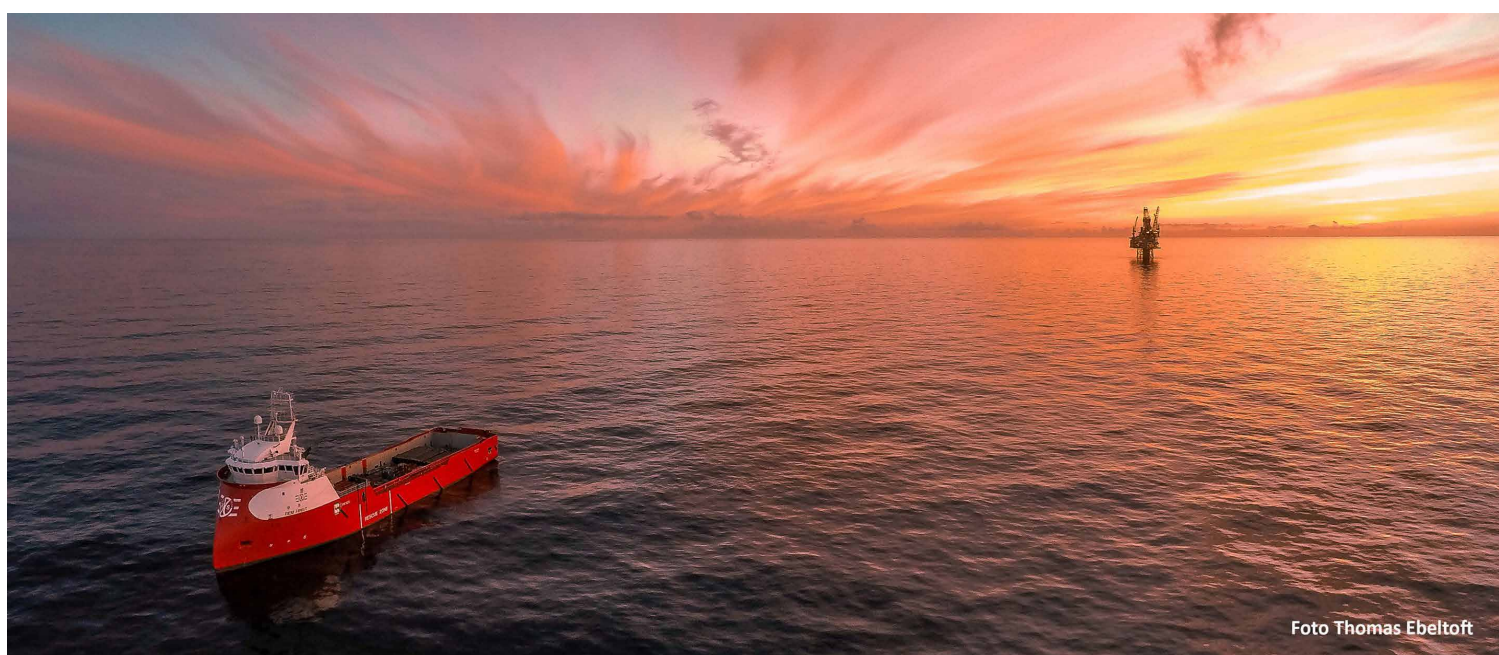


Arctic Economic Council Maritime

Transportation Working Group Report:

The State of Maritime Transportation in the Arctic



Executive summary

In recent years, Arctic shipping operations have increased as a result of new shipping routes and natural resources exploitation projects, both in Canada and Russia. The transport volumes are expected to rise to 100 million tons by 2025. Today's satellite technology provides an opportunity to follow and track all vessel movements, which will result in more exact knowledge in the coming years on the actual transport volumes.

Most of the volumes have thus far been so-called destination transports. In recent years, experimental transit movements using the Arctic passages have also emerged, especially by Chinese operators. So far, the transit volumes have remained marginal.

The Arctic Council's Working Groups have been actively pushing for a new regulatory framework for Arctic shipping. The AEC needs to establish closer dialogue with the Arctic Council and its working groups.

The United Nations Conference on Trade and Development (UNCTAD) provides the basis for international shipping operations. The United States has so far not ratified the Convention. For historical reasons, the prevailing ice class regime for ships is different in Canada and Russia. Although the International Association of Classification Societies (IACS) in 2008 launched the guidelines for the International Association of Classification Societies' Unified Requirements, the AEC supports the classification societies' further work to harmonize the rules to form a real Pan-Arctic system of rules.

The recently developed Polar Code by the IMO is the first approved set of goal-based rules. The AEC supports the active work of the Arctic Council Protection of the Arctic Marine Environment (PAME) to monitor the implementation of the Polar Code by various flag states, as there is a high risk that differing risk criteria will be used.

The general trend points towards the creation of new regulations on Arctic shipping to protect the Arctic environment, governing activities such as the use of heavy fuel oil, black carbon emissions and underwater noise. The AEC supports the principles of sustainability and is not against this development, but emphasizes the need to have sufficient opportunities for Arctic shipping and other industries to adapt. Without natural resource development to provide funding for expensive infrastructure projects such as port development, the region will remain remote and largely inaccessible. Without the ability to competitively develop the Arctic's natural resources, the Arctic states will not be able to improve their regional economies.

The AEC Maritime Transportation Working Group (MTWG) target is to have all the premium ship operators join the work of the MTWG. Several issues at international, regional and national levels require the operators' attention and cooperative efforts through the AEC. The AEC should continue improving its cooperation with the IMO, World Ocean Council, International Chamber of Shipping (ICS), Oil Companies International Marine Forum (OCIMF), Arctic Regional Hydrographic Commission (ARHC), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and other relevant actors to further improve the shipping industry's safety and environmental performance in Arctic waters.

One of the AEC's key themes is freedom of trade in the Arctic. In recent years, unfortunately, we have witnessed increased protectionism. This leads to higher costs and reduces the speed of new innovations. Lack of freedom of trade results in decreased sharing of knowledge and experience. The AEC therefore supports all efforts to reduce protectionism. Furthermore, the AEC encourages discussions on how investments in localized shipping could be supported in practice by the various governments.

The AEC Maritime Transportation Working Group started its work in 2014 with members nominated by each of the AEC's Legacy Members. Since then, shipping communities from South Korea and Greece have joined the work, together with representatives of ship operators such as Gazprom Neft. The work of the AEC's Maritime Transportation Working Group is led by Mr. Mikko Niini.

Encouraging growth in Arctic shipping

For decades, the Arctic waters have been covered with impenetrable ice formations, and very little commercial trade has taken place. Climate change, the melting of the Arctic sea ice, and the introduction of new technologies have in recent times led to the emergence of trade flows in response to the increased global demand for natural resources. The drivers in this development have been the exploitation of minerals such as nickel and iron ore, as well as oil and natural gas. While the destination transports have been dominant, the opening up of coastal waters both in the North-East Passage as well as the North-West Passage have inspired the shipping industry to set up pilot projects for transits between the Atlantic and Pacific basins. The Russian Federation declared the Northern Sea Route (i.e. North-East Passage) open for international shipping in the early 1990s. The first foreign-flag vessel, Nemarc Shipping's M/T *Uikku*, made a commercial transit in 1997. Since 2010, COSCO Shipping has been particularly active in transit navigation and has made the majority of these voyages.

Significant regular local deliveries have also been taking place in Canadian, Alaskan and Russian coastal locations and villages.

The nickel exports using new technology ship solutions started simultaneously in Canada (Voisey's Bay) and Norilsk (Dudinka) in 2005. The latter was based on six newbuilds based on the "double-acting" principle, which was soon incorporated in Varandey's and Prirazlomnoye's oil production and export logistic solutions (five 70,000 TDW purpose-built Arctic tankers). The pivotal major opening took place in 2017 when investors Novatek, Total and CNPC began using a purpose-built fleet of 15 Arctic 170,000 CM LNG carriers for the Yamal LNG project with scheduled loadings every 36 hours for the Asian market. These ships are owned and operated by the major international shipowning groups Dynacom, Teekay, Mitsui OSK Lines and Sovcomflot and represent a total investment of more than 5 billion USD.

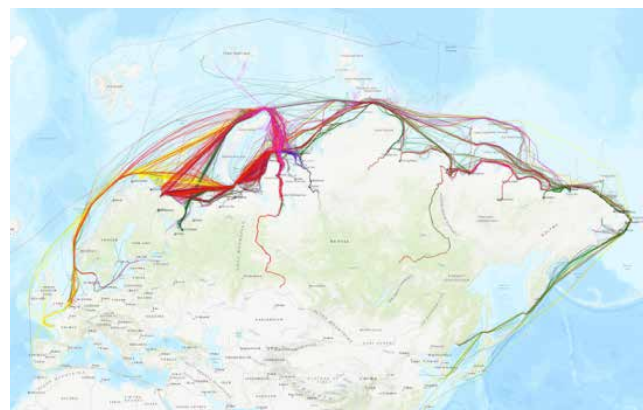
Another new logistics system is Gazprom Neft's Novy Port light crude oil export shuttle solution with seven purpose-built 42,000 TDW Arctic shallow draught double-acting shuttle tankers operating out of the Ob river offshore tower terminal

to the transshipment hub in Murmansk. All these investments have also stimulated the producing industries to invest in related 10 terminal and escort icebreakers of their own.

The annual volume of these Arctic shipping trades in Russian waters is already exceeding 20 million tons, while iron exports from Canada's Baffin Island to Europe and Asia in 2018 for the first time exceeded five million tons. Some of these ore transports have taken the shortest route to the Pacific basin via both the North-West and North-East passages.

The total export volumes are expected to rise to 100 million tons by 2030.

New investments have provided a basis for the recent expansion of the Arctic fleet. This expansion has been executed according to current sustainability principles, improving maritime safety and reducing the environmental impact. These are also well aligned with the principles of the Arctic Investment Protocol, which has now been further developed by the AEC¹. The customised new technologies in marine solutions which have been introduced have also proved that sustainable investment in the Arctic regions can be both competitive and feasible.



Shipping in the Northern Sea Route during 2018. Source: CHNL

In Russia, further new investments such as Novatek's Arctic LNG 2 for 19.7 million tons of annual LNG exports have been launched. This will lead to the construction of 15 new Arctic LNG carriers and two escort icebreakers.

In 2005, the Arctic Council published an Arctic Marine Shipping Assessment to provide a better understanding of shipping operation volumes. The new AIS data provides a new opportunity to follow this up and gather more accurate data.

¹ For more information about the Arctic Investment Protocol and the AEC's work on it, please see <https://arcticeconomicouncil.com/submission-form-best-practices-in-line-with-arctic-investment-protocol-guidelines-for-responsible-investment-in-the-arctic/>



The Centre for High North Logistics (CHNL) in Kirkenes, Norway, has been conducting analyses of shipping operations on the Northern Sea Route for some time, and is ready to provide any client with a range of analyses.

In 2019, the Arctic Council Protection of the Arctic Marine Environment's (PAME) Working Group started working on a new project called *Operationalization of the Arctic Shipping Traffic Database (ASTD) System*. This activity will operationalize the ASTD. It includes the construction (by 2019) and subsequent operation, administration and management of a data repository hosted by the Norwegian Coastal Administration. Access to the database is restricted, as set out in the Cooperative Agreement among the Arctic States.

The project collects a wide range of historical information, including ship tracks by ship type, information on number of ships in over 60 ports/communities across the Arctic, assumptions on detailed measurements of emissions by ships, shipping activity in specific areas (e.g. the Exclusive Economic Zone (EEZ) and the Polar Code area) and indirectly fuel consumption by ships.

PAME will use the data from the system to conduct analyses and develop projects that will benefit many different projects

across the Arctic Council's bodies. Participating countries (currently seven of the eight Arctic States) will have access for their own research and analysis, while Permanent Participants, Arctic Council Observers, and other subsidiary bodies can gain access to the system upon request. Each permitted user can download data for their own analysis, and add their own data to the system, including shapefiles, to be displayed in the database.

PAME describes the ASTD as a significant step towards reducing the knowledge gap concerning circumpolar ship traffic in the Arctic. With changes in the extent of the Arctic sea ice and projected changes and increases in shipping in the Arctic, the database will allow the Arctic Council to be at the forefront of monitoring trends and assessing any changes for use in its studies, assessments, analyses, and the development of recommendations that improve Arctic maritime safety and support the protection of the Arctic people and environment.

Recommendation:

The AEC should create a relationship with PAME. This should include access to the ASTD database to support the AEC's own research and analysis on the maritime transport efficiencies in the Arctic.

Creating stable and predictable regulatory frameworks

The background to the Arctic Economic Council's (AEC) Maritime Transportation Working Group (MTWG) was the need for the shipping industry to join forces and create a forum for the internal exchange of ideas, sharing of experiences and agreement on common policy interests.

The AEC, since being established during Canada's chairmanship in the Arctic Council in 2013-2015, has defined five overarching themes to form the basis of the work of the Council. Two of these are essential for maritime transport, namely

- Creating stable and predictable regulatory frameworks and
- Encouraging public-private partnerships for infrastructure developments

United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS is the international agreement that resulted from the third United Nations Convention on the Law of the Sea (UNCLOS III), which took place between 1973 and 1982. UNCLOS replaces the older 'freedom of the seas' concept dating from the 17th century: national rights were limited to a specified belt of water extending from a nation's coastlines, today usually 12 nautical miles. All waters beyond national boundaries (territorial waters) were considered international waters: open to all nations, but belonging to none of them (the *mare liberum* principle promulgated by Hugo Grotius).

The Convention, concluded in 1982, replaced four 1958 treaties. UNCLOS came into force in 1994. As of today, 168 countries and the EU have ratified the Convention.

UNCLOS includes two important special clauses relevant to Arctic shipping. Clause 234 specifies coastal states' special rights due to icy waters as follows: Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the

year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence. Thus, the article grants additional unilateral power to coastal states in terms of regulating international shipping within their economic zone. However, it contains several conditions for its applicability. Both Canada and the Russian Federation have created such regulations.

Clause 235 in turn sets out the environmental responsibility of the states: States are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment. They shall be liable in accordance with international law.

The United States has not ratified the Convention and has so far not expressed any intention to do so.

Overlapping Ice Class rules

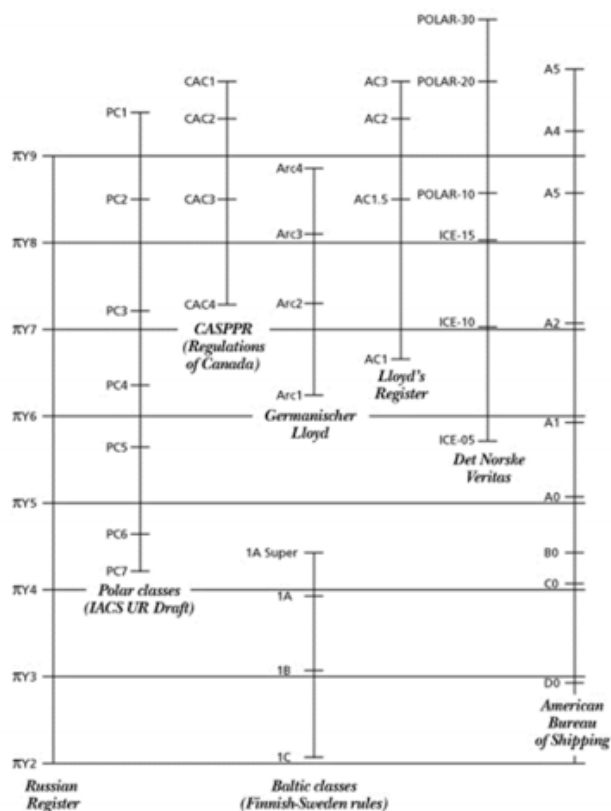
One of shipbuilding's historical traditions is the role of the classification societies, which controlled and supervised the quality and basic safety control of ships over the centuries. Many of them are today also authorised by the Flag State administrations to act on their behalf. An example of the significant work done by the 'classes' are sets of safety and structural rules for marine newbuilds, including their operation in icy waters. The classification societies had created their own criteria for ice-going ships, but gradually all of them have united to follow the Finnish-Swedish ice class regime, which forms the basis of merchant vessel icebreaking assistance in the Baltic Sea.

A comparison table (next page) shows an example of the situation.

For polar water operations, the class requirements differ somewhat from each other. The most widely used are the DNV GL class notations and the Russian ice class regime, which is the basis for ships operating especially in Russian Arctic waters. Rules in Canada in turn have their own origin in the very different ice conditions, focusing on ice risk levels rather than practical operations in Arctic waters like those in Russia.

Over the last two decades, the Classification Societies have, through their cooperation body, the International Association of Classification Societies (IACS), made efforts to harmonise

*Comparison between different rules for ice strengthening.
Carried out by Krylov Institute in St. Petersburg*



the rules, but so far this has been successful only for the sub-arctic classes. Through intensive work for two decades, the IACS finally achieved a compromise in 2008, *The International Association of Classification Societies Unified Requirements*. These requirements harmonize the rules to be used in the construction of all ships intended to operate in ice-covered waters, including waters where multi-year ice may be present.

These cover themes such as hull areas, design ice loads, peak pressure factors, shell plate requirements, framing (transversely framed / longitudinally framed), structural stability, corrosion/abrasion additions and steel renewal, materials in general, longitudinal strength and appendages and welding.

The harmonized requirements also detail machinery requirements for Polar Class ships, such as the main propulsion, steering gear, emergency and auxiliary systems essential for a ship's safety and the survivability of the crew. Machinery and supporting systems are to be designed so that they can function properly in the freezing temperatures of the

Arctic. Systems that are subjected to damage as a result of freezing are to be made drainable. Machinery also needs to be protected from the harmful effects of ingestion or accumulation of snow. Measures need to be taken to prevent damage due to freezing to tanks containing liquids, sea bays, ice boxes, ship side valves, fittings above load waterline, and ballast tanks. Vent pipes, intakes and discharge pipes, and associated systems are to be designed to prevent blockage due to freezing and ice or snow accumulation. There needs to be a way of re-circulating the seawater. Accommodation and ventilation system intakes are to be provided with means of being heated.

Recommendation:

The AEC strongly supports the idea that the major Arctic classification societies should continue their efforts to harmonize their ice class ruling.

In practical terms, so far a ship has not been built which would be universally compliant to work on a Pan-Arctic basis. Through the implementation of the Polar Code (PC), however, it is gradually being assumed that the use of Polar Code classes will be selected as the priority ice class, subject to acceptance by the Canadian and Russian authorities. Already today the lower IACS PC classes (PC 6 and PC 7) are compatible with the Baltic FSIC ice classes, subject to sufficient propulsion power, but not vice versa.

The Polar Code

The harmonisation effort has been continued by the United Nations' specialized agency the International Maritime Organization (IMO). The result, the Polar Code, has been in force since January 1st, 2017, regulating maritime navigation and operation, as well as environmental maritime issues in the Arctic (and the Antarctic). The adoption of the Polar Code represents a milestone in the international regulation of the Arctic, as the Polar Code is fundamental to safe and environmentally friendly maritime activity in the region. The industry considers that a swift and harmonised implementation of the Polar Code is of high importance.

The International Code for Ships Operating in Polar Waters (the Polar Code) is a new code adopted by the IMO. It is also the first of new IMO regulations based on goal-based standards, thus not providing direct solutions or prescriptive rules on all aspects. The Polar Code includes mandatory items and also recommendations and guidelines.



The Polar Code acknowledges that polar waters may impose additional demands on ships beyond those normally encountered. The main requirements are related to safety, protection of the environment, and seafarer competence, and it is implemented through amendments to the IMO regulations on Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), which are already globally complied with by the shipping industry.

The Polar Code applies to ships, depending on their international certification requirements, as follows

- Part I safety requirements and Part I manning and training requirements apply to ships certified in accordance with SOLAS and which operate in polar waters.
- Part II environmental protection requirements apply to ships that must comply with MARPOL and which operate in polar waters.

For non-SOLAS ships that are required to hold a MARPOL certificate (such as fishing vessels), only the Part II environmental protection requirements of the Polar Code apply.

Part I-A is subdivided into twelve (12) mandatory chapters of safety measures. These are General, Polar Waters Operational Manual (PWOM), Ship Structure, Subdivision and Stability, Watertight and Weathertight Integrity, Machinery Installations, Fire Safety/Protection, Life-saving Appliances, Safety of Navigation, Communication, Voyage Planning, Manning and Training. Additional guidance and recommendations on safety are provided in Part I-B.

Part II-A is organized into four (4) mandatory chapters of environmental protection measures. These chapters are aligned with their respective MARPOL Annexes (I, II, IV, and V) and introduce additional discharge limitations above and beyond what is already prescribed by MARPOL. Part II-B is offered to provide additional non-mandatory guidance relating to pollution prevention.

The Arctic Council has actively supported the implementation of the Polar Code and with this goal in mind, has established a special forum, the Arctic Shipping Best Practices Information Forum. This forum is in fact a website with qualified information, but additionally also annual seminars. The aim of the Forum is to raise awareness of the Polar Code's provisions amongst all those involved in or potentially affected by Arctic maritime operations and to facilitate the exchange of information and best practices between the Forum participants on specific shipping topics, including but not limited to hydrography, search and rescue logistics, industry guidelines and ship equipment, systems and structure.

The Arctic Council's PAME has created a publicly accessible web portal with information specific to each chapter of the Polar Code: www.arcticshippingforum.is.

Participation in the forum is open to Arctic States, Permanent Participants and Arctic Council Observers as well as "widely-recognized professional organizations dedicated to improving safe and environmentally sound marine operations in the Arctic, as demonstrated by expertise and experience in Arctic shipping and/or related issues, subject to AC PAME approval". The AEC Maritime Transportation Working Group (MTWG) has been invited to attend these seminars. The MTWG chairman has highlighted the experiences of the AEC shipowner members in implementing the Polar Code in these seminars.



In May 2017, Finland started its two-year chairmanship of the Arctic Council. On February 22nd, 2018 the Finnish Transport Safety Agency and the Arctic Council's PAME jointly organized an international Polar Code conference as part of Finland's Chairmanship programme. At this conference, the Arctic Council member states, seafarers and industry representatives shared their immediate experiences of Polar Code implementation during the first year of its enhancement. The AEC Maritime Transportation Working Group was also invited to share its members' experiences.

Being the first goal-based regulation framework, the Polar Code contains an obvious risk that the various bodies' implementation of the Polar Code is not necessarily in line with each other's. A key objective of this first Polar Code conference was to discuss the challenges associated with implementing the new regulations.

In Arctic waters, where distances are long, search and rescue operations (SAR) in case of emergencies are considered to be a particular challenge. The Polar Code requires ships to have lifesaving equipment that guarantee the survival of evacuated crew members and passengers for five days. However, tests carried out by Norwegian actors indicate that compliance with this provision of the Polar Code is more or less impossible. Inadequate satellite monitoring and forecasting conditions in the Arctic areas was also highlighted as another challenge.

This conference attracted some 130 participants from Arctic Council member states: the USA, Canada, Russia, Norway, Sweden, Iceland, Finland and Denmark, but also from many observer countries, including China, Japan, the United Kingdom, the Netherlands and Germany. Representatives of the European Commission and the Arctic Council Secretariat also attended the conference.

The Chair of the Arctic Council highlighted in his keynote speech the current Arctic Council challenges, stating that "the Arctic Council is wrestling with the general question of how to address maritime issues. At the moment they are dealt with in several Arctic Council Working Groups, from slightly different angles". In his opinion the established Arctic Council Task Force on Arctic Marine Cooperation must dodge some icebergs before it presents the results of its work to the Ministers in 2019.

The AEC's Maritime Transportation Working Group was very glad to hear the Arctic Council Chair remind participants of the 2017 Fairbanks Declaration: "The Arctic Council and its Working Groups would benefit from closer cooperation with the Arctic Economic Council in many areas, including maritime transport and connectivity. This is also the wish expressed by the Ministers when they signed the Fairbanks resolution."

In addition to certain technical regulations, each ship must have a Polar Water Operational Manual (PWOM) which gives further information on its operational capabilities and limitations. Any operational limitations of a ship must also be presented in the Polar Code Certificate.

The Environmental Chapter of the Polar Code sets out stricter environmental regulations than the MARPOL Convention does in other marine areas, for example, concerning the discharge of oil and oily waters and chemicals or their mixtures into the sea. Any such discharges are prohibited in Arctic waters defined in the Polar Code. The discharge of black water, or sewage, and solid waste close to the edge of a glacier or ice sheet is regulated more strictly in the polar waters.

The Environmental Chapter of the Code also contains recommendatory provisions on the use of non-toxic biodegradable lubricants or water-based systems outside the underwater hull, implementation of the Ballast Water Management Convention before its entry into force, and minimization of biofouling in icy conditions.

On the basis of a AEC Maritime Transportation Working Group member survey, most of AEC's primary Arctic maritime operators are already in the process of preparing for the Polar Code documents and certification. Quite a few had let the individual ships' bridge teams take on the task, searching for all the necessary information and in this way establishing a true learning process. The PAME effort with the Polar Code Best Practices Information Forum was therefore considered very welcome. The biggest challenge appeared to be the survival equipment, as not everything required exists. This had raised the fear that interpretations might be different by different authorities.

Worries were also expressed about whether a certificate could serve two operating regions (e.g. Canadian Arctic vs. Russian Arctic) or whether it would be better for a vessel to have two different certifications.

Recommendation:

It is proposed that reporting ice incidents and damage to the authorities by the operators should be made compulsory in the next phase of the Polar Code, to safeguard the continuation of good technological developments for improved Arctic safety.

Potential ban on the use of heavy fuel oil (HFO) in Arctic waters

At the 73rd session of the IMO's Marine Environment Protection Committee (MEPC 73) in 2018, the governments of Finland and Canada with others submitted proposals on a Heavy Fuel Oil (HFO) ban and further environmental regulation of underwater noise. These discussions continued in February 2018 at the 6th meeting of the IMO's Sub-Committee on Pollution Prevention and Response (PPR) and will continue at the MEPC 74 meeting in May 2019. The IMO is conducting a study on the impacts of the proposed ban prior to launching the final regulation.

The original idea at PPR 6 was to have this ban enter into force one year after the sulphur cap, i.e. in 2021, but this will be reconsidered at the next session of the MEPC.

An immediate ban would cause harm to the existing seasonal trades with vessels of opportunity, e.g. to and from Baffin Island. The AEC's Maritime Transportation Working Group is of the opinion that there should be gradual implementation, leaving sufficient time for the industry to prepare e.g. with terminal facilities for temporary storage of the HFO fuels before entering into Arctic waters. The ban would also immediately affect the competitiveness of the extraction of Arctic natural resources compared to exports from sources such as Brazil, Murmansk, Narvik and Kirkenes, which are not within the Polar Code waters. In addition, it would lead to higher costs for deliveries to the indigenous peoples in the Arctic areas. Without the ability to competitively develop the Arctic resources, the Arctic states will not be able to improve their regional economies.

Due to an improved safety culture, oil spills caused by the shipping industry have reduced radically. In areas where active vessel traffic management (VTS) is operated, this development appears to be very clear. The United States and Russian Federation have recently adapted traffic separation schemes in the Bering Strait and initiatives for a VTS system for the Russian Arctic waters have been introduced. The effect of these measures should be taken into consideration in the forthcoming IMO meetings.

While there is much talk of the role of commercial shipping in support of resource and economic development, it is vital to recall the fundamental role played by marine shipping in support of community resupply. Few other regions of the world rely as heavily on marine transport to sustain and enhance development of community life. Reliance on safe and



accessible shipping is inexorably tied to social well-being and regulators must bear this in mind when assessing the potential impact of regulatory development.

Oil spill response capabilities for Arctic waters have been improved considerably in recent years, e.g. by the CCG and ECRC in Canada, NOFI in Norway, Marine Rescue Service MRS (Morspas) in Russia, with investments in major new ice-capable response vessels. Thus, the Arctic states' ability to respond to oil spills is much better than it used to be some years ago when the discussion on the ban emerged.

The entry into force of the IMO 2020 sulphur cap on January 1, 2020 may fundamentally affect the fuel supply situation for the whole global shipping industry. Therefore, the AEC Maritime Transportation Working Group suggests not rushing into a ban, as the fuel types used by ships may alter considerably. The situation should rather be monitored for a while prior to any final regulations.

AEC and International Cooperation

The AEC Maritime Transportation Working Group's target is to have all the premium ship operators included in its work. Many issues at international, regional and national levels require the

attention and cooperative efforts of the operators through the AEC. Therefore the AEC Maritime Transportation Working Group will continue to improve its cooperation with the IMO, World Ocean Council, International Chamber of Shipping (ICS), Oil Companies International Marine Forum (OCIMF), Arctic Regional Hydrographic Commission (ARHC), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and other relevant actors to further improve the shipping industry's safety and environmental performance in Arctic waters.

When one Arctic country intends to introduce new national legislation that may affect mobility, interoperability or the like in the Arctic region, other Arctic countries should be informed. When the Arctic Council or its Working Groups discuss issues that may have an impact on maritime transportation, the AEC should be consulted to provide the industry's view of its consequences on trade and growth.

Recommendation:

The AEC Maritime Transportation Working Group should enhance its cooperation with other international organizations and industry bodies in order to find areas of mutual understanding.

National regulation

UNITED STATES

In the United States' maritime Arctic, there are currently no specifically Arctic rules or regulations for ships sailing in Arctic waters. Ships follow the rules and regulations established in IMO conventions such as SOLAS, MARPOL and STCW. However, this changed on January 1, 2017 when the new IMO Polar Code for ships operating in polar waters came into force. These binding or mandatory rules will apply to the U.S. maritime Arctic north of 60 degrees north in the Bering Sea region.

For 6 months each year (December to May), the Bering Sea region is ice-covered. Nearly all ship traffic operates during the ice-free season, generally June through November, although the Chukchi and Beaufort Seas are partially ice-covered during June and July. The U.S. Coast Guard will implement and enforce the Polar Code in the U.S. maritime Arctic, with a particular emphasis on the Polar Ship Certificate and Polar Operation Manual required in the Code. It is unlikely that the U.S. will have additional Arctic-specific rules beyond the IMO Polar Code.

Within the U.S. maritime Arctic in the offshore lease sites, the regulatory environment has been dynamic and emerging. Shell has experienced changing and unpredictable rules and regulations from the U.S. Department of the Interior (the U.S. federal agency responsible for the lease sites) and ultimately halted their Arctic drilling program in 2015. The U.S. court system addressing lawsuits which were attempting to prevent offshore drilling and challenge the marine safety and environmental protection capacities of leasers and the federal government, has made the regulatory environment unclear at times.

Development projects in Alaska are taking much longer because of this. There is talk of moving toward a system similar to Canada, where a development project is put on a tight schedule for approval, and legal challenges are minimized or eliminated. In addition, there are discussions about increasing the lease periods to compensate for this increased regulatory burden. Overall, the regulatory environment for offshore oil and gas development in Arctic Alaska has not been stable, although a set of predictable rules and regulations are emerging.

There is no consensus in Alaska on what is the best tax regime for oil, gas and mining operations. The state exacted a huge tax increase in 2007 and that tax increase was rolled back in 2014²

There is acknowledgement in Alaska and on the federal side that the rules of the game cannot continue to be changed if the goal is to encourage development. Whether this will ever be the case remains to be seen, primarily because oil, gas and mining development is such a polarizing issue between the need for revenue and jobs vs. the environment.

DENMARK/GREENLAND

In Greenland, there are special Greenlandic requirements when operating in its territorial waters and Exclusive Economic Zone (EEZ), e.g. reporting in accordance with GREENPOS. Also, according to Order no. 1697 of 11th of December 2015 "Order for Greenland on the safe navigation, etc. of ships" it is mandatory for all ships to have at least one person available on board with the necessary local knowledge of the waters to be navigated. In addition, according to Greenland Pilot Act No. 1698 of 11th December 2015, it is mandatory for all passenger ships with more than 250 passengers onboard to use a pilot when sailing within Greenlandic national waters.

Information about pilot services in Greenlandic waters can be found here: <http://gps.gl/>

NORWAY

The High North is Norway's most important foreign policy area. The Norwegian government pursues an ambitious High North policy, giving priority to knowledge-based business development, innovation and entrepreneurial activity. The government is keen to promote the development of knowledge that will provide a basis for future business activity in the High North.

The Oil Directorate of Norway has awarded new operating licences to the international industry in the 23rd and 24th licencing rounds (the latter in 2019) and through the system of Awards in Predefined Areas (APA). The most northern licences so far are for areas close to Bear Island and along the Russian border in the eastern Barents Sea.

The initiative in this context has been to ensure that economic activity is carried out in a responsible manner, through emergency preparedness and environmental efforts. The ambitions for a sustainable development of the region are also reflected in the government's maritime strategy "Blue growth for a green future"³.

One of the follow-up initiatives within maritime strategy is a proposal to open up access to Spitzbergen for Norwegian International Registered (NIS) vessels. In addition, a tailor-made strategy for Spitzbergen has been presented by the government in 2016.

2: For more information about the history of tax in the oil industry in Alaska, please see e.g. <http://www.alaskajournal.com/Alaska-Journal-of-Commerce/July-Issue-2-2014/The-evolution-of-Alaskas-oil-taxes/>

3: "Blue Growth for a Green Future is available at: https://www.regjeringen.no/contentassets/05c0e04689cf4fc895398bf8814ab04c/maritim_strategi_engelsk_trykk.pdf

RUSSIAN FEDERATION

The variety of extreme natural conditions in the Russian Arctic dictate advanced technical requirements for vessels operating in these Arctic waters. However, the human factor is the cause of 80% of all accidents at sea. Therefore, relevant experience and specific skills for operating in Arctic conditions are essential for ensuring safety in Arctic navigation. In this regard, both international and national standards of navigational safety, which are being developed, should reflect the minimum requirements relating not only to the vessels' equipment and technical conditions, but also to the qualifications of their crews.

The Russian Federation has unique experience of Arctic navigation and governing navigation safety in Arctic waters. Russia's state regulatory framework in the Arctic is based on centuries of experience in the regulation of shipping and economic activities. Regular year-round shipping has been regulated since the 1970's in Russian Arctic waters, especially to and from ports west of the Taymyr peninsula in the Ob and Yenisei river estuaries.

Russia's experience was incorporated in the currently effective Rules of Navigation in the Water Area of the Northern Sea Route. The analysis of accident statistics in the area of the Northern Sea Route demonstrates that the above-mentioned rules are successful in ensuring the safety of navigation. The effectiveness of the above-mentioned rules is determined by the fact that in accordance with the United Nations Convention on the Law of the Sea's (UNCLOS) Article 234, the rules contain more strict regulations than the International Code for Ships Operating in Polar Waters and contain more general requirements. According to the Russian view, the Polar Code may be effective in the areas not covered by national rules; however, it cannot substitute national norms, which were developed on the basis of a deep understanding of specific problems in particular coastal areas in the Arctic.

However, both national and international rules should be constantly amended and improved in order to avoid irreversible damage to the Arctic environment. In the Russian opinion, improving the standards of navigation safety and toughening the rules will improve the level of environmental protection and lower the risks of accidents with vessels. In this regard, Russian members support the proposal of the AEC Maritime Transportation Working Group to conduct an analysis of all the norms and rules which are applicable in the Arctic, and to make an evaluation of their effectiveness. Such consultations will enhance the relevance and objectivity of all the newly introduced measures.

Arctic shipping infrastructure should be developed

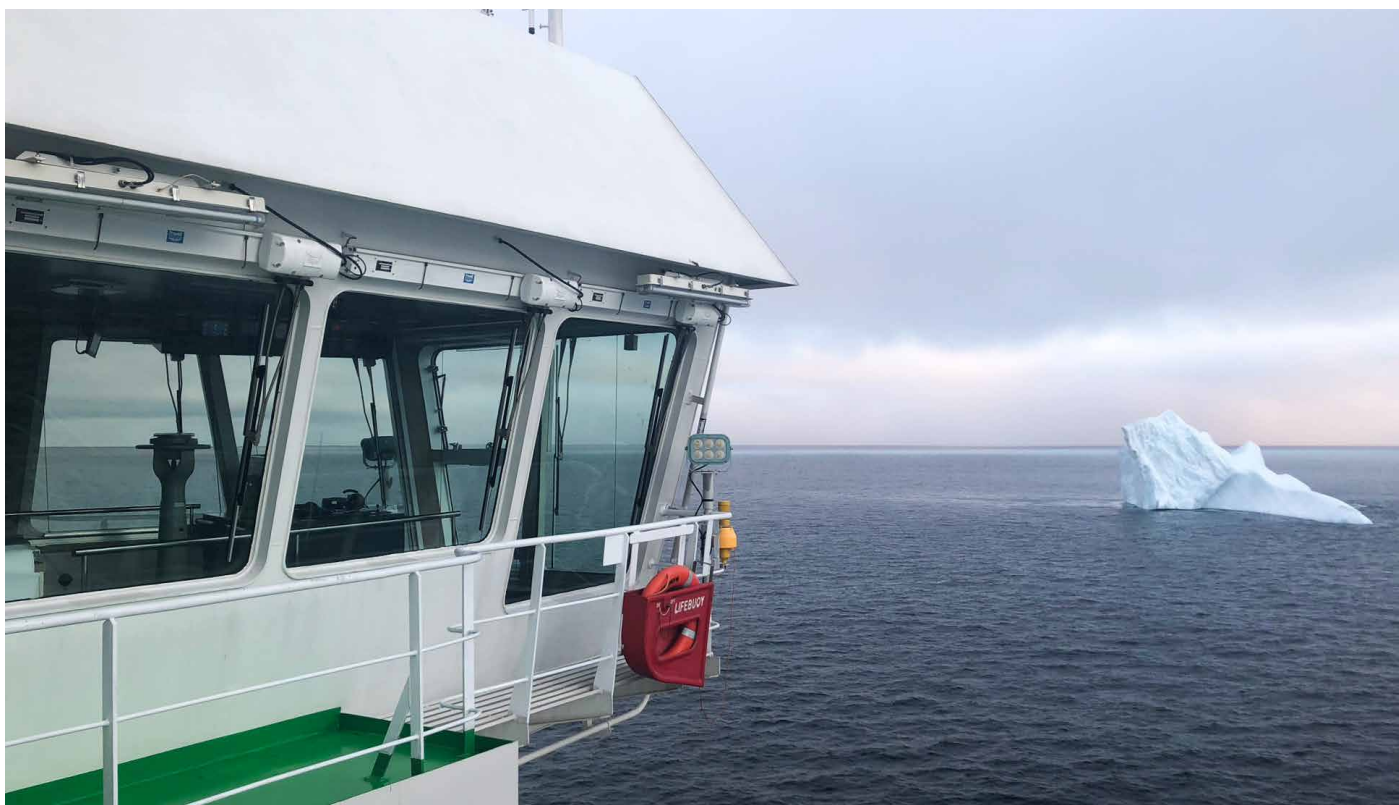
The AEC Maritime Transportation Working Group is of the opinion that more and stronger public-private partnerships are needed for infrastructure developments in the Arctic.

THE UNITED STATES

There is very little marine infrastructure available in the United States maritime Arctic at the moment. For example, search and rescue (SAR) capacity, environmental response capacity, ports, aids to navigation, comprehensive communications, hydrography & charting and non-commercial icebreaking capacity are non-existent or are inadequate. The U.S. National Strategy for the Arctic Region notes this gap in infrastructure and singles out 'Charting the Arctic' as an area for immediate attention and of critical importance. For example, public/federal funding support for the NOAA to conduct expanded hydrographic operations is sorely needed.

However, there does not appear to be new federal funding for a wide spectrum of required infrastructure to support the economic development of the U.S. maritime Arctic and Arctic Alaska. Public-private partnerships (meaning State of Alaska - private partnerships) are needed, but thus far have not evolved. A major study conducted by the U.S. Army Corps of Engineers and the State of Alaska noted that an Arctic port (at Nome in the Bering Strait region) should be built to support natural resource development – both in terms of exports of commodities to global markets and support to the emerging Arctic offshore oil and gas industry.

All such new infrastructure will require large investments. Some will come in the future from the State of Alaska if its financial situation improves, but most will come from private investment. Without natural resource development to provide funding for expensive infrastructure projects such as port development, the region will remain remote and largely inaccessible. Foreign investors from Singapore have recently shown an interest in Arctic Alaska. Many U.S. actors recognize that public-private partnerships are the only model for developing infrastructure in Alaska. Many also understand that there will be minimal investment from federal funding in the decades ahead.



Finally, the federal budget proposal for 2019 includes USD 675 million to start the construction of a series of three polar icebreakers. The winner of the construction tender is expected to be announced before summer 2019.

The Alaska State Legislature has approved legislation encouraging public-private partnerships and is establishing a framework governing how public money could be allocated to projects such as a deep draft Arctic port.⁴

DENMARK/GREENLAND

In Denmark there are talks of possible public-private partnership (PPP) models in order to share the capital expenditures (CAPEX) and operating expenses (OPEX) in improvements of the ICT infrastructure in Greenland. Similar models have been discussed in relation to the design and building of a ship for research and surveillance purposes. The ship could be used as a showcase for Danish maritime technologies.

So far, all infrastructure and new infrastructure projects in Greenland are 100% publicly owned. However, thoughts about bringing public-private partnerships into new major projects in Greenland are brought up from time to time. The potential of public-private partnerships on marine environmental surveillance in the Arctic waters surrounding Greenland is currently being evaluated by the authorities; however, no decision has been made.

NORWAY

In Norway's maritime Arctic, one example of a public-private partnership in the field of search and rescue is the "SARiNOR" project. Initiated by Maritime Forum North (MFN) in 2012, it has received wide recognition throughout the Norwegian search and rescue (SAR) community. It is worth mentioning that the Norwegian Ministry of Foreign Affairs has on numerous occasions expressed satisfaction with the content, format and preliminary results of the project.

Maritime Forum North has initiated the next phase of SARiNOR, SARiNOR 2, which will focus on salvage and preventing environmental pollution in case of accidents at sea in the High North. The project will run over two years, with a budget of NOK 20 (approx. €2) million.

Another example is the joint project by the Centre for High North Logistics (CHNL) and the Institute of Arctic Logistics of Youngsan University in Busan, South-Korea and FSUE Atomflot in Murmansk, Russia. Norwegian partners are the Department of Marine Technology at the Norwegian University of Science & Technology (NTNU), DNV GL's Arctic Operations & Technology, and the Norwegian Shipowners' Association. The project, funded by the Ministry of Foreign Affairs, looked at the "Feasibility and Reliability of Shipping on the Northern Sea Route and Modeling of an Arctic Marine Transportation & Logistics System".

4: <http://www.housemajority.org/2014/01/29/herron-intros-legislation-focusing-on-alaskas-arctic-future/>



The CHNL, having been established by private initiatives, is today an independent institution within Nord University in Bodø, Norway with an external board, but funded from the state budget.

Oil spill response in the northern waters of Norway, as along all the coasts, is provided by NOFO – the Norwegian Clean Seas Association for Operating Companies. It is mostly funded by investors, but also receives some public funding.

THE RUSSIAN FEDERATION

The Russian Arctic has an infrastructure which is adequate for the existing type and volume of activities. It includes primarily nuclear icebreakers, search and rescue capabilities, etc.

However, the growth of the extractive industries and the development of transport require the construction of infrastructure, which will meet the emerging challenges and risks.

A good example of the public-private partnership as a method of development of remote Arctic territories is large-scale investments by the Russian Federation into the LNG production and transportation facilities on the Yamal Peninsula. Oil terminal support icebreakers are typically funded

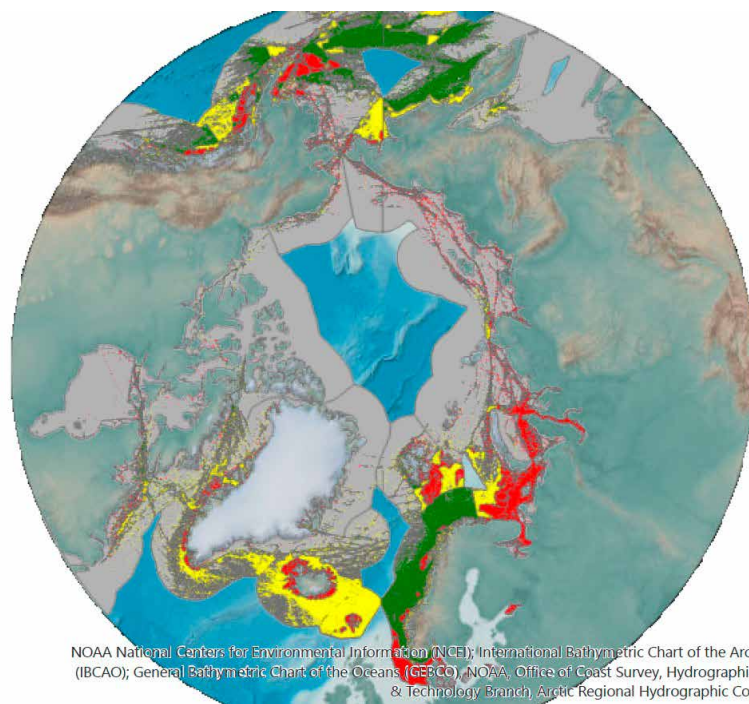
and operated by investors, but the main assistance in the deep seas is provided by the government body Rosatomflot, which today also regulates the whole traffic system along the Northern Sea Route.

Russia's legislation in the sphere of industrial oil and gas projects is also under development.

The Government of the Russian Federation has adopted a special state program aimed at the social and economic development of the Russian Arctic.⁵

The Arctic Region has an enormous energy potential: nearly 22% of the world's oil and gas energy resources are found here. The future development of Arctic oil and gas resources is the likely scenario to support global and regional economic growth. In this context it is obvious that the development of the Arctic is impossible without making large-scale investments in transport infrastructure, and that there will need to be improvements in search and rescue (SAR), navigation capabilities, hydrographic research and ice-breaking capabilities. Thus public-private partnership appears to be the most appropriate mechanism for the effective development of infrastructure in the Arctic.

5: More information is available at: <http://publication.pravo.gov.ru/Document/View/0001201404240039>



Other rules and infrastructure-related regulations, and development needs

There are also other relevant topics relating to the needs and safety of shipping, which have been discussed with the AEC Maritime Transportation Working Group.

International search and rescue (SAR) co-operation has been a key issue in the newly established Arctic Coast Guard Forum (ACGF). Cooperation in the framework of the Arctic Coast Guard Forum, initiated in 2015, has developed quickly. The Search and Rescue Capabilities survey, the Arctic states' Rescue Coordination Center's meeting, the Arctic On-scene Coordinator's course and the initiative on cooperation in the field of Arctic SAR education, can be mentioned as some of the activities that have taken place so far.

Even though the ACGF has only been active for three years, the Arctic Coast Guards have already trained in practical-level SAR cooperation during the Arctic Guardian exercise organized in Iceland in September 2017. The Finnish Chairmanship hosted the second Joint Live Exercise of the ACGF, POLARIS 2019, which took place in Finland in April 2019. This is the first international Coast Guards' SAR exercise to take place in freezing waters. In parallel with the winter exercise in 2019, an Arctic Search and Rescue seminar will be arranged, during

which Arctic stakeholders working in various fields will have the opportunity to present their activities and to develop new partnerships.

The International Hydrographic Organization (IHO) has set up a special Arctic Regional Hydrographic Commission (ARHC) which had its 7th annual meeting in August 2017 in Ilulissat, Greenland and the 8th meeting in Longyearbyen in September 2018. The next meeting is scheduled to take place in Murmansk in September 2019. There is an ongoing general follow-up on possible overlapping and the development of each member countries' mapping is being monitored.

Much work remains to chart Canada's vast Arctic to modern standards. Recognizing the enormity of this task, and the practical limitations of resources, a committee of users, practitioners and regulators meets regularly to discuss exchange information and establish priorities to ensure best use of available resources. Other Arctic states may be advised to establish similar committees or panels.

Individual reports on the situation in the various Arctic countries are available online ⁶.

Good overall materials on this ARHC co-operative work are also available online ⁷.

The above interactive map with various layers can be found on the International Hydrographic Organization's (IHO) website and it indicates the priority areas (in red) and secondary areas (in yellow) for seabed mapping based on reporting by their member governments⁸.

6: Individual reports on the situation in the various AEC member countries are available here: https://www.iho.int/mtg_docs/rhc/ArHC/ARHC7/ArHC7Docs.htm

7: Material of the ARHC co-operative work is available at https://www.iho.int/srv1/index.php?option=com_content&view=article&id=435&Itemid=690&lang=en

8: <https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=2e0f077b8a0147149c8229c9204332d7>

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) arranged a seminar on Arctic Navigation in November 2016. The summary report is available online.⁹

This Arctic seminar issued the following conclusions to the IALA main body:

1. A harmonized approach should be adopted for marking polar routes and providing digital services with common standards of provision, web-based services and other means.
2. IALA-NET is a suitable platform for exchanging and storing historical AIS data for statistical analysis and the use of Risk Management tools.
3. Since connectivity is a primary enabler for development in the Arctic, the limited communication infrastructure continues to be a major challenge.
4. VDES-SAT could provide virtual AtoNs and other e-navigation services in the arctic. The frequency allocation needs to be supported at ITU.
5. A multi-system approach should be developed for resilient PNT, using a mixture of GNSS and terrestrial systems and a multi-system receiver.
6. There is a significant shortage of hydrographic survey data to give a comprehensive set of (simplified) ENC for Arctic voyages. Crowd sourcing of hydrographic data can give a significant contribution.

Establishing stable market conditions and supporting free trade

The Arctic area historically has been considered to be of strategic importance to the Arctic coastal states. For security reasons, access by foreign flag vessels to the territorial waters and economic zone has therefore been limited.

In some of the member states this attitude has been prevailing for all the marine industries, including shipbuilding. This “Jones Act” thinking appears in today’s political climate to be gaining more support as the Russian Federation is implementing laws on local flags for all cabotage or natural resources-based exports.

For the international shipping industry, this is a major challenge as the traditional “freedom of the seas” principle is no longer suitable. So far exemptions for foreign investors have been granted, but the current political climate does not favor international cooperation.

In the long term this will have a negative effect on the interests of the international shipping community in Arctic transports. It will also have a negative effect on the costs of operations. As a rule of thumb, the shipping and shipbuilding costs in such “closed” societies are triple the international market terms today.

This also means that knowledge and experience are not shared as easily as when there is freedom of trade.

There is also clear evidence from technological development in the 1980’s, when competitive solutions were offered by the industry to both Canadian and Russian operations, with many technological innovations being introduced as a result of the competition.

Recommendation:

The AEC supports all efforts to reduce protectionism. Further, the AEC encourages discussions regarding how investments in localized shipping could be supported by the different governments in practice.

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