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Deliverable No. 2.6

Minutes of the second transdisciplinary workshop

Submission of Deliverable

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PUBLISHABLE SUMMARY

This transdisciplinary stakeholder workshop to explore research priorities of the maritime industry was held in Hamburg at the SMM–the Shipbuilding, Machinery and Marine Technology trade fair– from 6 to 9 September 2022. Project activities comprised holding conference sessions, discussions with participants at a project exhibition stand, and the distribution of an online questionnaire to determine research needs and priorities. The outcome showed the primary importance of real-time data on key environmental conditions in Polar waters, especially on sea ice, and accurate forecasting of such conditions. Industry representatives expressed a high priority for research to minimise the environmental impacts of polar operations. They were also interested in research to identify policies and frameworks that will ensure safe, sustainable, and just operations, and also to understand the impacts of changing environmental conditions on risk and vulnerability. Industry representatives also gave high priority to research on pollution caused by shipping and related industrial operations, as well as to decreasing anthropogenic noise associated with maritime operations.

1   Introduction

This deliverable comprises the Minutes of the Second Transdisciplinary Workshop, held under Task 2.1, which aims to deliver co-designed input into the prioritisation of Polar research needs and into the development of Polar research actions in WP3, as well as into the process to optimise Polar observing capacities in T6.1. The transdisciplinary workshops are being held to collect input from a variety of shareholders on Polar research needs, including from Polar residents, students, researchers, Indigenous and local communities, businesses, and industry. The maritime industry is an important sector of business and industry in Polar regions particularly comprising commercial shipping activity and cruise tourism. An important event in relation to the maritime industry is the SMM–the Shipbuilding, Machinery and Marine Technology trade fair. This is a biennial international trade fair for the maritime industry, bringing together decision-makers and industry professionals from all sectors. Accordingly, it was considered an event that would present valuable opportunities to interact with representatives of the various components of the maritime industry, to present information about EU-PolarNet 2 and it objectives and to receive feedback on research needs and priorities from the portions of this industry that are operating in Polar waters.

The transdisciplinary workshop held at SMM was a joint activity by the EU Polar Cluster, EU-PolarNet 2, ARICE and Arctic PASSION. The ARICE project has worked to provide Europe with better capacities for marine-based research in the Arctic Ocean by promoting access to and optimal use of the Polar research icebreakers as well as by working with the maritime industry on a 'ships and platforms of opportunity' programme. The Arctic PASSION project is associated with shipping through its Pilot Service on Improving Safety for Shipping in the Polar Seas.

To provide information on the sponsoring projects as well as to interact more directly with interested industry representatives, a project booth was established in one of the conference exhibition halls, 'The Green Transition Hall', that was open to visitors throughout the trade fair. In addition to information and flyers concerning the sponsoring projects, the booth invited visitors to respond to a questionnaire on research interests and priorities that was accessed via a QR code. Thirdly, a ten-minute 'pitch' entitled "Operations in ice-covered waters: how can the maritime industry benefit from cooperation with science?" was made to provide an overview of relevant EU projects and a one-hour session was held to provide more consideration of key relationships between maritime industry activities and scientific research in Polar waters.

2   Main Objectives

The objectives of this Deliverable is to report the activities conducted during SMM maritime industry fair as part of the second transdisciplinary workshop under WP2, Task 2.1 "Collecting input from the stakeholders for Polar research needs and strategies" led by UNIVIE, ICR and AMAP. The aim was to meet with representatives of the maritime industry and gather input from them regarding their research needs as well as inquiring about their interest in cooperation on scientific research and observation activities.

2.1   Collecting input from the maritime industry

This objective was to collect research and innovation needs from the maritime industry as input to the research prioritisation process in WP3. The transdisciplinary workshop reported here was held in association with the SMM–the Shipbuilding, Machinery and Marine Technology trade fair–which is a biennial international trade fair for the maritime industry, bringing together decision-makers and industry professionals from all sectors.

The SMM is a very large event, involving 40 000 visitors, 2 000 exhibitors, 100 countries and 11 exhibition halls. In addition to the exhibits, the SMM features five conferences with about 70 international speakers and a broad programme of topics. It is the largest maritime industry trade fair and is considered to be the most important global maritime industry event of the year. The SMM was held in Hamburg from 6 to 9 September 2022.

EU-PolarNet 2 collected the input in this event in three ways:

1.   An exhibition stand by the EU Polar Cluster;

2.   Two sessions to present the objectives of EU-PolarNet 2 and interact with industry stakeholders;

3.   A questionnaire to identify research interests and needs of the various sectors of the maritime industry.

2.2.1   Exhibition stand

The EU Polar Cluster exhibition stand was located in the SMM Hall A4, the "Green Transition Hall". It featured information including flyers and roll-ups on the EU Polar Cluster projects EU-PolarNet 2, ARICE, NUNATARYUK and Arctic Passion. An important part of the stand was the request to fill in the online questionnaire regarding research priorities of the maritime industry and possibilities for cooperation between the maritime industry and science. For this, QR codes to the questionnaire were provided in addition to the other information. The core team at the stand comprised eight people, representing partners from AWI, UOULU, CNR, AMAP, WOC EUROPE, as well as Grid-Arendal.

The roster ensured that two people would be present at the stand at any one time. The goal was to make new connections with the actors of the maritime industry and invite them to fill out the questionnaire on research prioritization.

The team at the stand met with visitors to explain the objective of the project and share the link to the questionnaire. There were different numbers of visitors each day: Day 1, 30 different people; Day 2: 43 people; Day 3: 21 people; Day 4, the quietest day of the fair, 3 more people. These new contacts were quite slow to fill out the questionnaire, but ultimately a total of 26 responses were received.

2.2.2   Sessions

Two sessions were organized during the SMM:

A ten-minute-long 'pitch' on 7 September on the Green Transition Stage; and

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A one-hour-long stage session on 8 September also on the Green Transition Stage.

The first session was the ten-minute-long 'Pitch' on 7 September at 12:10 on the Green Transition Stage, which was presented by Dr Kirsi Latola (UOULU), representing EU-PolarNet 2. The Pitch was entitled "Operations in ice-covered waters: how can the maritime industry benefit from cooperation with science?" The Pitch was well-attended, with about 30 people present. Dr Latola introduced them to the projects included in European Polar Cluster, the EU-PolarNet2 project and highlighted ARICE as an excellent example of successful collaboration between science and the maritime industry. She noted that ARICE aims to provide Europe with better capacities for marine-based research in the ice-covered Arctic Ocean by better coordinating the existing polar research fleet, offering transnational access to a set of international High Arctic research icebreakers, and collaborating with the maritime industry in a 'programme of ships and platforms of opportunity'.

Dr Kirsi Latola presenting the 'Pitch' on 7 September

With regard to what science can provide to the maritime industry, Dr Latola noted that EU-funded projects in the EU Polar Cluster, such as EU-PolarNet2 and ARICE, are engaged in collaborating with the maritime industry operating in the Polar regions to identify the most pressing research needs for the maritime industry sector, ensure that data collected for navigation purposes is transferred to national and international databases, and facilitate other types of collaborations tailored to the participating industries. She also noted that two research needs identified in the Integrated European Polar Research Programme developed under EU-PolarNet1 are relevant to the maritime industry: informed weather and climate action, with accurate weather and sea-ice data and predictions, and challenges and opportunities for Polar operations, including safety at sea and knowledge about environmental impacts of operations on marine life and coastal communities.

Dr Latola concluded with inviting the attendees to attend the one-hour session the following day, visit the stand and/or connect with the project online. **Link to her presentation**.

The second session was the one-hour-long stage session on September 8th at 13:35 also on the Green Transition Stage. Christine Valentin (WOC-EUROPE) moderated the session. This second stage session was well attended, with 40 people sitting in the audience and ten other people standing at the back, coming and going. The session was filmed and will be uploaded to the **SMM Youtube channel**

The session began with four presentations, followed by questions and discussion.

Dr Nicole Biebow presenting examples of cooperation between science and industry in EU projects

The first presentation was by Dr Nicole Biebow, head of the staff unit for International Cooperation at the Alfred Wegener Institute, EU-PolarNet2 project coordinator, and ARICE (the Arctic Research Icebreaker Consortium). Dr Biebow presented examples of cooperation between industry and science in Polar research, beginning with a questionnaire on co-creating research needs that provided important insights into research needs of stakeholders in relation to topics in Polar regions that should be solved by future research. These responses were brought together with other information in several publications by EU-PolarNet1. Examples of science-industry cooperation include the 'programme of ships and platforms of opportunity' in the Arctic under the ARICE project that expand monitoring and observing capacities. ARICE has also prepared recommendations for the underway collection of data on meteorology and marine conditions that are essential for the provision of safety-related services for ships at sea. The benefits of cooperation on the collection of oceanic and atmospheric data include expanding data series to fill major gaps in understanding. These data will be used to develop better models targeted to operational areas as well as improving weather informatin and the predictability of extreme events, thus reducing risk to ships and platforms. This cooperation also provide opportunities to shape ocean science and policy as well as to participate in the development of new technologies. **Link to her presentation**.

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The next presentation was by Dr Andrew Fleming, remote sensing manager for the British Antarctic Survey, Manager of Polar View activities (sea ice service), and leader of Pilot Service 6 'Improving Safety for Shipping in the Polar Seas' in the Arctic PASSION project. Dr Fleming stated that the aim of this Pilot Service is to reduce the risk of shipping incidents by improving the application of the International Maritime Organization's POLARIS risk assessment system. Improvements will be co-designed and co-developed with the Working Group on Protection of the Marine Environment (PAME), national ice services, shop owners and operators, insurers, etc. This comprises four steps: 1) a historical analysis of shipping risk in the Arctic; 2) current risk information to ships at current position; 3) a forecast of POLARIS risk assessments based on sea-ice forecasts; and 4) onboard delivery, visualisation and evaluation of risk assessments.

Dr Fleming noted that new tools are being developed to improve the safety of shipping in ice-covered waters. He described a new Artificial Intelligence tool, IceNet, which has been developed by the British Antarctic Survey, that can lead to improved early-warning systems for sea ice. IceNet is based on the use of AI techniques to learn how to forecast Arctic sea ice based on satellite data from the past four decades, together with long-term observations of eleven climate variables, results of model runs and other simulations to forecast environmental conditions. An important forum to enhance the safety of maritime operations in ice-covered waters is the International Ice Charting Working Group; this is a working group of the world's national ice services that has been established to promote coordination of operational se ice and iceberg information services and data sharing. It operates a number of task teams to explore in more detail key aspects relevant to safety in ice-covered waters. **Link to his presentation.**

The panel at the second session

The third presentation was by Vladislav Sidorenkov-Duprez, R&D Engineer, and Science Coordinator for the French cruise operator PONANT, who was involved in the construction of Le Commandant

Charcot and all science activities on board. Le Commandant Charcot is a luxury icebreaker that is able to operate polar expedition cruises. It is equipped with two scientific laboratories and berths for four scientists, as well as with a range of measurement equipment for weather, oceanic and ice conditions, etc.

Mr. Sidorenkov-Duprez reported that PONANT is operating four ships in polar waters and one especially, being an icebreaker, is navigating where very few other ships are able to navigate. This scarcity of operation is leading to a scarcity of knowledge (in navigation and in science) in Polar areas. In order to increase this knowledge, PONANT has developed a programme of Ship of Scientific Opportunity: the icebreaker Le Commandant Charcot has been fitted with laboratories and scientific instrumentation to collect data in Polar areas in domains such as glaciology, microbiology and physical oceanography. These data are then shared with research scientists in international databases to improve global models or gain insights on scientific subjects. He stated that this collaboration is also beneficial for the industry: the more availability of scientific knowledge, the more adjustments can be made to operations. For example, the study of sea-ice coverage and thickness leads to route optimization, while knowledge of ecosystems can lead to reducing the ship's impact. Finally, citizen science projects have been developed in order to transform cruise ship passengers into witnesses of the Polar areas, and raise their awareness on the latest scientific discoveries. **Link to his presentation**.

Rob Hindley, Head of Machinery and Structures, Aker Arctic, the company that designed Le Commandant Charcot, stated that Aker Arctic's answer to the question "How can the maritime industry benefit from cooperation with Science?" is "data, data, data." Industry needs for operations in ice-covered waters are focused around the areas of emission reductions and safety of operation. Both of these areas are highlighted as areas where science can contribute to an increased understanding of ship operations in ice and the effect of the hazards that they encounter.

Route optimization, which for Polar ships means in the first instance avoiding ice, can benefit from cooperation with science, in particular relating to how remote sensing technologies can be integrated into vessel route planning tools. Understanding what ice will be in front of the ship also helps the ship operators to evaluate the safety level of the ship, and speed and manoeuvrers can be adjusted accordingly. Remote sensing using satellite imagery can contribute to long-term viability planning and route planning, while near-field sensing contributes to understanding the hazards from ice immediately in front of the ship. In both cases, this is a matter of acquiring (and processing) the right ice data in a timely manner. Ice data can also be used to support the Polar shipping regulatory framework, where operational limitations in ice are required to be set under the IMO's Polar Code. The Polar Code relies on POLARIS (Polar Operational Limit Assessment Risk Indexing System) as a methodology to evaluate the risks to ships operating in an ice regime – reliable and accurate ice data are a key component of ensuring that POLARIS works well. Ensuring that the POLARIS approach is working well in practice (since the Polar Code came into force in 2017) requires benchmarking and feedback from operators. This can be done with full-scale ice trials, but these are expensive and infrequent. Industry must look to using the latest technology to gain the same data, and get the right feedback for safe and efficient operations and this is where science has a collaborative part to play. **Link to his presentation.**

Key points in the discussion of the presentations were:

•   Rob Hindley stated that more data are key to improving navigation safety. Ships need to be used as instruments for monitoring and observation. But a strong dialogue is needed between the International Maritime Organization (IMO) and academia, to help identify industry needs and the needs of academia. Users also need to be trained to be able to use the data appropriately.

•   Vladislav Sidorenkov-Duprez noted that gaining the trust of the scientific community was slow, but it is a crucial step. PONANT had to make their intentions clear in relation to scientific observations. Now they are providing logistical support for an ambitious program with German and Canadian scientists.

•   Nicole Biebow commented that working with the World Ocean Council has been key to connect science with the maritime industry. But these are two different worlds. AWI and PONANT are now working together. AWI had to work on a clear assessment of what this collaboration could be like before accepting it. In terms of research priorities, safety is a key priority, but also pollution! We cannot clean up an oil spill in the Arctic. Noise pollution is also a huge issue.

Pictures from the booth and the events can be found here:

https://photos.app.goo.gl/MjbrEGrazXUekG9Y6

2.2.3   Online questionnaire

The questionnaire aimed to determine the interest of stakeholders in the maritime industry in the results of scientific research and the types of needs that they had for the conduct of research as well as their priorities. The QR code to the questionnaire was available at the EU Polar Cluster stand, and it was promoted by the core team who also visited several other exhibition stands at the fair and distributed the information with QR code. Ultimately, 26 respondents filled in the questionnaire. The full questionnaire, together with the raw data on the results, is attached in the annex.

3   The results from the questionnaire

The key issue the questionnaire was devised to answer was what are the most important research priorities in the maritime industry according to the respondents to the questionnaire. The results showed that:

•   The highest priority, chosen by 41.1% of the respondents, was the need for more research on minimizing the environmental impacts of operations in Polar regions; within this category, 54.4% considered that research on pollution caused by shipping, cruising and industrial operations should be prioritized by the scientific community, while 31.8% considered anthropogenic noise from maritime operations to be the highest research priority.

•   23.5% considered research to identify policies, frameworks and governance to ensure safe, sustainable and just operations as their highest priority; within this category, the priorities for research were fairly evenly spread among research on interoperability and exploitation of distributed data (22.6%), operational demands and the need for regulations covering areas such as design,

construction, etc. (19.1%) and protection status of the regions and limitations of operations related to different types of activities (19.1%), together with several other lower priorities.

• 17.7% considered their highest priority to be the need to understand the impacts of changing environmental conditions and operations on risk and vulnerability; within this priority, 33.3% considered their highest research priority to be broad-scale technological development to ensure that operations in Polar Regions consider the risks associated with changes in polar conditions, 26.7% prioritized the development of appropriate responses in case of accidents to protect life, the environment and community values, while another 26.7% prioritized the development of technologies and institutional mechanisms and operational competences to meet challenges associated with increasing and changing risks and vulnerabilities.

There was only one respondent who chose 'understanding and promoting the concept of social license for polar operations.

Respondents were requested to choose their priority among four suggested recommendations in relation to research relating to maritime operations in Polar regions. This showed that 36.4% of the respondents would recommend the creation of a dedicated and comprehensive framework for coordination and collation of research to strengthen and make available the knowledge base to measure and regulate the footprint of operational activities in the Arctic and Antarctic. In second place, 27.3% recommended more collaboration among academia, Indigenous organizations, communities, governments and industry to enhance technology development, better sustainable economies, and capacity building in Polar regions. The final two recommendations were each chosen by 18.2%, with one covering the development of new technologies and the other the engagement of operators in the collection of ecosystem monitoring data.
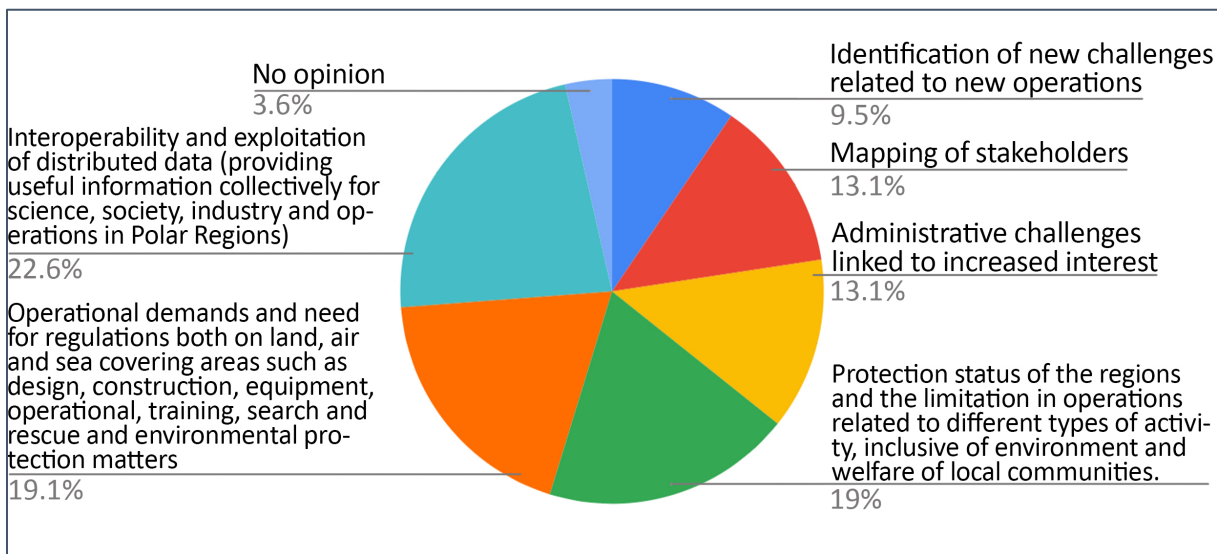
Details of these responses are shown together with the diagrams below.
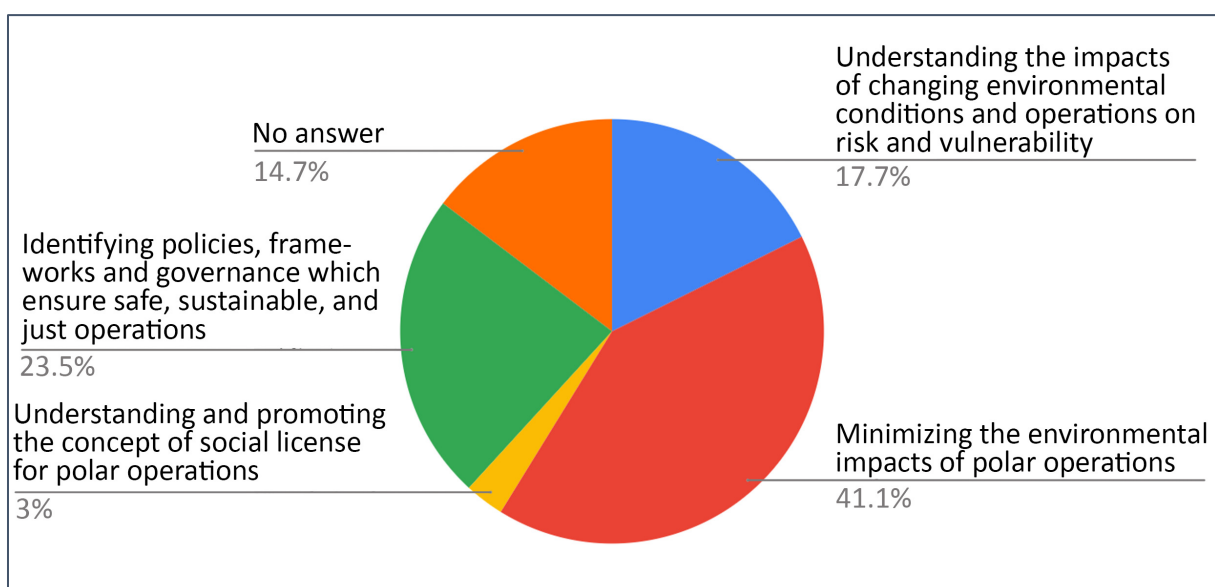
The largest research priorities as defined by respondents from the maritime industry.
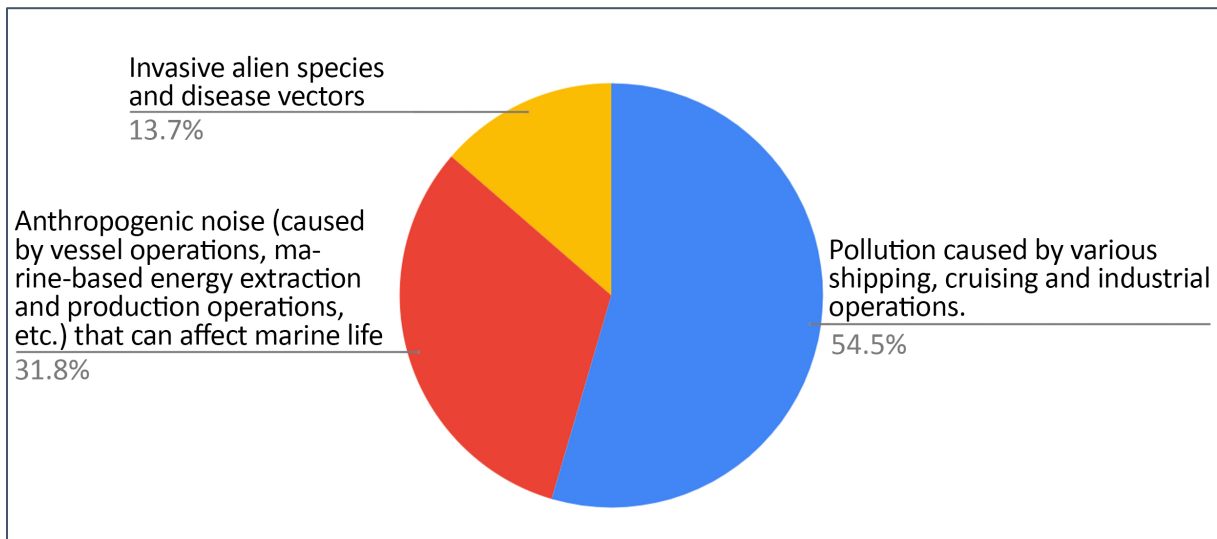
Priority 1: Minimizing the environmental impacts of polar operations: Please select 1 environmental risk that should be prioritized by scientific research.

Priority 2: Identifying policies, frameworks and governance which ensure safe, sustainable, and just operations: Please select 3 aspects that should be prioritized in view of further policy and governance developments.

Promote broad scale technologi-
cal developments to ensure that
existing and new operations in
the Polar Regions are considering
the risks associated with ongoing
changes in polar conditions and
operations.
33.3%

Appreciate how the changing
polar conditions and changing op-
erations impact the type and level
of risk and vulnerability, as well as
what and where these risks and
vulnerability are.
13.3%

Underpin the development of
technologies as well as
institutional mechanisms and
operational competences to meet
the challenges associated with
increasing and changing risks and
vulnerabilities.
26.7%

Develop appropriate responses in
case of accidents to protect life,
the environment and community
values.
26.7%

Priority 3: Understanding the impacts of changing environmental conditions and operations on risk and vulnerability.

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Priority 4: Understanding and promoting the concept of social license for polar operations

Only one answer: 100% for "the complexity of building meaningful and lasting relationships between these groups based on mutual trust".

0% for:

-        increasing expectations on industries from communities and governments,

-        unequal power relations between key stakeholder groups,

-        the challenge of finding a common language and approach among stakeholder groups to achieve deeper, more mutually acceptable ways of coexisting.

Recommendations, by order of priority:

-        36.4% of answers were for: A dedicated and comprehensive framework / platform for coordination and collation of research that will strengthen and make available the knowledge base required for society and governance to measure and regulate the "footprint" of operational activities in the Arctic and Antarctic, and to ensure that new operations take place within a responsible, safe, and sustainable framework.

-        27.2% of answers were for: More collaboration between academia, Indigenous organizations, communities, government, industries to enhance technology developments, new jobs, safer operations, better sustainable economies (transport, fisheries, and industry), and capacity building in Polar Regions.

-        18.2% of answers were for: The deployment of new technologies such as in the form of autonomous platforms carrying sensors, automated distributed sampling hubs, increased use of emerging remote sensing capabilities, supporting not only safe and sustainable polar operations, but a wide range of research needs.

-        18.2% of answers were for: The engagement of operators in the collection of long time-series of ecosystem monitoring data. These should be utilized to their maximum and expanded with greater spatial coverage, engaging operators in using mobile, comparative, and complimentary measurement platforms.

3.1   Conclusions from the questionnaire

The questionnaire was answered primarily by people the "business" world (80.8%), and in smaller numbers (3.8% respectively): research, R&D, classification society, policy makers and maritime education for nautical and technical officers. Their main field of work was to a large extent shipping, followed by shipbuilding, and in much smaller numbers: cruise tourism, fisheries, offshore oil and gas, ports/marinas, digital services, offshore renewables, electronic navigation equipment, supplying equipment, ship equipment, marine carpentry and custom brokerage. Most of the answers were

associated with people who work in sea-ice covered regions, but 34.6% of the participants did not work in these environments.

The participants indicated that, by far, their largest research priority was about minimizing the environmental impacts of operations in the polar regions, with a significant focus on pollution caused by shipping, cruising and industrial operations as a key topic, followed by anthropogenic noise from maritime operations.

The participants' second most important priority focused on identifying policies, frameworks and governance to ensure safe, sustainable and just operations. There, three aspects of these priorities stood out, starting with the interoperability and exploitation of distributed data, followed by operational demands and need for regulations on land, air and at sea, as well as the protection status of the regions and the limitations in operations related to different types of activity, inclusive of the environment and welfare of local communities.

Finally, the third most important priority identified related to understanding the impacts of changing environmental conditions and operations on risk and vulnerability. One key aspect of this priority stands out: the promotion of broad-scale technological developments to ensure that existing and new operations in the Polar Regions are considering the risks associated with ongoing changes in polar conditions and operations. The development of appropriate responses in cases of accidents and the development of technologies as well as institutional mechanisms and operational competences to meet the challenges associated with increasing and changing risks and vulnerabilities were both selected with a lower level of interest.

In terms of recommendations from the marine industry, their highest recommendation is for "A dedicated and comprehensive framework / platform for coordination and collation of research that will strengthen and make available the knowledge base required for society and governance to measure and regulate the 'footprint' of operational activities in the Arctic and Antarctic, and to ensure that new operations take place within a responsible, safe, and sustainable framework". This is closely followed by a recommendation for "More collaboration between academia, Indigenous organizations, communities, government, industries to enhance technology developments, new jobs, safer operations, better sustainable economies (transport, fisheries, and industry), and capacity building in Polar Regions".

4   Research priorities identified in other sessions

There was an opportunity to take part in several conference sessions covering other topics during the trade fair. In a panel session considering new directions in the design of cruise ships in the light of the experiences associated with the Covid-19 pandemic. Much of the discussion focused on what kind of feelings and experiences people want to have from a cruise, particularly in comparison to what it used to be before Covid. The aim is to get people to see the world differently, to experience the world and not just sit in a cabin; this means that there should be attractions onshore and new possibilities for experiences. The design of the ship was also considered: whether a smaller or bigger ship is better, do people want to

have their own space, balconies and peace and quiet or smaller cruises with fewer people on board. There is a need for more spacious public areas and nice cabins so that people can decide if they want to go to public areas or stay in their nice cabin; this requires a totally new way of designing cruise ships. 2023 mission free cruises also requires new planning of cruise ships and companies need to design new ships to be as environmentally friendly as possible with the current technology. In conclusion, Cruise shipping needs to be a forerunner for sustainable shipping, which is also required by customers and the technology has to be designed to match the requirements.

Another session considered collaboration for wider adoption of energy efficiency measures for ships. There is a need for more cooperation in achieving the energy efficiency for reducing operational costs. It was noted by panellists that a lot of cooperation already exists and that there are EU-funded projects addressing this issue. It was generally noted that industry has to be transformed. New technical solutions have to be developed, which can be sold commercially and thus used widely. The use of wind and fuel cells were seen as something for the future. There was a question as to whether wind sales could be a solution for cargo ships, but a wind sails company said that their product would also work for cargo ships. Currently the problem is the price of fuel. However, the currently most discussed topics are fuel cells and wind systems. With large cargo ships, the solution might be a mix of different systems as there is no one solution which works for all.

5 Outlook

This workshop provided an excellent opportunity to interact with key stakeholders in maritime industries, particularly cruise tourism, shipping and ship building, to inform them of the project and its aims and to receive feedback on their needs for and interests in scientific research and data observation activities. The questionnaire has provided a list of priorities of research needs as well as a set of recommendations for future work. The clear interest of some industry participants in working with scientists and serving as a platform for scientific research was shown in the participation and presentation of the PONANT cruise company and one of its ship builders.

6 Appendixes

Appendix 1: Questionnaire results – raw data

Please select the stakeholder category you belong to
26 réponses
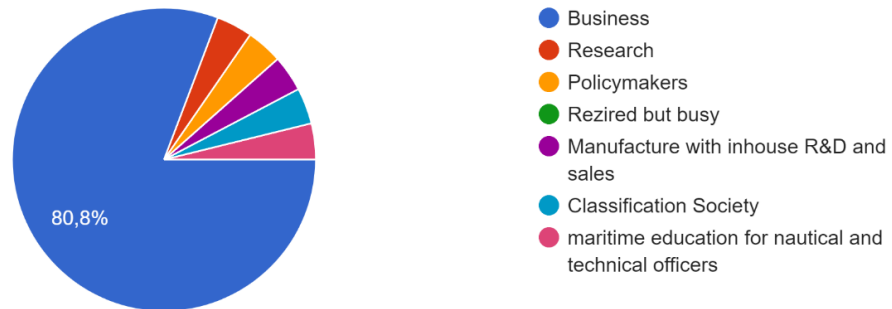
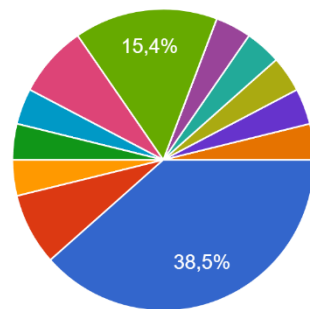80.8%: business
3.8%: Research
3.8%: Manufacturing with R&D
3.8%: Classification Society
3.8%: Policy makers
3.8%: Maritime education for nautical and technical officers
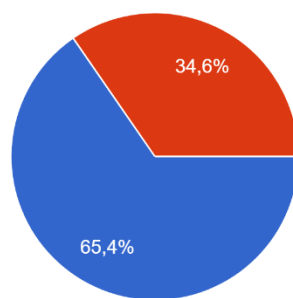
Please select the main field of your work
26 réponses

- Shipping (inclusive of products & servi…
- Cruise
- Fisheries/Mariculture/Aquaculture
- Offshore oil and gas
- Offshore Renewables (Wind, Tidal, Ot…
- Ports/Marinas
- Digital services
- Shipbuilding

▲ 1/2 ▼

38.5%: shipping

15.4%: ship building

7.7%: cruise

7.7%: digital services

3.8%: offshore oil and gas

3.8%: ports/marinas

3.8%: electronic navigation equipment

3.8%: supplying equipment

3.8%: fisheries

3.8%: ship equipment

3.8%: marine carpentry

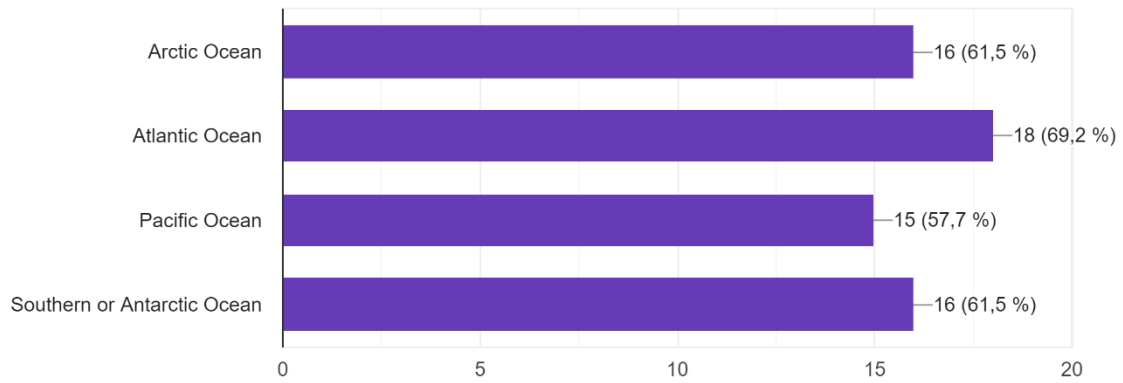3.8%: custom brokerage

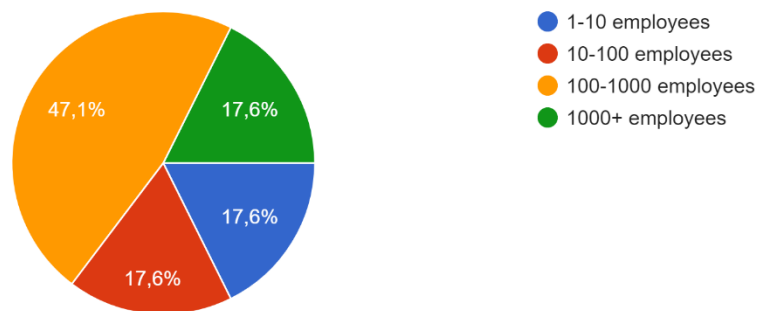## Are you working in sea ice covered regions?
26 réponses

- Yes
- No

In which waters do you operate ?
26 réponses

Ocean	Value
Arctic Ocean	16 (61,5 %)
Atlantic Ocean	18 (69,2 %)
Pacific Ocean	15 (57,7 %)
Southern or Antarctic Ocean	16 (61,5 %)

How large is the organization you work for?
17 réponses

- 1-10 employees — 17,6%
- 10-100 employees — 17,6%
- 100-1000 employees — 47,1%
- 1000+ employees — 17,6%

Are you interested in contributing to European polar research?
17 réponses

- Yes — 88,2%
- No — 11,8%

15/12/2022
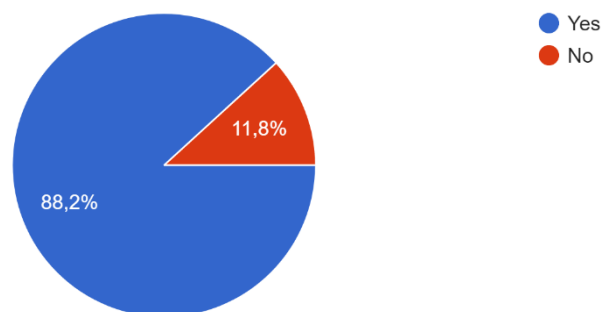
RESEARCH PRIORITIZATION - PART 1 :   Please select the first theme that you think should be prioritized in view of increasing knowledge require...o select a second priority theme as a second step.
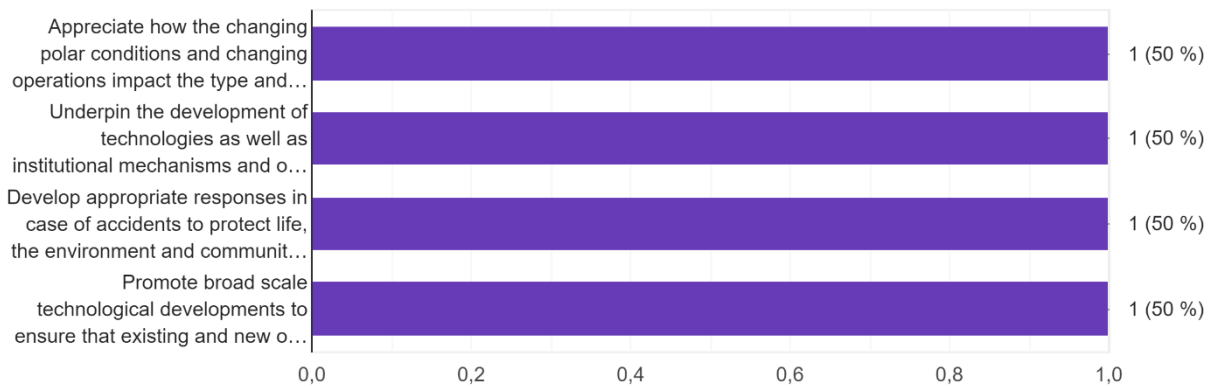17 réponses

- Understanding the impacts of changing environmental conditions and operations on risk and vulnerability
- Minimizing the environmental impacts of polar operations
- Understanding and promoting the concept of social license for polar operations
- Identifying policies, frameworks and governance which ensure safe, sustai…
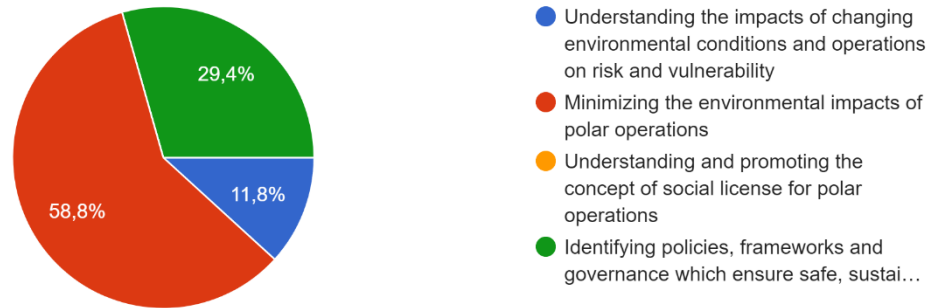
Next question is: Please select 2 key priorities within the theme "understanding the impacts of changing environmental conditions and operations on risk and vulnerability":

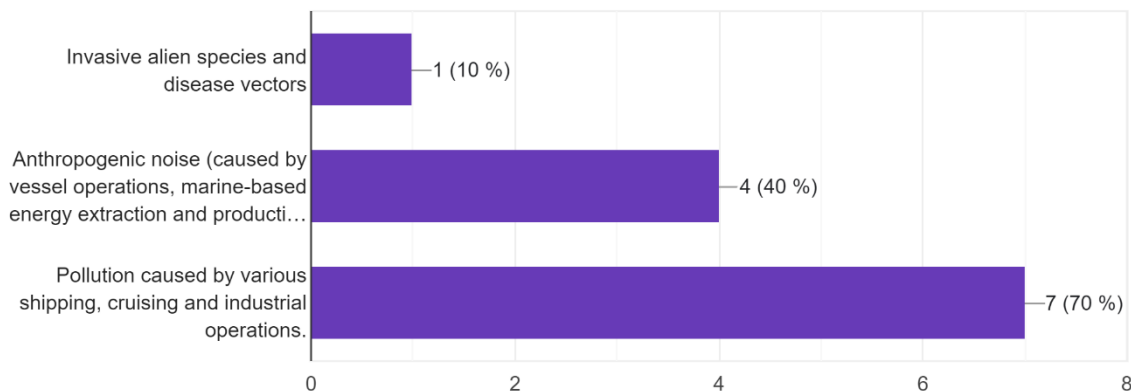Please select 2 key priorities within this research theme:
2 réponses

Next question is within the theme "Minimizing the environmental impacts of polar operations"

Please select 1 environmental risk that should be prioritized by scientific research:

10 réponses

Next question is: Please select 3 key priorities within the theme "Identifying policies, frameworks and governance which ensure safe, sustainable and just operations".

Please select 3 aspects that should be prioritized in view of further policy and governance developments:

5 réponses
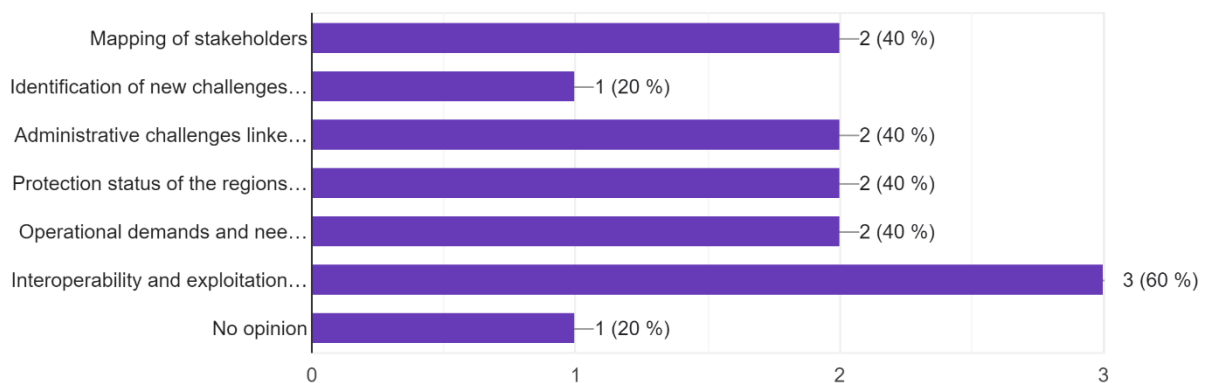
Note: no one selected the theme "Understanding and promoting the concept of social license for polar operations."

RESEARCH PRIORITIZATION - PART 2 :   Please select the second (and last) theme that you think should be prioritized in view of increasing knowled... operations in the Polar Regions in the long-term.

17 réponses
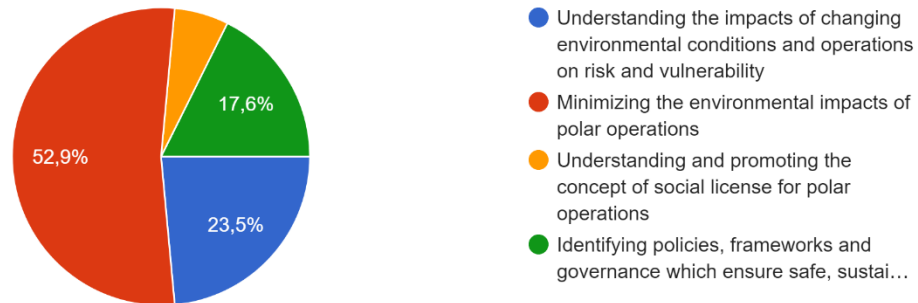
- Understanding the impacts of changing environmental conditions and operations on risk and vulnerability
- Minimizing the environmental impacts of polar operations
- Understanding and promoting the concept of social license for polar operations
- Identifying policies, frameworks and governance which ensure safe, sustai...

Next question is within the theme "Understanding the impacts of changing environmental conditions and operations on risk and vulnerability":

Please select 2 key priorities within this research theme:

4 réponses

Next question is within the theme: Minimizing the environmental impacts of polar operations.

Please select 1 environmental risk that should be prioritized by scientific research:

9 réponses
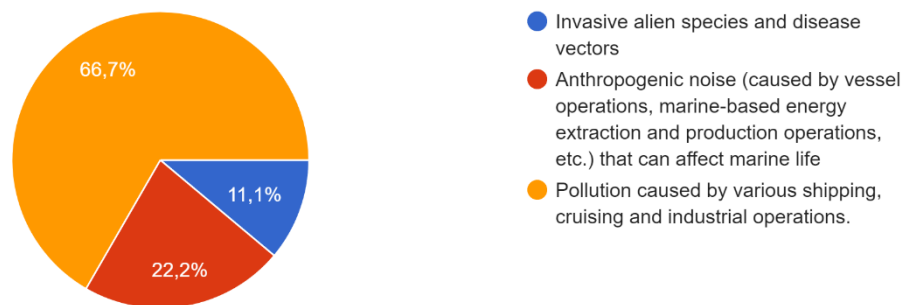
- Invasive alien species and disease vectors
- Anthropogenic noise (caused by vessel operations, marine-based energy extraction and production operations, etc.) that can affect marine life
- Pollution caused by various shipping, cruising and industrial operations.

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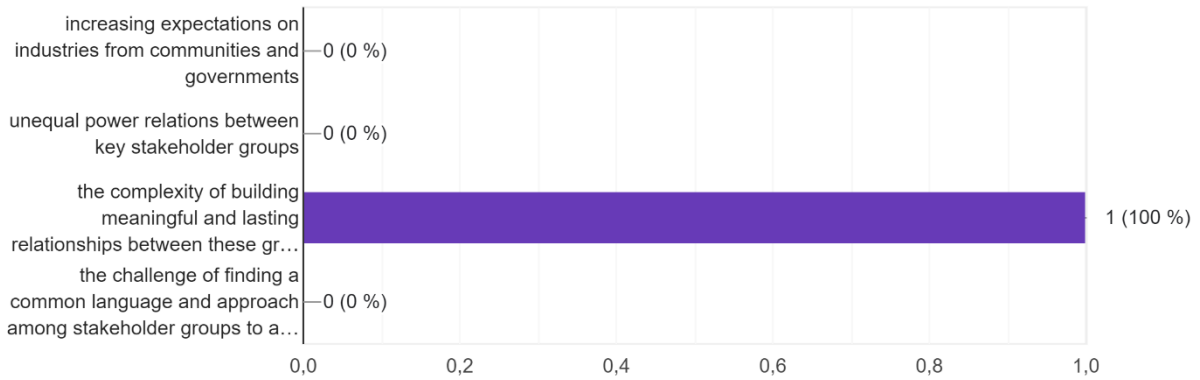Next question is within the theme "understanding and promoting the concept of social license for polar operations":

Please select two key challenges to sustainable development which SLO could contribute to solving:
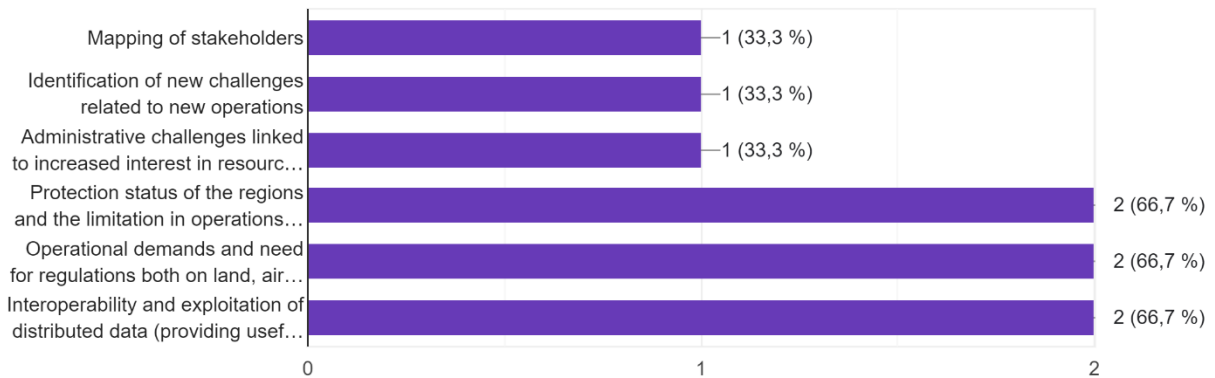
Une réponse

increasing expectations on industries from communities and governments	0 (0 %)
unequal power relations between key stakeholder groups	0 (0 %)
the complexity of building meaningful and lasting relationships between these gr…	1 (100 %)
the challenge of finding a common language and approach among stakeholder groups to a…	0 (0 %)

Next question is within the theme "Identifying policies, frameworks and governance which ensure safe, sustainable and just operations":

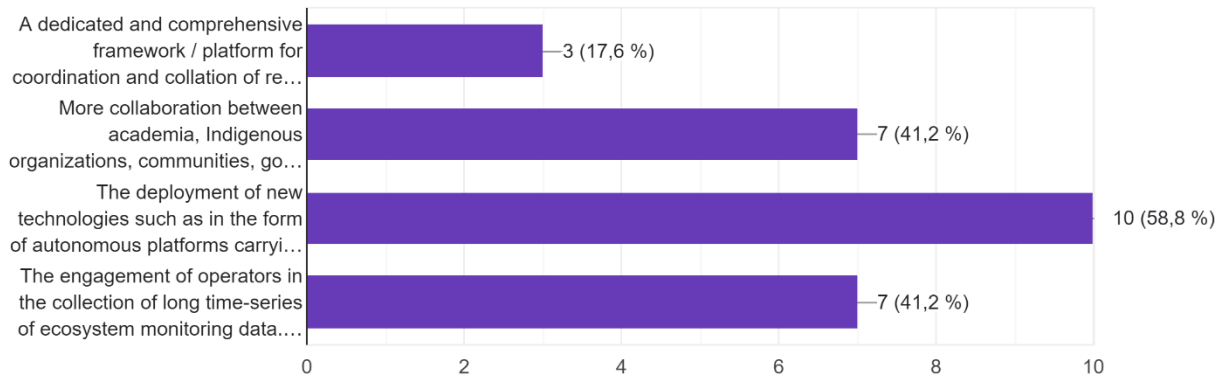Please select 3 aspects that should be prioritized in view of further policy and governance developments:

3 réponses

Mapping of stakeholders	1 (33,3 %)
Identification of new challenges related to new operations	1 (33,3 %)
Administrative challenges linked to increased interest in resourc…	1 (33,3 %)
Protection status of the regions and the limitation in operations…	2 (66,7 %)
Operational demands and need for regulations both on land, air…	2 (66,7 %)
Interoperability and exploitation of distributed data (providing usef…	2 (66,7 %)

Please select at least 1 recommendation that you agree with

17 réponses

A dedicated and comprehensive framework / platform for coordination and collation of re… — 3 (17,6 %)

More collaboration between academia, Indigenous organizations, communities, go… — 7 (41,2 %)

The deployment of new technologies such as in the form of autonomous platforms carryi… — 10 (58,8 %)

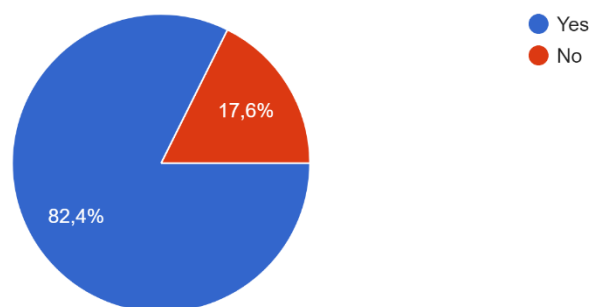The engagement of operators in the collection of long time-series of ecosystem monitoring data.… — 7 (41,2 %)

I give my permission to use my responses in the research prioritization work done by EU Polar Cluster projects
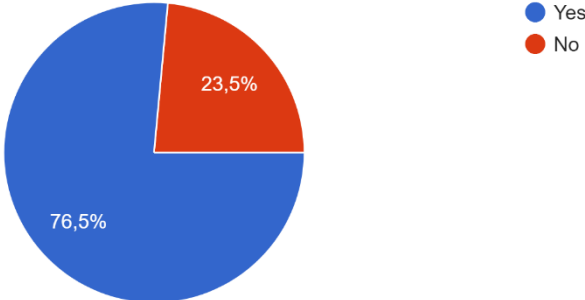
17 réponses

- Yes
- No

100%
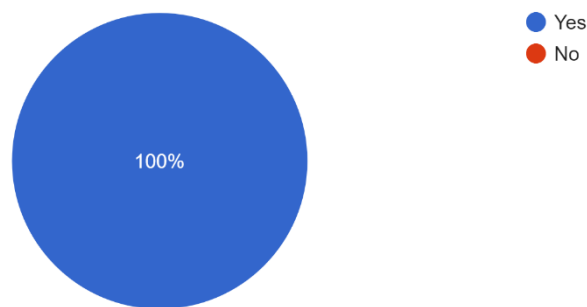
Do you agree to be contacted regarding the results of the questionnaire?

17 réponses

- Yes
- No

17,6%

82,4%

Do you agree to be contacted again if there are any additional questions?
17 réponses

15/12/2022

Appendix 2: Program for the panel discussion

How can the maritime industry benefit from cooperation with science?

World Ocean Council Europe

Moderator:
Christine Valentin,
Executive Director, World Ocean Council Europe

Maritime traffic in the polar regions (and especially in the Arctic Ocean) has expanded rapidly over the last decade, representing both challenges and opportunities for the sector. Several EU-funded projects of the EU-Polar Cluster, such as EU-PolarNet 2 and ARICE, are engaged in collaborating with the maritime industry to ensure safe operations in ice covered waters.

The aim of this panel discussion is to identify the most pressing research needs for the maritime industry sector operating in the polar regions and discuss possibilities for industry - science cooperation.

Vladislav Sidorenkov Duprez,
R&D Engineer and Science Coordinator, PONANT

Rob Hindley,
Head of Machinery and Structures, AKER ARCTIC

Nicole Biebow,
Head of International Cooperation Unit, Alfred Wegener Institute

Andrew Fleming,
Head of Mapping & Geospatial Information Centre, British Antarctic Survey