariners Guide for The Northern Seaway Routes.

1. Geographical breakdown

The Arctic region is large and we will not be able to cover the entire area with one guide.
How should a geographical breakdown into subareas, and respective routing guides, be carried out? Further, how should the individual subareas be defined, to ensure necessary overlap between the individual routing guides?

Proposal:
A division of the area into 4 to 5 subareas, with respective routing guides:

- NW passage
- Area between Greenland and Norway (entrance to the Arctic from the Atlantic)
- NE passage
- Area between Alaska and Russia (entrance to the Arctic from the Pacific)
- Area around the North Pole

And one complete overview providing the most relevant information

Your comments:

CHS Input:
OPTION 1 – Paper Product
The 'proposal' above is a reasonable approach for a paper product as the sheets would be based primarily on the principal marine traffic areas.
The product would be Polar Gnomonic or Polar Stereographic?
In some cases such as the Bering Sea the area of coverage for ARHC being the Arctic NAVAREAS is not ideal as they would not cover appropriately the southern approaches to the Arctic that would also be ideal for the Mariner. The Northern Sea Route and the Northwest Passage would be complete however and may be the 1st MRG prototypes to be made.

It is hard to imagine that there could be a single 'complete overview' given the vast area to cover and the amount of information needed to make it relevant – this product may not be necessary.
Likewise a product covering the Area around the North Pole may not be required.

OPTION 2 – Digital Product
A fully digital web-based version (a portal) would not require a cookie-cutter methodology to cover Arctic waters in AO size.
Canada considers the Mariners Routeing Guide (MRG) to be a planning tool and not a carriage requirement since the majority of the documents and instruments it references are carriage expectations. Without carriage requirement there may be flexibility in the product design.
Pan, zoom and click functionality served over the internet is an emerging choice of delivering many mapping services.
Maintaining it current (synchronized with NtM etc.) might be easier in digital format plus in a single digital portal information would not need to be duplicated as it likely would with individual paper versions
In most respects this Arctic MRG does not meet the intent of the IMO's Ship Routeing instructions or the IHO Guidelines for Mariners Routeing Guide as there are few actual Compulsory Routes in Arctic waters. The Arctic is however a complex and emerging marine transportation region and a Mariners Guide may be well received.
Given the comment above is it still considered necessary to call this a Routeing Guide as it may be misleading or are Mariners Routeing Guides around the world varying in content and internationally accepted as a planning tool?
The matter of governance for a digital product of this sort would need further discussion and this may be the critical element to ensure this concept is sustainable.

Option 3 – Mariners Routeing Guide by Member State area of responsibility
A Mariner Routeing Guide based on a Member State's area of responsibility is another consideration which may be easier to maintain and control.
Harmonization of these products could be guided by the ARHC

NOOA Input
Agree. Geographical breakdown by region would be simplest approach. From teh Bering Sea, perhaps include the region from St Lawrence Island north to Pt Barrow as one region.

U.S. Input
While the proposed geographic breakdown is the simplest approach, we would also support the inclusion of the region from St. Lawrence Island to Point Barrow as a separate region.

Additionally, considering that the area around the North Pole is iced-in year round, is there a need for a Routeing Guide in the Area around the North Pole?

Denmark Input
West Greenland - Does the area NW passage cover Greenland?
Maybe there should be an area named the area between Greenland and Canada.

2. Content
What types of information should be included in each Arctic mariners' routing guide? Should information additional to the S-49 guidelines be included due to the particular nature of navigation in the Arctic?

Proposal:
We should follow the IHO publication S-49, with particular focus on chapter 3.

1. Plan(s) of the area (graphic)
2. Passage planning (txt)
3. Routing (txt)
4. Communication (txt)
5. Pilotage (txt)
6. Natural environment (txt)
7. General

Radio Information coverage diagrams (NAVEARA, MF broadcast is there is any etc.)
Ice information (limits etc)

Your comments:

CHS input.

In respect of content of the Mariners Routeing Guide CHS considers the following to be included:

- *Plan (E1 of S-49 IHO Guidelins for Mariners Routeing Guides, chart or graphic) of the area should be No. 1*
- *Natural conditions (U6 of S-49 and general discussion of dangers, marine protected areas, etc.) possibly be No. 2 (EC, NRCan, INAC, DFO)*
- *Routes in text (E1 of S-49, in graphics, colour-coded best to worst on Plan) possibly be No. 3,*
- *Passage Planning (E2, U2 of S-49) possibly be No. 4 (TC, CCG, DND/CCG)*
- *Communication/Reporting (E4 of S-49) possibly be No. 4 (CCG MCTS other Arctic Navareas)*
- *Communication Services (U4 of S-49) possiblybe No. 6 (NORDREG, EC weather, EC ice)*
- *Significant Infrastructure may be an additional area of interest above and beyond those noted in S-49 (safe harbours, anchorages, airstrips, communities, SAR depots) could be No.7*

The list of information to be included would be limited to how mch can be placed on an A0 size paper but if the product was digital there would not be the same limitations

Ideas of potential Canadian content:
- shoreline and basic bathymetric information (CHS source)
- significant AtoN information such as ranges (Coast Guard source)
- vessel traffic zones, call-in requirements plus Search & Rescure depots (Coast Guard source)
- marine protected areas (Dept Fisheries & Ocean source)
- community info, airstrips, hospitals (various source)
- regulatory details (Transport Canada source)
- relevant CHS Sailing Direction info plus possibly the Marine Environmental Handbook (CHS source)
- Arctic marine mammal information (source to be determined)
- details on communication facilities and protocols (various sources)
- Ice Service information

NOOA input
Agree with proposal above. Perhaps include additional information on weather, and include various weather forecast resources.

U.S. Input

The Routeing Guides should include the following information:

- *The two International Buoyage Regions A and B, where lateral marks differ. A small graphic of the geographic division of the two regions showing only the Arctic could be displayed.*

- *Additional information on weather including various local weather forecast resources should be included.*

- *Any Marine Protected Areas (MPA's) on Alaska's North Slope, such as the Arctic National Wildlife Refuge. Specific MPA URL's should be included.*

- *Any provisions and/or regulations for subsistence hunting. Coast Pilot passages for the areas of concern should be included.*

Concerning Item 2 Communication, it may be useful to consider including HYDROARC as an area coverage/diagram.

Regarding Ice within this region, consider including information about the International Ice Patrol and reporting procedures.

3. Presentation of the routing guide contents
How should the information in each routing guide be structured?

Proposal:
Information should be divided 2 main sections:
1. General information covering the entire Arctic, should be presented identically in all the arctic routing guides.
2. Information relevant to a specific area should only be presented in the relevant arctic routing guide.

Your comments:

CHS Input

Point 1 above – agree with this principle so long as the information can be properly shown at scale. There are several charting features that if incorporated should be displayed identically across the entire arctic coverage (ie ionospheric disturbances; magnetics; refraction; underwater cables; exploration platforms; general weather; ice; etc.)

Point 2 above – agree in principle though not yet clear that each area will be a stand-alone product. Avoiding clutter and ambiguous information related to the area at hand should be the guiding principle.

Comment: Given the unique nature of the Arctic it may be advantageous to consider a fully web-based product that has a web mapping capability to allow mariners to access and print (if desired) their specific areas of interest.

NOOA Input
Agree with proposed structure; general info plus region specific.

U.S. Input

Agreed.

4. Updates
How often should we update the routing guides?

Proposal:
We should conduct a yearly update of the routing guides. Relevant updates should be sent to the Routing Guide Working Group in good time before each ARHC meeting, in order for the WG to present updated versions of relevant routing guides at the ARHC meeting.

Information related to safety of navigation should be updated when occurred. Generally we recommend an update questionnaire before navigational season starts to check if all information is correct.

CHS Input

- *Make Mariners Routeing Guide a Print On Demand product.(standard chart size or booklet form)*
- *An annual print would not be required*
- *Not being a carriage requirement would free the product from having to be maintained up-to-date by Notice to Mariners though if POD it could be digitally revised as NtM were raised on information contained in the MRG*

The 2nd consideration is a digital portal product

- *Create an entirely new web service with associated web mapping features. One portal and user navigates to area of interest.*
- *Potentially easier to maintain and possibly governed via global accounts whereby each country could maintain their data (or arrange bilat for other country to do it for them) live.*

Given this would not be a carriage requirement document it would not be officially updated for NtM but could be synchronized with changes made via NtM, Safety of Nav Circulars etc with a running list of changes maintained in metadata

NOOA Input
Agree, yearly updates. Include significant charting changes (e.g., new charts). Update questionnaire before the navigational season is a great idea. We (NOAA) can also update with upcoming survey efforts for the coming navigational season.

U.S. Input

Yearly updates seem to be excessive. There should be flexiblity on the ability and need to update relevant Maritime Safety Information via a Notice to Mariners process. Include a review prior to the release of any new edition.

It may be more practical to have either a yearly review with an update every five years or to simply let events drive the update cycle.

The update frequency also primarily depends on the format used to produce the Routing Guides (hard copy product vs. digital portrayal). See #5 (Format):

1. *PDF version—these can be corrected whenever you want. Make the corrections to the Routing Guide data base, produce the new PDF version, upload the new PDF to the appropriate web site or other appropriate electronic delivery system, and make an announcement that a new PDF of the Routing Guide is available.*
2. *Traditional hard copy—Yearly updates would be excessive. Any changes could be made by the traditional Notice to Mariners method. Each subject of the Routing Guide is separately boxed in and has its own individual unique number. If the information in a particular subject box has been updated, only that box needs to be issued in the traditional "cut-and-paste" format in the Notice to Mariners. Each producing country could make a determination of when a new edition of a hard copy Routing Guide should be produced. It may also be more pracitcal to update the graphics less frequently than the*

text. In this case, production may be made easier by presenting all graphics on one side and the text on the other side.

If both electronic and hard-copy versions of the routing guide are produced, any changes made in one version must also be made in the other in order to maintain consistency.

Finally, consideration also needs to be made as to what is the maximum acceptable (but probably legal) length of time for updated information to be added to the Routing Guides compared to when this information initially appeared in other navigation safety publications (pilots/sailing directions, radio aids publications, hard copy/electronic charts, etc.).

We support the issuance of an update questionnaire before the navigation season.

Denmark Input
Smaller updates and corrections can be announced through Notice to Mariners and if available on the internet a link to the relevant homepage can be added.

5. Format
What format(s) should be used for publishing the routing guides?

Proposal:
Each guide should be published in two formats:
- A paper chart and a digital version of a paper chart (pdf)
- An electronic chart (?)

Your comments:
CHS Input:
Option 1:
Following traditional chart products would be a POD paper, with raster electronic version. This could then be covered by a web version similar to the web version of the Baltic Sea MRG.

Option 2:
Forego the traditional chart-like product and build an Arctic Mariner Routeing Guide web mapping service.
- *Polar view*
- *Mariner digitally navigates to their area of interest;*
- *Mariner digitally assembles their view by click-and-dragging relevant info as they deem necessary for their planning*
- *This could be saved or printed as required*
- *Crowd sourcing may be a future add-on whereby local knowledge such as migrating marine mammals, a unique port of refuge, or other could be linked to the web product*

NOOA Input
General and regional specific should be published paper and digital. Since they are actual guides, it's not likely they will take the place of official navigational charts. Thus, don't see the need for ENC.

U.S. Input

Raster products and PDF should be produced first and should be formatted so that they can be easily printed. There are two options for the PDF:

- *Formatted to fit a 36" plotter.*
- *Formatted like a booklet chart (letter, legal or even ledger sized)*

Because the Routeing Guides are not to be used for navigation, there may not be an advantage in producing them as true ENCs. If the need does arise, we should wait until a method for producing S-100 compliant Navigation Publication products in more heavily used areas has been fully established. Then we could begin thinking about producing Arctic S-10X Routeing Guides.

6. Contractual relationships

As agreed at the ARHC meeting in Canada, Denmark should chair the Routing Guide Working Group, and the United States should be responsible for the practical implementation of an Arctic Mariners' Routing Guide. We still have to establish a framework for the production and update of the routing guides.

Proposal:

- Each HO in the is will be responsible to provide the necessary information for the routing guide at no cost
- The routing guides should be available for the mariners without unnecessary cost, which means free digital versions should be available through the internet.
- Other production or use of the routing guides should be approved by ARHC
- One country will be responsible for gathering the relevant information for each respective routing guide and forwarding it to the United States. The United States, as agreed, will oversee the practical implementation.
  - NW passage - Canada
  - Area between Greenland and Norway - Denmark
  - Area between Alaska and Russia - USA
  - NE passage - Russia
  - Area around The North Pole - Norway, or to be determined.

Comments:

CHS Input:

The governance model or framework for the production, updating and distribution of the MRG product is a complex discussion and given the 5 different administrations there may be need for flexibility.

It was clear from the ARHC1 that United States had agreed to produce the prototype but it was not clear that this was a long-term commitment.

Canada would need a legal opinion on whether this product would be protected under copyright laws.

Appropriate disclaimers is a requirement.

If a web service it may be possible to structure the package whereby layers have owners and each layer can only be manipulated by that owner. Administrator would have some general control.

Hosting of a web service may be complex due to fire walls and presentation protocols – a third party may be an option for hosting of a digital MRG.

If a POD/CD product it should likely have a nominal price and be included in pricing lists of all 5 Arctic Ocean coastal states. The concept of incurring costs for printing and distribution without at least a cost recovery plan may make the product unsustainable.

NOOA Input
Agree.

Norway Input

Data for the area around the North Pole to be collected from IBCAO.

U.S. Input

Will the Routeing Guides be produced in any other language than English?

If the guides are to be available via the internet, are there any copyright issues/laws that require a legal review?

Denmark Input.
NW passage should be kept as one area as stated under 1. Question nr. 1.

7. Production plan
How should we plan the production?
When the prototype is approved by the ARHC, we should aim to produce one new routing chart every year. In what order should the guides be produced?

Proposal:
The countries covering an area will decide when they find it appropriate to produce the relevant routing guide, and inform the ARHC and the Routing Guide Working Group. Below is a suggested sequence for a production:

- NW passage (2012)
- Area between Greenland and Norway (Entrance to the Arctic from the Atlantic) (2013)
- Area between Alaska and Russia (Entrance to the Arctic from the Pacific) (2014)
- NE passage, to be determined
- Area around The North Pole: to be determined

We should check how the information flow will be between the printed and web version.
Who will be responsible to deliver what, when and how?
We have to set a time frame when the information should be online latest.

Your comments:

CHS Input:
Internal resources for all countries are likely strained.

If production was outsourced would there be mechanisms for each country to fund their area of responsibility.

Lessons learned from the prototype should give insight into the question of effort to build and maintain. This experience should be considered before production plan commitments are made.

Building one paper sheet per year may be a doable task.

Judging the emerging and future demands for digital applications for navigation it is possible a full-web MRG may get the best up-take. Canada would be open to developing a prototype of the web-based product for ARHC discussion.

NOOA Input
Plan sounds good, although I would bump up the timeframe on the area between Alaska Russia. Try for 2012 or 2013 vice 2014? Draft plans should be circulated for comment well before navigation season (e.g., March/April).

U.S. Input

Since for the most part, different countries are producing each of the five proposed plans, there may be no reason for a staggered production schedule. In reality, the schedule may depend almost entirely on the interest and the resources available to the producing county. Putting aside the North Pole guide for now, we have four producing countries each responsible for one region. Set a deadline for a particular year when all four Routing Guides would be issued.

In the event that the Guides are produced sequentially, we would like to see the timeframe for production of a Routeing Guide for the Area between Alaska and Russia moved forward to 2012 or 2013. Draft plans should be circulated for comment well before the navigation season (e.g., March/April)

8. Additional Comments
If you have any further comments that you feel would be useful to the work on creating an Arctic mariners' routing guide, please use the space below or attach additional pages.

CHS Input:
Keep our Routeing Plan simple as possible or at least as easy to build and maintain as possible should be the goal and only if it is relevant to the user. The IHO and IMO guidelines for these products reinforces that it must be for complex areas of navigation. In the south these complex areas are tight, congested and very likely shallow so there is clear need for the product. In the Arctic the complexity is the unknown environment, the high likelihood of unpredictable weather and ice and the wide-absence of high quality hydrographic information and charts. In this respect the Arctic may be considered complex and may warrant this type of consolidated product. It is possible that we could deviate from a traditional charting product and this merits due considerations.

The ultimate test is whether or not the mariners find it helpful. In this regard there should be a period for client testing and feedback before more effort is expended.

At the end of the day the product may serve to organize a range of data sources into a single generic view and provide arctic mariners and marine transportation administrators with a high level view and if it is digital a possible portal to all navigation related information for cruising the North.

NOOA Input
Weather and ice are a key component. Perhaps yearly updated plans can include something about current year ice and anticipate timeframe for ice free regions. Updates to weather forecast resources should be updated as well, to include recent knowledge gained in previous navigation seasons.

U.S. Input

Weather and ice are a key component. Perhaps yearly updated plans can include something about current year ice and anticipate timeframe for ice free regions. Updates to weather forecast resources should be updated as well, to include recent knowledge gained in previous navigation seasons.