**Paper for Arctic Marine Best Practice Information Forum**

**5-6 June 2017**

**A summary of how IALA expects to advance safe and environmental sound Arctic navigation and suggested information to be considered for the Information Forum web portal.**

Ships operating in the Arctic environments are exposed to a number of unique risks. Poor weather conditions and the relative lack of good charts, communication systems and other navigational aids pose challenges for mariners. Charting improvements may be expected to take many years. The provision of marine aids to navigation (AtoN) is difficult or impractical.

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) supports the initiative of the Arctic Council, Protection of the Arctic Marine Environment to create an Arctic Shipping Best Practice Information Forum and will support the work as best it can.

This paper gives a summary of how IALA expects to advance safe and environmentally sound Arctic navigation and suggests Information to be considered for the future Forum web portal.

After the first meeting of the Forum in June 2017 IALA will most likely be in a better position to make the list more concise or to suggest further inputs.

**About IALA**

IALA is a non-profit, international technical association.

Established in 1957, it enables marine aids to navigation authorities, manufacturers, consultants, and, scientific and training institutes from all parts of the world to exchange and compare their experiences, achievements, and technical and operational policies via participation in IALA Technical Committees.

The Committees work to create IALA Recommendations and Guidelines, which are recognised worldwide as the international standards for the implementation and operation of aids to navigation. These standards help to ensure that the movements of vessels are safe, expeditious, cost effective and harmless to the environment.

IALA’s scope and expertise extends to e-Navigation and Vessel Traffic Services.

The IALA World-Wide Academy is an established arm of IALA and has responsibility for training and capacity building.

The IALA Council comprising, twenty-two elected and two appointed Councillors who administer IALA and meet twice each year. Councillors are elected by the organisation during the General Assembly and are normally the head of the authority responsible for aids to navigation in the country represented. General Assemblies are held every four years and Councillors hold their positions for the duration of the time between two General Assemblies.

IALA coordinates the technical aspects of its work by establishing formal technical committees and hosting a range of conferences, workshops and seminars. Formal committees are established when a subject relevant to the aims of IALA is considered to need on-going study or discussion by experts in a particular field. Committees may also be tasked with providing continuous monitoring of subjects that could influence the provision of aids to navigation in the future. Four committees are currently in operation. Each meets twice per year, usually at IALA headquarters, and managed by a chairman and vice-chairman. IALA Committees are very well represented with nominal attendance of between 70-140 delegates. The primary objective of the committees is to develop IALA guidance documents, manuals and recommendations. The documents are used by international navigation authorities and are the principal way in which IALA harmonises the establishment and operation of marine aids to navigation systems across the world. Specially targeted conferences; workshops, seminars and symposiums are also hosted on a regular basis across the globe.

**IALA Committees**

The Aids to Navigation Management (ANM) Committee deals with the management of aids to navigations services, with its focus being the development and review of issues such as channel design, correct use of aids-to-navigation, management of services relating to AIS networks, the maritime buoyage system and Risk Management. The committee is also responsible for editing and reissuing every four years the IALA Navguide and IALA Questionnaire.

e-Navigation is a vision for the integration of existing and new navigational tools to enable the transmission, manipulation and display of navigational information in electronic form. The IALA e-Navigation (ENAV) Committee addresses aspects of e-Navigation relating to marine aids to navigation and works closely with other international organisations, especially the IMO and IHO, to develop the concept of e-navigation.

The Vessel Traffic Service (VTS) Committee deals with all aspects of VTS, including the expanding role of vessel traffic monitoring in maritime safety, efficiency, environmental protection and security. The Committee also provides robust and timely guidance to those involved in VTS matters.

IALA’s Engineering and Sustainability (ENG) Committee is responsible for the engineering, design, maintenance and conservation of marine aids to navigation and promotion of international research on issues such as light measurement and conspicuity. The committee also addresses international research and development on human perception of light and colour, light measurement and conspicuity of marine signals.

Further information on the general activities of IALA can be found at:

<http://www.iala-aism.org/about-iala/>

**IALA activities in the Arctic**

**2010 IALA Resolution**

All Arctic Council member governments and all governments with permanent observer status to the Arctic Council are members of IALA.

IALA is very much engaged with the challenges of safe navigation in Arctic waters. In 2010, delegates from Canada, Denmark, Norway, Russia, and the United States as well as the IHO met at IALA headquarters in France to discuss the marking of polar traffic routes. As delegates from the five Arctic states and the chairs of IALA’s technical committees presented their perspectives on the current challenges in the Arctic, several common themes emerged.

For example, several noted the need for a more reliable communication infrastructure in the Arctic, with the lack of full communications coverage in shipping areas and the need to provide effective warnings to mariners. IALA also noted that traditional physical marine aids to navigation would be “unrealistic” in certain Arctic waters, due to the remoteness and harsh environment of the region.

At the conclusion of the meeting, the delegates from the five circumpolar Arctic states and IALA adopted a resolution agreeing to strive for harmonisation of their approaches to the risks of navigating in Arctic waters. In doing so, the five nations expressed a desire to explore the potential of a common Arctic ship reporting and data sharing system approach to Arctic marine traffic awareness and monitoring, and a harmonised system of marine aids to navigation.

This resolution was seen by the participating states, as a first step in developing a common approach to addressing “the risks inherent in the expansion of marine traffic” in the Arctic. As part of the resolution, IALA agreed to provide a forum for later discussions on navigation safety in the Arctic. It also resolved to support the nations in:

* enhancing marine traffic awareness;
* establishing ship reporting and data sharing systems;
* marking polar routes and development of virtual aids to navigation;
* application of risk management methodology; and
* discussing the importance of improving hydrographic services in the region.

IALA’s resolution was also forwarded to the IMO and the Arctic Council, and the states present agreed to meet annually through the IALA forum on Arctic navigation safety issues. The Council members from the arctic states meet two time a year during the ordinary council meetings.

IALA hopes that the important work commenced at this inaugural forum can be continued and will convene a Seminar on Arctic Navigation in Paris 9-10 November this year with participation of relevant stakeholders including sister organisations such as IHO and the Arctic Council Secretariat.

**Aids to Navigation**

Provision of marine aids to navigation in polar areas has considerable challenges. IALA Guideline 1108 on Providing AtoN Services in Polar Regions contains guidance for aids to navigation professionals working in the polar environment. The guideline was a result of a workshop hosted in 2013 in Ilulissat, Greenland by IALA in association with the Danish Maritime Authority on the challenges of providing AtoN services in Polar Regions.

The workshop covered subjects such as User requirements, AtoN site selection, AtoN construction, installation and maintenance, project planning and management, as well as the potential of e‑Navigation in Polar Regions.

The guideline 1108 can be found on the IALA web site <http://www.iala-aism.org/product-category/publications/> and could be considered for the future Forum web portal.

In addition to traditional aids to navigation, IALA works with the concept of “virtual AtoN”. The virtual AtoN can be transferred by radio signal from shore Authorities and displayed on a ship’s electronic chart display even though there is no actual AtoN at the indicated location. Virtual AtoNs can be used to mark channels or hazards when the deployment of a physical AtoN is not possible, or when the channel or hazard is temporary. The virtual AtoN concept can be developed as a tool for increased safety of navigation taking into consideration special conditions in the Arctic. Terrestrial AIS is presently used for communication on virtual AtoN, but other communications systems could be used.

IALA Recommendation O-143 on Virtual Aids to Navigation contains guidance to national authorities and stakeholders on the provision of virtual AtoN.

The Recommendation can be found on the IALA web site <http://www.iala-aism.org/product-category/publications/> and could be considered for the future Forum web portal.

**Vessel tracking**

The IALA-NET vessel tracking system composes a group of national maritime authorities, which provide ship AIS reports from their terrestrial AIS systems to a central server, and in return, receive the data of other contributors. At present, the following Arctic countries provide their terrestrial AIS data to IALA-NET.

• Denmark including Greenland - Danish Maritime Authority

• Finland - Finnish Maritime Administration

• Norway - Norwegian Coastal Administration

• USA - U.S. Dept. of Transportation

• Sweden – Swedish Maritime Administration

• Faroe Islands

Information on IALA-Net may be found at:

<http://www.iala-aism.org/products-projects/technical-area/iala-net/>

Clicking on “Get Started” in the menu at left will reveal instructions for joining IALA-NET. Other links in the menu provide technical information on the data format, statistics, and display. There is no fee for membership, only a commitment to provide terrestrial AIS vessel tracking data to the other members of IALA-Net in exchange for receiving their data.

Recommendation E -142 on Maritime Data Sharing can be found on the IALA web site <http://www.iala-aism.org/product-category/publications/> and could be considered for the future Forum web portal.

**Development of data communications for e-Navigation**

IALA is involved in several works related to maritime data communication. Members of IALA contribute with their expertise in several committees. The IALA’s e-Navigation Committee is developing a VHF Data Exchange System (VDES), which will encompass the existing two AIS radio channels, and add other channels for terrestrial and satellite data exchange between ship and shore or ship and ship.

Present plans for the VDES scheme include a 100 KHz bandwidth data channel and two channels for satellite detection of AIS for vessel tracking. Two way data exchange ship-satellite is still in discussion. The VDES could be applicable in Arctic waters.

In 2015 the United Nations agency the International Telecommunications Union (ITU) approved the standard for VDES. A remaining outstanding issue is the approval of the satellite component for the VDE channels which is targeted for approval at the World Radio Conference in 2019.

IALA also envisages that the 500 KHz marine band, presently used for Navtex broadcasts, will be used for a more modern data transfer method. The Navdat concept looks like a suitable candidate.

Both VDES and Navdat are envisaged to be free services for the user. Full development of VDES will rely on shore authorities upgrading their existing AIS base station networks to VDES.

All together this will result in a much improved communication and data transfer in the Arctic area.

IALA Guideline 1117 on VHF Data Exchange System (Overview) can be found on the IALA web site <http://www.iala-aism.org/product-category/publications/> and could be considered for the future Forum web portal.

**Data modelling and Maritime Service Portfolios for e-Navigation**

IALA’s ENAV Committee is working with the International Hydrographic Organisation (IHO) to develop product specifications for AtoN and VTS services, within the IHO S-100 geographic information concept. IALA has been allocated a domain within the IHO S-100 registry for this purpose. Several product specifications could be developed for special Arctic related information as well.

Maritime Service Portfolios (MSP’s) are described by IMO as sets of operational and technical services and their level of service provided by a stakeholder in a given sea area, waterway, or port. IMO has recognised that Polar areas will require specific MSP’s for e-Navigation (MSP examples include meteorological, tidal, and ice information). IALA’s ENAV Committee is working to create recommendations on content and quality for MSP’s.

**e-Navigation projects and test-beds**

IALA participates in several e-Navigation projects together with its members from both national authorities and industry, as well as other non-member partners. Furthermore, several IALA members are engaged in e-Navigation test bed projects. Some of the test beds are specifically created for Arctic use as for instance the Arctic Web.

IALA has developed a Guideline for the harmonization of reporting test bed results and a list of test beds with information on contact details, web pages, content etc. can be found on the IALA web site <http://www.iala-aism.org/products-projects/e-navigation/test-bedsprojects/arctic-web/>

Links to relevant testbeds could be considered for the future Forum web portal.

**Vessel Traffic Services (VTS)**

IALA guidance documents for VTS cover technical matters, operations, and VTS operator training.

Several IALA Members operate VTS services and Ship Reporting Systems (SRS) in the Arctic. IALA will continue to develop guidelines and recommendations, technical, operational and training concepts, including those necessary for Arctic needs.