1. General Information

1.1. Project title

Polar ICE: Implementation, Compliance and Enforcement of the Polar Code in Arctic waters

1.2. Placement within the Fram Centre: Arctic Ocean

1.3. Applicant(s):

Dr. Anne Katrine Normann, Norut (project leader). Research scientist: Piotr Graczyk, Norut. Professor Hans-Kristian Hernes, Faculty of Humanities, Social Science and Education (HSL), UiT The Arctic University of Norway. Professor Tore Henriksen, Faculty of Law, K.J. Jebsen Centre for the Law of the Sea, UiT The Arctic University of Norway. Other partners: Dr. Andreas Raspotnik, High North Center, Nord University. Dr. Ludmila Ivanova, Kola Science Center, Apatity. Professor Alexander Sergunin, St. Petersburg State University. Michael Kingston, Michael Kingston Associates/Special advisor to Arctic Council PAME WG on shipping/Advisor to London Insurance Market on Polar Matters/Organising Committee Member of Arctic Shipping Best Practices Information Forum. Collaborator: HALPIN - Centre for Research & Innovation at NMCI - National Maritime College of Ireland. Andreas Kjøl, Kystverket. Administrative responsible for lead institution: Erling Sandsdalen,
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1.4. Project summary (max. 250 words)

The IMO Polar Code (PC) entered into force in January 2017. It is the first binding international regulation setting out minimum international safety and pollution prevention requirements for ships operating in polar waters. After more than one year of implementation, the involved stakeholders, including flag states' maritime authorities, classification societies and operators discern several challenges for effective and consistent PC implementation. The proposed project will examine the issues related to different interpretations of PC, with focus on goal-based vs. prescriptive requirements, especially in reference to crew training and life-saving appliances (LSA). The objective is to develop a better understanding of differences in PC interpretation and knowledge gaps that are influencing on effective and consistent PC implementation and generate knowledge that will assist in better harmonisation and implementation of PC. Adding the legal perspective to the picture will provide further insight into possible solutions and existing practices. This project will also explore the key venues and measures that can help closing the knowledge gaps and facilitate harmonisation, especially with respect to the interplay between institutions and stakeholders. The project will be organised in three work packages, proceeding from mapping out key differences in interpretations (WP1), through legal analysis (WP2) to a compilation of differences and gaps and possible measures to address them. Through close alignment with the ongoing endeavours to address these issues both at the Arctic Best Practices Information Forum and the Arctic Council's PAME, this project will develop applied solutions for better international collaboration on PC implementation.

1.5. Geographical localization of the fieldwork/work

Arctic Ocean, Arctic coastal states, states with interests in Arctic shipping or hosting relevant shipping industry.

2. Relevance

2.1. Relevance for the Fram Centre and the society in general

Research based knowledge and insights on international, national and industrial efforts to harmonize the implementation of the Polar Code contributes to sound management and stewardship of shipping-related activities in the Arctic Ocean. The project aligns to the national Arctic strategy, which highlights international and institutional cooperation for maritime safety and sustainable development of shipping in the Arctic. Project findings will provide input to Norway's efforts to promote harmonised and effective global implementation of the Polar Code (Norwegian Minis-

tries 2017, 36). Said Arctic strategy pinpoints Norway's responsibility as a coastal state to promote safe and environmentally sound activities in the north. Effective harmonized implementation of the Polar Code is crucial for safe and environmentally friendly Arctic shipping. This makes the project highly relevant not only to shipping stakeholders, but also coastal communities, Arctic indigenous peoples and the wider public that may be affected by ship accidents in the Arctic.

2.2. Relevance and placement in flagship(s)

This project is of relevance for research priority "Management regimes and conditions for international cooperation" in the Flagship Arctic Ocean as one of its key objectives is to follow the implementation of the Polar Code.

2.3. Type of application and relevance to call

The project is a three-year research project of major size, targeting an important, novel and institutionally innovative aspect of the Arctic region maritime governance. It corresponds closely to the research priority "Management regimes and conditions for international cooperation", which is driven by the question to what extent the Polar Code will address the identified challenges and what role various stakeholders, including insurance industry, classification societies and international institutions will play in its implementation (Fram Centre 2016, 9). The processes and behaviour studied in this project will be closely intertwined with questions related to the growth of new industrial activities in the Arctic Ocean and will inform their future expansion northwards and how this can be regulated and governed through international agreements and cooperation (ibid.). Furthermore, this project coincides with the program's sub-goals with regard to the monitoring and understanding of shipping activities in the Arctic Ocean by considering various drivers, assessing the adequacy of international and national management regimes in regulating industrial activities, and contribute to developing solutions for reduced risks stemming from these activities.

3. Scientific part and budget

3.1. Background and status of knowledge

The adoption of the mandatory International Code for Ships Operating in Polar Waters (Polar Code) by the International Maritime Organisation (IMO) in 2014/2015 and its entry into force on 1 January 2017 were important milestones in ensuring safe and sustainable shipping in the Arctic. The need for and the process of development of the mandatory Code have been widely addressed in the literature (see e.g. Brigham 2000, Molenaar 2012, Stokke 2013, Chircop 2014, Brigham 2014, Henriksen 2014, Liu 2016, Jensen 2016) and recommended by the Arctic Council's Arctic Marine Shipping Assessment (Arctic Council 2009). The effective implementation of the Polar Code requires interplay between these actors, with flag states, coastal states, and port states' maritime authorities, classification societies, insurers and operators playing crucial roles. Although the time that has passed since the Code's entry into force is not significant, the experience from, among other 21 ships certified under the Norwegian flag provided for identification of several issues as challenging for implementation. The project team has conducted a pre-study to identify main challenges for implementing the Polcar Code, which included our participation in the Arctic Shipping Best Practices Information Forum (the Forum) in London in May 2018, and at PAME II-2018 meeting in Vladivostok in October 2018. We hosted a Polar Code project workshop in October 2018, which was attended by the Norwegian Maritime Authority, Norwegian Coastal Administration, UiT The Arctic University of Norway, Nord University, St. Petersburg State University, Kola Science Center, SINTEF, Maritimt Forum Nord, London-based maritime insurers and the Forum. The workshop list of attendees is attached. Moreover, we conducted interviews with representatives of the Association of Arctic Expedition Cruise Operators (AECO), DNV GL, Transport Canada, the U.S. NOAA and the Danish Maritime Authority to further deepen our understanding of

the challenging issues in the Polar Code implementation. Additional material and information was gathered from the presentations given at the International Conference on Harmonised Implementation of the Polar Code held in Helsinki in February 2018.

This pre-study indicates that the key challenge for effective Polar Code implementation lays in different interpretations by involved stakeholders and the need for their harmonisation. PAME has already embarked upon initiatives to facilitate an efficient implementation of the Code, including the establishment of the Forum, the Russian/Finnish initiative on a harmonised implementation of the Code, and Norway's proposal to develop an overview of the Arctic States' interpretation of the Code. Our pre-study indicated that the main interpretation issues revolve around goal-based versus prescriptive (functional) requirements and regulations. These refer primarily to relationships between ship category, ice/polar class, ice conditions and POLARIS as a decision support tool, crew training, requirements for life-saving appliances (LSA) and survivability. These issues can, to a large extent, be denominated the *human element* in Polar Code implementation. The human element was addressed at the Forum meeting in May 2018. Two comprehensive survival exercises by SARex Svalbard and SARex2 demonstrated that the PC requirement of survival until rescue for a minimum of five days is hard to comply with. Rescue craft captain's leadership, knowledge and experience are critical factors for success (Solberg et al. 2017, Solberg et al. 2016). Survival equipment meeting the requirements does not exist readily. Crew training is another essential issue where significant discretion has been left to ship owners/operators. An important issue in this connection are also the "one-time goers" to Arctic waters who would may not be willing to invest much in training. The human element is considered to be "probably the biggest challenge for implementing and enforcing the Polar Code" (Bennett 2018).

Different interpretations by maritime authorities give rise to additional legal questions such as different scopes of application of parts adopted through SOLAS and MARPOL (Part I-A / Part II-A), roles of coastal, flag and port states in the implementation, including Port State Control (and two regional MoUs - Tokyo and Paris), use of right of intervention in respect of vessels operating in areas beyond their capabilities, delegation of powers by the flag state to classification societies in certification and coastal states' responsibility to provide necessary infrastructure. Flag state administrations may also set additional or special requirements for ships of their flag (DNV GL 2017).

Access to information and cooperation are key to address these challenges and both the IMO and Arctic Council have an important roles to play. The Forum mitigates the information deficit through its Web Portal with submissions of relevant stakeholders, but gaps still exist. Decision makers must have a common understanding of these rules in order to ensure consistent implementation. In order for operators, flag states, insurers, financial institutions and port state control to understand the requirements, harmonizing interpretations is essential. This includes developing a thorough understanding of the operating environment so that all parties involved have a better understanding of the industry standards and the best information available to ensure best practices are used. Several entities have developed different tools and instruments to support PC implementation. This includes, for instance Lloyd's Register Polar Code interactive tool, the Polar Code Advisory issued by the American Bureau of Shipping (ABS 2016) or the Polar Operational Limit Assessment Risk Indexing System (POLARIS) - a single ice regime system aimed to incorporate best practices and experiences from Canadian and Russian ice regimes. Furthermore, the IMO itself adopted an "interim guidance" (IMO 2016) in order to gain experience in PC application in reference to methodologies for the assessment of operational limitations in ice that should be reviewed four years after the entry into force of the Polar Code in order to make any necessary amendments based on experience gained. Also, some Arctic flag states and port states have issued their guidance on PC interpretation (U.S. Coast Guard 2016, Norway's submission to PAME II-2018). This list is

not exhaustive and the need for additional sector guidelines and instruments suggests that there is still plenty of uncertainty and ambiguity related to PC implementation.

3.2. Objectives/goals/hypotheses of the project

Main objective: This project aims to develop a better understanding of differences in PC interpretation and knowledge gaps that are influencing on effective and consistent implementation of the Polar Code.

Findings obtained in the first project phase aims to close the knowledge gap about different interpretations focusing on the roles of respective actors, relationships between goal-based and prescriptive requirements, and survivability, especially in relation to the "human element" of the PC implementation. We seek to complement the ongoing processes at the Forum, Arctic Council/PAME and IMO through close collaboration with these bodies and our connection to them.

A set of specific **sub-goals** corresponding to respective work packages will guide this study: **(1)** to identify and map out how different flag states interpret specific PC provisions related to goal-based/functional requirements (especially in terms of ice conditions/polar class, crew training and LSA) and how these interpretations are received by other involved stakeholders (classification societies, ship operators, insurers, Port State Control, coastal states) through their own guidelines and approaches; to identify and map out the key knowledge gaps in this regard; **(2)** to analyse the legal aspects, consequences and measures to address these issues, also through a comparative study with other IMO instruments, such as the International Safety Management (ISM) Code and the International Ship & Port Facility Security (ISPS) Code, which also rely heavily on the owner/operator to develop processes that adequately address a specific ship and operation; **(3)** to compile a catalogue of different interpretations (that would directly complement the Norway's PAME proposal), knowledge gaps in stakeholder's understanding of specified PC provisions as well as a list of possible international avenues and measures to address these issues (that could further complement these efforts by the Forum's Web Portal).

3.3. Approaches and methods

The project is organised around three Work Packages (WP) that build one on another to achieve the main objective and accompanying sub-goals. This first stage is limited "human element" challenges of different interpretations. The project will benefit from involvement of relevant stakeholders such as DNV GL, AECO, Hurtigruten, Maritimt Forum Nord, with whom we established good working relationship during the pre-study. At this point, we have a good overview of other relevant stakeholders, of whom some have expressed their willingness to provide information. We expect the sample to be expanded once we start the project. Those we interview will indicate other actors who can provide useful information. We have come into contact with maritime authorities from all Arctic States, with particularly well developed connection to the Norwegian Maritime Authority, Norwegian Coastal Administration and Ministry of Trade, Industry and Fisheries. Our collaborator is also the National Maritime College of Ireland, which is a partner in two large EU-funded projects (including Horizon2020) related to Arctic maritime operations, with focus on innovation safety of operations under extreme conditions. We aim at further exploring the innovative dimension in Polar Code implementation and our partnership with NMCI under this project will facilitate that goal. Through our Russian partners' contacts and networks we ensured a good insight into Russian implementation practices and contact to relevant stakeholders within Russian shipping industry and maritime authorities. The project team represents disciplines such as political science, law, economy, and political geography as well as practitioners in maritime insurance and ice operations and international collaboration on Arctic shipping issues that ensures interdisciplinary and in-depth multi-perspective analysis of the issue.

Working Package 1: In the project's first stage organised within WP1 we will identify and map out different interpretations of the PC provisions in defined areas and the involved stakeholders views on these aspects of the PC implementation. To this end we will utilise primarily the

Forum's Web Portal (www.arcticshippingforum.is) which has submissions from major stakeholders. The submissions has not yet been analysed, and no information on knowledge gaps, ambiguities or divergent interpretations has been compiled. This desk study, which will be carried out in close collaboration with one of the Portal's creators, who is a project team member, will provide data for further analysis. This will be supplemented by semi-structured interviews. The desk study at this stage will also include industrial guidelines, reports and other relevant material on PC implementation. The ongoing interaction with stakeholders will take place through participation in key events such as the PAME I-2019 to be held in Gothenburg in February 2019, Arctic Shipping Forum in Helsinki in April 2019, Arctic Shipping Best Practices Information Forum meeting in May/June 2019 in London, PAME II-2019 (location to be determined). It is also assumed that the participation in the Forum's meeting in London will provide for the opportunity to conduct interviews at the IMO Headquarters (among others, with Dr. Heike Deggim, with whom we have already established contact) and with relevant stakeholders based there, primarily from among insurers, P&I clubs and classification societies, of whom most attend the Forum itself. If there will be no opportunity to do that on one of the above mentioned occasions, we may travel to Oslo (Ministry of Trade, Industry and Fisheries), Haugesund (Norwegian Maritime Authority) and Ålesund (Norwegian Coastal Administration) to conduct necessary interviews. Team members from Russia may also travels to relevant places such as Moscow or Murmansk to conduct interviews with relevant stakeholders. The industry representatives will be approached primarily during the Forum's meeting in London and the Arctic Shipping Forum in Helsinki. These personal contacts will be supplemented by electronic communication over email and teleconferences.

Working Package 2: The WP2 is primarily a desk study based on the results from the WP1. Interviews or material may be also required. Input and feedback from stakeholders will be an ongoing process throughout the project. The team members from WP2 will be also closely involved in activities of the WP1 to explore where is the need for further clarification through interviews, so that the interviews needs are aligned with the indicated meetings calendar. This WP2 will also scrutinise the form of the Polar Code as the first goal based standard adopted by the IMO as a new type of the legal framework consisting of three layers of "goals", prescriptive requirements" and "regulations". The regulations sets out one way of meeting the goals and functional requirements, however other solutions may be applied, as long as it is documented that the goal and the functional requirements are met. This gives all larger freedom, but at the same time, it requires a higher level of knowledge and understanding of the risks to be mitigated and the necessary measures to be applied. The perspectives of maritime authorities and industry on this aspect will be also touched upon in the interviews and analysed. Furthermore, a comparative study of the implementation of other IMO codes such the ISM Code or ISPS Code will supplement the analysis.

Working Package 3: In WP3 the team will compile a catalogue of different interpretations with additional, knowledge gaps in stakeholder's understanding of specified PC provisions and information gaps in the Forum's Web Portal, as well as a list of possible international avenues and measures to address these issues and close the gaps. This will be done primarily as a desk study relying on the results from the two previous WPs, however complemented by additional input from interviews and participation in the mentioned events.

After one year, we will evaluate the project progress, and leave open the possibility to expand the scope to other PC provisions and challenges. There is an inherent dynamic where we assume we will be more conscious of the different actors and issues that may emerge. We will aim at expanding the study to non-Arctic flag-states, which we already identified as one of the challenges for PC implementation.

4. Project plan, project period, leadership, organization and cooperation

A time aspect of three years enables us to follow the complexity of the implementation, compliance and enforcement of the Polar Code; both for new vessels for which the Polar Code was operational with 1 January 2017, and for already existing that must adhere to Polar Code provisions from 1 January 2018.

Team members

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Alexander Sergunin	St. Petersburg State University		WP1, WP2

5. Budget

In attachment.

6. Ethical perspectives / data sharing

We will conduct interviews with various stakeholders in Norway and Russia, and anonymity of interviewees will be secured. We will present the interviewees with written information about the project, with a consent form with the option of withdrawing from participation at any time in the project period. The survey design will follow the requirements set out by the national authorities for information security, and the project proposal will be submitted to the Norwegian Social Science Data Services (NSD) and go through its ethical committe for evaluation and approaval. The project intends to share data with other projects in the Fram Centre, to the extent that it does not interfere with the project's publication possibilities.

7. Education

The participants are affiliated to different education programs at academic institutions. The findings from this project can be a resource for the curriculum of the courses offered, as well as input to Master and PhD theses.

8. Dissemination

The main channel for disseminating project results will be academic publications in international peer-reviewed journals. We aim for a minimum of three publications in scientific journals such as: Ocean Development and International law, Ocean and Coastal Management, and Marine Policy. Other relevant journals are Arctic Review on Law and Politics, Polar Geography, Polar Research, Polar Record, and Journal of Transport Geography.

Outreach activities will be performed primarily as an integral part of the project members' ordinary activities, using our existing network, as well as contacts established early in the project for dissemination. Arenas include Fram Centre arrangements, Arctic policy arenas, and the series of annual Arctic Shipping Forums. To engage a wider audience and foster popular outreach, each scientific publication will be accompanied by a summary describing the research results in a form accessible to the general public. The project team will take steps to generate public debates in Norway and internationally, through online newspapers, research platforms and social media. We aim for publications on two non-scientific platforms directly related to project partners: www.highnorthnews.com. High North News is an independent newspaper published by the High North Center at the Nord University. www.thearcticinstitute.org. The Arctic Institute is a non-profit organization based in Wash-

ington DC. Its newsletter has over 2000 subscribers and its Twitter account is followed by 14000 users.

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