

**Arctic Regional Hydrographic Commission (ARHC)  
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**Harmonization of Arctic Voyage Planning Guides for Pan Arctic Coverage**

**Submitted by:** Canada, Denmark, United States

**Executive Summary:** The Arctic Regional Hydrographic Commission (ARHC) continues its support for the concept of the Arctic Voyage Planning Guide (AVPG). An initial prototype was published by Canada in 2013 as an interactive web mapping service. The third meeting of the ARHC tasked Canada, Denmark and United States to propose a minimum presentation standard for the AVPG considering that an interactive web mapping service may not be the suitable solution for all ARHC Member States.

**Related Documents:** Arctic Mariners Routeing Guide historical discussions in ARHC; link to the Canadian AVPG <http://geoportal.gc.ca/eng/Gallery/MapProfile/5>  
IMO Resolution A.893(21), Guidelines for Voyage Planning  
ARHC3-3.3 Report of the Arctic Routing Guide Working Group  
ARHC3-3.3INF 2 INF Paper on Mariners Routeing Guide  
Survey Results of MRG Questionnaire  
Mariners Routeing Guide Updated (US) (ARHC 3)  
Baltic Mariners Routeing Guide  
German Bight Mariners Routeing Guide  
English Channel Routeing Guide

**Related Projects:** US Prototype available at [www.nauticalcharts.noaa.gov/avpg](http://www.nauticalcharts.noaa.gov/avpg)

### **Introduction / Background**

The Arctic Voyage Planning Guide (AVPG) was a continuing agenda item at the 3<sup>rd</sup> meeting of the Arctic Regional Hydrographic Committee in Tromso Norway October 2012. AVPG prototypes were presented at ARHC3 by Canada and United States. Survey results from the member states were also presented, reviewed, and discussed.

Canada presented a digital web map version and United States presented a hardcopy cartographic version that has potential to be geo-referenced tiff in a web environment with web enabled links for extended data access. (see [http://www.iho.int/mtg\\_docs/rhc/ArHC/ArHC3/ArHC3Docs.htm](http://www.iho.int/mtg_docs/rhc/ArHC/ArHC3/ArHC3Docs.htm))

The Canadian web portal concept was appreciated but some concern was expressed about the ability for all Member States to replicate the interactive web map capability. Alternatively, the geo-referenced USA proposal was a more traditional cartographic presentation with potential for digital functionality using hot-links to official government internet locations for additional information.

Canada Denmark and United States were tasked at ARHC3 to develop a minimum standard for the AVPG presentation for ARHC4 discussion.

### **Analysis/Discussion**

Since ARHC-1, progress has been made in the development of an Arctic voyage planning resource for mariners considering navigating the widely recognized challenging and dangerous Arctic Ocean Region. Member States were queried for input for development of such a product and the results analyzed. Two initial prototypes were developed and discussed from ARHC2 to ARHC3. In April 2013, Canada released a national AVPG for Canadian waters and now the US is developing an option to expand geographic scope and presentation of an AVPG to cover US Alaska.

Canada, Denmark and United States concluded that a three step approach should be used to establish a common AVPG perspective to advance decisions. This three step approach is as follows with each step being elaborated:

1. What is the intention of the Arctic Voyage Planning Guide (i.e. how will the AVPG be used)?
2. What will be the content structure of the product (i.e. what are the minimum themes and information for the AVPG)?
3. What are the product delivery options?

#### 1. How will the AVPG be used?

The AVPG is intended as a strategic voyage planning tool for national and international vessels. In this context the Arctic Voyage Planning Guide is not intended as a mandatory carriage item. The AVPG is a compilation of data and services relevant to mariners preparing to travel in the Arctic. It is intended to draw together information to support the planning of a safe voyage. The AVPG provides contextual information such as basic data on the physical environment plus the navigational support services available in the area including chart coverage, marine communication, weather services, icebreaking, etc. In this capacity as a strategic planning tool it is understood that the AVPG is not intended for tactical navigation decision-making on the ship bridge.

#### 2. What are the minimal themes and information for the AVPG?

The following set of themes and content items were applied in the Canadian experience to cover the essential voyage planning elements. These themes and content did have input from Mariners though mostly in a Canadian context. The themes and content were designed to allow end-user access to all essential planning information while being

careful not to cross the line whereby the tool may be misunderstood as a tactical navigation tool. For instance, the designers were advised to avoid including bathymetric and navigational aid detail so as not to imply the tool could be used in a tactical navigation situation.

ARHC decisions on themes and content should consider the level of effort required to keep the product up-to-date. If a generalized cartographic presentation is preferred it may result in additional effort to maintain the product. On the contrary, a digital version that mirrors official information already maintained at its source is understood as having a great benefit in reducing updating effort, limiting liability and maximizing benefit for end-users.

The themes and information layers listed below are proposed as a provisional list of minimum content for an AVPG. It is further proposed that this list be used for a period of 5 years, ending in 2018, at which time the minimum content will be reviewed in the context of Member States' experience and mariner feedback:

#### Theme 1 – Carriage Requirements

- Navigational Warnings Services
- Radio Aids to Navigation
- List of Lights and Buoys and Aids to Navigation
- Nautical Charts and Publications services

#### Theme 2 Regulatory Requirements

- Acts and Regulations specific to marine navigation (similar to S-49 E.3.2)
- IMO Guidelines for Operating in Polar Waters

#### Theme 3 Arctic Environment Considerations

- Communities and Populated Areas Information
- Weather Station Locations and Services Available (similar to S-49 E.4.2 and U.4))
- Airports and Hospitals
- Resource Development Significant Locations

#### Theme 4 Route Planning

- Traditional Traffic Routes (similar to S-49 E.3.2)
- Controlled Navigational Areas including Vessel Traffic Services Zones
- Limiting Depth For Constricted Waterways
- Tide, Current and Water Level information (similar to S-49 U.6.1)
- Environment Protected Areas
- Major Aids to Navigations (similar to S-49 E.1.2 and U.1.2)
- Places of refuge or Pilot Boarding Stations (similar to S-49 E.1.5)
- Calling-in Points (similar to S-49 E.4.1)

#### Theme 5 Reporting and Communicating

- Areas of Legislative Importance to Navigation
- Marine Communication Services (similar calling-in info to S-49 E.4.1)

#### Theme 6 Marine Services

- Ice Breaking Support Services
- Search and Rescue Support Services
- Ice Services Information (similar to S-49 U.6.4)

#### Theme 7 Nautical Charts and Publication

- Nautical Chart Catalogue and Coverage  
Publication Catalogue and Coverage

### 3. What are the product delivery options?

Hydrographic Offices traditionally delivered their products and services in paper format though the trend is changing toward digital products and service delivery. There are strong indications from the end-user community and also by Hydrographic Offices, that embracing a digital model for navigational publications is aligned to changes in industry and in the direction of the International Maritime Organization. Canada created web application that allows the user to display all the themes in any combination in a live map. In addition, the underlying data layers are provided as web mapping services.

In its consideration of how a paper product might be an acceptable alternative, Canada created a panel layout in contrast to the single A0 chart format.

(see [http://www.iho.int/mtg\\_docs/rhc/ArHC/ArHC3/ARHC3-3.2\\_INF1\\_Proposed\\_Canadian\\_Arctic\\_Voyage\\_Planning\\_Guide\\_2.pdf](http://www.iho.int/mtg_docs/rhc/ArHC/ArHC3/ARHC3-3.2_INF1_Proposed_Canadian_Arctic_Voyage_Planning_Guide_2.pdf))

This had advantages of aligning the panels to various themes thereby reducing the clutter and simplifying the presentation. This cartographic presentation could be geo-referenced similar to what the United States proposed at ARHC3. However, due to the wide variety of possible combinations of information and paper layouts, the committee is making no recommendation for specific form of a paper version of an AVPG.

The US is working on a prototype printable web page following the proposed themes and minimum content adopted by Canada, listed above. The US has developed a prototype which is envisioned to be a thin shell that relies on maintenance of geographic layers at their source. When viewed online, it will contain live maps as well as static information. The US also anticipates providing the information as web mapping service.

In addition, to bring together Member States' individual AVPGs under one ARHC banner, the US recommends the development of a single entry portal that allows access to each national AVPG.

The committee recommends that AVPGs developed by Member States, incorporate two key principles for product delivery:

1. Web interface for either cartographic or web map product with links for additional national content
2. Printable for portability and disconnected use.

### **Conclusions**

Canada, Denmark and United States have discussed and considered the points in the Analysis section. ARHC4 is invited to use the three tier approach taken by this discussion group to guide a positive outcome on a series of Arctic Voyage Planning Guides.

### **Recommendations**

The drafting team recommends that ARHC consider the options for implementation of a pan-Arctic Voyage Planning Guides and adopt a way forward. Specifically:

1. Agree on the purpose of the AVPG. The AVPG is intended to be used for planning in advance of a voyage, and not as a tactical decision aid during the voyage. Other products, such as the nautical chart and Coast Pilot already serve these purposes.
2. Agree to the 7 themes outlined in section 2 of this document. These comprise the provisional minimum content standard for inclusion in an AVPG. The committee further recommends that this list of be reviewed in 5 years at which time we expect to have the benefit of deployed AVPG implementations and additional customer feedback.
3. Agree that the ARHC website provide a common portal with links to each nation's routing guide. Agree that the delivery mechanism for the AVPG be web accessible, either a static cartographic presentation or an interactive web map. It is recommended that Member States develop a printable version of the main content of the AVPG for reference when not connected to the internet.
4. Agree that nations should develop and publish their prototype AVPGs before ARHC5. It is anticipated that the ARHC will solicit stakeholder feedback between ARHCs 5 & 6.
5. ARHC to determine if a working group is to be established to address any issues that develop during the year through correspondence

### **Justification and Impacts**

Not required as this has been a multi-year agenda item for the ARHC

### **Action Required of ARHC**

The ARHC is invited to:

1. Consider the five recommendations of the committee for the formation of the AVPG.

2. Provide clear direction to Member States on the purpose, content, and form of distribution of the AVPG so that MS may begin their development.