



## Workshop on International Access to Research Infrastructure in the Arctic

ASSW 2021, March 23, 2021

Organized by FARO, APECS, ARICE, and INTERACT

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## Purpose of the workshop

The purpose of this workshop was to initiate dialogue and develop networks that facilitate access for international scientists to national research facilities and infrastructure in the Arctic (also referred to as “transnational” or “cross-border” access), with the three goals of; identifying challenges, best practices, and possible next steps for improved collaboration.

Physical access to research infrastructure in the Arctic – polar research vessels, stations, and aircraft - is essential for polar science. Knowledge about the availability and services of existing platforms is key to selecting the appropriate research site and experimental design for projects. In practice, this means that operators and managers of these infrastructure need to cultivate a strong communications effort with the scientific community. Communication is also paramount in outlining each platform’s guidelines, which ensures well-prepared and efficient visitors. Facilitating this exchange of information and making space available for access is already challenging at the national level. Adding an international dimension to operations makes it even more demanding, especially since it requires additional funding mechanisms to be in place to implement links between scientists and infrastructure.

These topics will be explored through a series of presentations and interactive break-out sessions to identify major challenges, best practices, and next steps for matching scientists and infrastructure, providing international access, and sharing knowledge. Questions that will be explored include:

- What are the most urgent logistical needs and locations for polar research in the next 10 years?
- What are the scientific and logistical possibilities and challenges for implementing shared international access?
- What mechanisms or exchange modes can be envisaged to coordinate networks of polar research infrastructure (e.g., vessels, stations, aircraft) at an international level? Will these mechanisms provide access to all researchers while continuing to recognize respective research infrastructures as national assets?

**Organizers:** Forum of Arctic Research Operators (FARO), Association of Polar Early Career Scientists (APECS), Arctic Research Icebreaker Consortium (ARICE), International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT)

**Participants:** Users and operators of Arctic infrastructure platforms, including but not limited to EPB, Isaaffik, SIOS, PAG, and others.

**Output:** Workshop report highlighting major challenges, best practices, and next steps/recommendations.

## Minutes

Number of participants and maximum attendance during workshop: 71 persons.

### Welcome

The Chair of FARO, Jennifer Mercer, welcomed all participants to the workshop. This workshop had been in development for almost two years. It was originally planned for the 2020 Arctic Science Summit week in Akureyri but was postponed to 2021 and held virtually due to the global COVID-19 pandemic. The purpose of the workshop is to initiate a dialogue and build a network to facilitate access for international scientists to national research facilities and infrastructure in the Arctic. The outcome will be a report with a review of existing best practices and recommendations for improved access in the future.

All participants were asked to introduce themselves in the chat.

### The Forum of Arctic Research Operators, FARO by Jennifer Mercer

The Forum of Arctic Research Operators (FARO) is a country membership organization formed in 1998 serving as a forum for logistics and operational support for scientific research in the Arctic. FARO currently has 21 member nations, and each nation has a national representative entity. A representative from the national entity serves as the National Point of Contact to FARO (NPOC) and preferably represents a major Arctic operator with a network to other national operators. FARO is operated by an Executive Committee (ExCom) drawn from its membership with an overall Chair of the organization and a FARO secretariat supports the organization. Any country engaged in Arctic research operations is encouraged to join FARO and participate in its activities.

Recent FARO initiatives include:

- Gathering Risk Management information from all international Arctic operators
- Understanding primary Arctic operational challenges by country
- Initiating international dialogue to promote inclusive environments at Arctic field research locations
- Using the networks and resources of NPOC's to facilitate international access to facilities/infrastructure
- Facilitating this workshop on International Access to Research Infrastructure in the Arctic (with INTERACT, ARICE, APECS)

To learn more about FARO, go to <https://faro-arctic.org/> or email the Secretariat at: [faro-arctic@bios.au.dk](mailto:faro-arctic@bios.au.dk)

### The Association of Polar Early Career Scientists, APECS, by Josefine Lenz

APECS is an international and interdisciplinary organization for early career researchers working in the Polar and Alpine Regions and the wider Cryosphere. APECS council has >140 members from 34 countries. Specifically, APECS aims to:

- Create a network of polar researchers across disciplines and national boundaries to meet, share ideas and experiences, and develop new research directions and collaborations
- Provide the opportunity for career development for both traditional and alternative polar and cryosphere professions
- Promote education and outreach as an integral component of polar research and to stimulate future generations of polar researchers
- New APECS Strategic Plan 2021-2025 is available online. The Strategic Plan is a result of discussions among the APECS Leadership (Executive Committee, Council and APECS Directorate), the APECS National Committees, and extensive consultation with the wider APECS membership and polar research community.

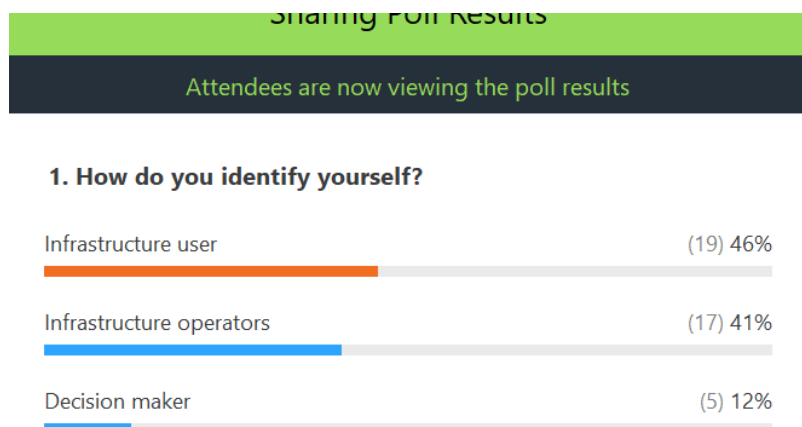
Some activity highlights of APECS includes:

- [Online technical training programme](#) together with ARICE
- MOSAiC School 2019, a 6-week training of the next generation of Arctic system science experts on RV Akademik Fedorov within in the ARICE project
- [Webinars](#) on ARICE supported projects and soft skill training
- Currently working on a [platform of national permits and regulations for fieldwork in the Arctic](#) and a Guide on CO<sub>2</sub> Reduction in Arctic Science together with INTERACT

APECS is currently looking for a new host institution as their hosting agreement with the Alfred Wegener Institute (AWI) ends in January 2022.

## Poll

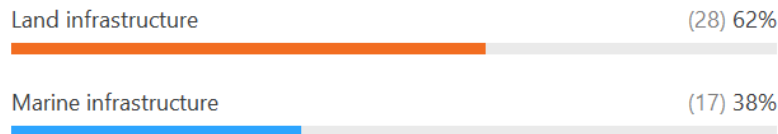
To get an overview of the interest of the participants, a Poll was made – see results below:



## Sharing Poll Results

Attendees are now viewing the poll results

### 1. Are you more interested in



Arctic Science Cooperation Agreement, by Frej Sorento Dichmann, Danish Agency for Science and Higher Education

At the Kiruna Ministerial Meeting (2013), the Ministers decided to establish a “Task Force to work towards an arrangement on improved scientific research cooperation among the eight Arctic States”. The agreement was ratified by all parties and entered into force in May 2018.

The key word for this agreement is “Access” - access to areas, infrastructure, and data.

Areas covered by the agreement:

- Intellectual property and other matters
- Entry and exit of persons, equipment, and material
- Access to research infrastructure and facilities
- Access to research areas
- Access to data
- Education, career development and training opportunities
- Traditional and local knowledge
- Laws, regulations, procedures, and policies

The agreement has resulted in the implementation of a reporting system for citizens of the eight Arctic Council member states. Scientists can report if they experience bottlenecks and barriers to working in other Arctic countries to a specific national point of contact for the implementation of the agreement. There is currently no reporting system for scientists in non-Arctic states, but the Agreement holder is looking into different options, one of these being through existing Arctic research organizations (e.g., IASC who is an observer to the Arctic Council).

The eight parties to the agreement meet once a year and discuss reported barriers and best cases, and information on how they implement the agreement. There is not yet a standardized form for this cooperation but the reporting and collection of information is approached differently by each of the eight Arctic countries. As the chairman of the Arctic Council, Russia will be responsible for hosting the meetings in 2022 and 2023.

For the future work:

- Terms of reference needs to be developed to have procedures on how to have a clear and collective understanding of the agreement, and follow up on the framework
- Need to find out how the agreement interlocks with other Arctic initiatives

**Discussion:**

**Q:** Countries that are not part of the eight Arctic states - are they able to report challenges for access?

**A:** Yes – started discussion with IASC to support some sort of communication. Agreement doesn't legally apply to non-Arctic states. Would like to know when non-Arctic states have trouble with access, to get a sense of where the trouble points are. Interested non-Arctic countries could also be invited to the yearly reporting meetings.

There is an intention to create more clear guidelines. Greenland is responsible for creating guidelines for access within the Kingdom of Denmark and they are aware of the agreement and are working on clarifying guidelines. Canada and the USA have done work to clarify as well. But there is still some work to be done, and both FARO and INTERACT are also working on issues related to the agreement (Permit systems and barriers) - this work will also be valuable to the 8 Arctic countries and the authorities responsible for the implementation of this agreement and the development of future guidelines.

Links to additional information on the agreement:

[Agreement on Enhancing International Arctic Scientific Cooperation — Uddannelses- og Forskningsministeriet \(ufm.dk\)](#) and [Agreement on Enhancing International Arctic Scientific Cooperation \(arctic-council.org\)](#)

List of national points of contact on the IASC website: <https://iasc.info/cooperations/arctic-science-agreement>

[Arctic Research Icebreaker Consortium, ARICE by Veronica Willmott, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research](#)

Arctic Research Icebreaker Consortium (ARICE) has been funded through the European Union Horizon 2020 Framework Programme for Research and Innovation integrating activity for Starting Communities (project number730965). The goal is to provide Europe with better capacities for marine-based research in the ice-covered Arctic Ocean. The consortium, consisting of fifteen partners from thirteen different countries including two North American partners, aims at giving the Arctic science community fully funded access to polar research vessels . ARICE offers scientists access to six polar research vessels and the opportunity to closely collaborate with the maritime industry. The European Commission funds the project, which is coordinated by the German Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), with 6 million Euros. The project ends in 2022.

In the implementation of transnational access to the six vessels ARICE has used a single entry portal with common evaluation procedures.

Through better coordination and sharing of information the project aims to address the following common challenges for international access to national polar research vessels:

- Few dedicated infrastructures
- Very expensive
- High demand – waiting list
- Icebreakers are nationally owned and access is controlled through the national programs -> Limited room for international initiatives.

For ARICE it is especially important to facilitate contribution/participation of scientists from nations that don't own polar research vessels but have strong polar programmes, or whose infrastructures operate in different locations.

### International Network for Terrestrial Research and Monitoring in the Arctic, INTERACT by Morten Rasch

International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT) is an infrastructure project comprised of a circumarctic network of currently 88 terrestrial field stations in northern Europe, Russia, US, Canada, Greenland, Iceland, the Faroe Islands and Scotland as well as northern alpine areas. INTERACT specifically seeks to build pan-Arctic capacity for research and monitoring and offers access to numerous research stations through a Transnational Access Program.

INTERACT has, in collaboration with APECS (Association of Polar Early Career Scientists), made an overview of the most common types of permits needed to conduct science in the Arctic countries. Local and national legislation and international agreements are considered and the document will be shared with the Arctic Council and be available online at the INTERACT website soon.

Virtual access (VA): 29 partners offer VA in INTERACT, via the INTERACT Virtual Access data portal that was launched during ASSW 2021.

The portal can be visited via: <https://dataportal.eu-interact.org/>

INTERACT publications can be found here in PDF: <https://eu-interact.org/publication/>

- and printed copies can be sent upon request.

### Svalbard Integrated Arctic Earth Observing System, SIOS by Inger Jennings

Svalbard Integrated Arctic Earth Observing System (SIOS) is an international partnership of research institutions studying the environment and climate in and around Svalbard. It is an independent organization of 24 institutions from nine different countries. Purpose is to create an observing system for Earth System Science.

The SIOS Knowledge center is the central hub of SIOS and coordinates the services of SIOS:

- Science optimization
- Data management service
- Remote sensing service
- Access and logistics service
- Training programme
- Communication and outreach



SIOS Knowledge center is funded to the end of 2021 by the Research council of Norway.

The Access and Logistics Service are coordinating regular access calls, observation facilities catalogue, logistical activities, and sharing of resources between SIOS members. Annual calls are approved by the General Assembly. The access programme is funded by host contribution and SIOS members. First call was in 2017 with 10 applications and 5 funded. In 2019, there were 29 applications and 9 funded. Less applications in 2020 due to the pandemic. Link to the access to SIOS infrastructure and stories: <https://sios-svalbard.org/RIAccess>

SIOS is also interested in expanding marine infrastructure and will participate in the marine break out session during this workshop.

The research infrastructure in the SIOS access programme can be found in the European Polar Infrastructure Database which is available for use here:

<https://www.europeanpolarboard.org/infrastructure/>

Questions about access: For INTERACT and ARICE the infrastructures are open to all countries outside of your own country. SIOS is not funded by the EU, so there are no restrictions on access.

[European Polar Board, EPB by Miguel Ojeda, Unidad de Tecnología Marina - Centro Mediterráneo de Investigaciones Marinas y Ambientales](#)

Presentation of the Action Group on Infrastructure under the European Polar Board (EPB). The group is represented by 20 countries in Europe, trying to connect the international arena to EPB partners and support international cooperation. EPB is hosting the European Polar Infrastructure Database compiled in collaboration with EU-PolarNet, with data provided by the Council of Managers of National Antarctic Programs (COMNAP), INTERACT, EUROFLEETS2 and SIOS:

<https://www.europeanpolarboard.org/infrastructure/>.

Working towards harmonization of polar infrastructure sharing knowledge. EPB is also hosting the Due South Database, an initiative of the Southern Ocean Observing System (SOOS), built with the assistance of the Australian Antarctic Data Centre, which collates upcoming expeditions to the Southern Ocean. The Due South database shares information on planned voyages and the scientists who will be aboard, as well as field plans, and it is accessible from the EPB website. Maybe in the future a Due North Database will cover science focused on the Northern Hemisphere.

A Workshop “Towards Harmonization of Polar Infrastructure Access” was held in Plovdiv in August 2019, organized with other projects such as INTERACT. The workshop tried to address the needs for improving access to infrastructures: information sharing, advanced planning, harmonization of requirements and other modalities of access.

Main output from this previous workshop addressing Infrastructure access:

1. Improving communication and information sharing between operators – clear definition of information needed by infrastructure managers.

2. Standardized format for information exchange for infrastructure access.
3. Knowledge and understanding of the timetables and timescales used: by the research communities (national, EU funding timetables, timescales of projects) and infrastructure and logistics information and timescales of planning of polar operations.
4. Importance of advanced planning and information availability for infrastructure managers.
5. Development of an online tool to organize infrastructure access and highlight spare capacity that others could use, by developing additional functionality to existing databases of such information.
6. Develop schemes for virtual and remote access to polar infrastructures, both to maximize access to those environments and minimise environmental impacts.

The full work, including all the recommendations that came through from EPBs work on sharing of infrastructure so far are available here: <https://www.europeanpolarboard.org/action-groups/action-group-on-international-cooperation/>

If you would like paper copies of the European Polar Infrastructure Catalogue, you can request them here: <https://form.jotformeu.com/90863175558367>

The PDF version is available here:

<https://www.europeanpolarboard.org/infrastructure/european-polar-infrastructure-catalogue/>

#### [Pacific Arctic Group, PAG](#) by Jacqueline Grebmeier, University of Maryland

The Pacific Arctic Group (PAG) is a group of institutes and individuals with a Pacific perspective on Arctic science. Organized under the International Arctic Science Committee (IASC), the PAG's mission is to serve as a Pacific Arctic regional partnership to plan, coordinate, and collaborate on science activities of mutual interest. PAG shares information on annual field activities in the Pacific Arctic region. PAG continues to develop and implement long-term monitoring activities such as Distributed Biological Observatory (DBO), Pacific Arctic Climate Ecosystem Observatory (PACEO), and research in the Central Arctic Ocean (CAO).

Two annual meetings occur, where the spring meeting takes place during the ASSW. The different upcoming cruises are posted on the website, but many of the cruises in 2021 are pending due to Covid-19. Chief scientists share possibilities across the different platforms when presenting.

PAG put in a request for a cross-platform proposal to IASC, as a pilot programme. The goal is to improve international participation in research cruises in the Arctic by supporting travel and pandemic quarantine costs for early career scientists and /or Indigenous knowledge holders.

Link to PAG Arctic portal: <http://pag.arcticportal.org>

## Report from land-based group

Organised and facilitated by: Elmer Topp-Jørgensen (FARO/INTERACT), Morten Rasch (INTERACT), Marie Frost-Arndal (FARO), Femi Thomas (APECS), and Svenja Holste (APECS).

Participants: Total 21 participants

- Operators: 8
- Scientists: 10
- Others: 3

### Break-out Group Introduction

The scope and plan of the two break out group sessions were introduced to participants before opening a dialogue addressing the two overarching aims of the group discussions:

**Session one** addressed the following main questions:

- Mapping challenges, good practices, and tools for access to arctic terrestrial infrastructures/field sites.
- Identify critical and important challenges to be dealt with in break-out session two.

The guiding questions for **session two** were:

1. How should critical and important challenges be addressed to improve access?
2. How can dialogue continue to continuously capture and resolve challenges?

Both operators and scientists attended the terrestrial breakout sessions articulating their experiences related to barriers to Arctic science. In general, it was a very open discussion, a bit short on feedback and further steps due to limited time.

The identified challenges are presented below in order of priority, combined with related recommendations.

### Challenges and Recommendations

#### Facilitating Cooperation Across Disciplines

##### *The barrier(s):*

A key challenge identified by the group was related to cooperation, knowledge sharing, and establishing synergies across traditional disciplinary “silos” between terrestrial, marine, freshwater, and atmospheric research. A key word in the discussion around best practices and tools was to ensure inter-disciplinarity. Although, there is a fair share of inter-disciplinarity in some projects, many disciplines/actors see themselves confronted with similar challenges. There is a need and benefit to learn from each other and to establish a sharing of information and best practices.

### *Good examples and recommendations:*

Organisations and scientists should work together to break down barriers between disciplines and knowledge systems. Joint events and more cross cutting/inter-disciplinary cooperation/projects are recommended to improve cooperation, knowledge sharing, and establishing synergies.

The present workshop serves as a good starting point for continued dialogue across disciplinary realms.

Participants gave the following recommendations for “What kind of forum could bring people together?”

### Circum-Arctic initiatives

- **IASC/ASSW21:** Participants agreed that the ASSW is a great meeting forum for cutting across disciplinary knowledge barriers. IASC could play a central role in bringing together relevant scientific and logistics organisations as well as major funding units to facilitate sharing of roadmaps and arranging topical workshops to improve collaboration across disciplines and knowledge systems.
- **FARO:** FARO (Forum of Arctic Research Operators - <https://faro-arctic.org/>), as organizer of the workshop, could bridge logistic operators across marine, terrestrial, and atmospheric realms. They also play a key role in linking to the scientific community.
- **INTERACT** (<https://eu-interact.org/>) and **ARICE** (<https://www.arice.eu/>) were highlighted as good examples of logistics platforms offering access to the Arctic for scientists working in different disciplines. However, the funding programmes also have limitations in relation to marine, land, and atmosphere linkages because of their respective disciplinary focus (terrestrial and marine). Another barrier mentioned was that their ‘Transnational Access’ programmes restrict national scientists from getting funding to their own country’s infrastructures. There is an opportunity for working together across disciplinary realms if some of these restrictions could be lifted or if the organisations could provide a common funding pool for projects cutting across research and knowledge realms. It is therefore important that organisations and funding agencies consider new ways and approaches to support excellent inter-disciplinary science.

### Examples of regional initiatives

- **SIOS** (Svalbard Integrated Arctic Earth Observing System - <https://sios-svalbard.org/>) was named as a well-functioning example of a regional initiative for connecting different disciplines of research by using different tools. In particular, facilitating data management and sharing through workshops and trainings (<https://sios-svalbard.org/CoreData>), providing access to research infrastructure (<https://sios-svalbard.org/RIAccess>), and reporting on the State of Environmental Science in Svalbard (SESS) (<https://sios-svalbard.org/SESSreport>) serve as good examples.
- The **Svalbard Science Conference** (<https://forskningradet.pameldingssystem.no/svalbard-science-conference-2>), organised by the Svalbard Science Forum, The Research Council of

Norway, and The Norwegian Polar Institute in cooperation with The Ny-Ålesund Science Managers Committee (NySMAC) invites researchers, research managers, and stakeholders to Oslo on 2-3 November 2021. The conference will focus on achieving excellent science through cooperation; enhance cooperation and quality within Svalbard research, build and strengthen inter-disciplinarity and international networks and consolidate Svalbard as an attractive platform for arctic research.

It was recommended that major science and logistics organisations (e.g. IASC, FARO, etc.) lobby the big funding actors like the EU Commission (Arctic Cluster, Infrastructure and Research Cluster) and possibly also national funding bodies and the Arctic Council to facilitate inter-disciplinary and cross-realm cooperation as key elements in future funding calls.

### Securing a common direction in complex operations

#### *The barrier(s):*

Participants considered it a challenge to move operators and science in the same directions when it comes to addressing societal challenges and scientific agendas. The **synchronization** of the many actors and activities in Arctic research and monitoring is a problem that must be addressed if international research agendas are to be implemented for the entire Arctic (e.g. through the IASC ICARP IV initiative, the Arctic Council, and other regional strategies and organisations). While multiple international Arctic research priority roadmaps such as the Integrated European Polar research Programme, ICARP III, and Sustaining Arctic Observing Networks (SAON), already exist, little is done to secure the implementation of these commonly developed agendas and their harmonization with national priorities, where differences in priorities can mean barriers for research. For example, research funding is often aligned with national science priorities and access and permits regulated through national legislation. There is little or no harmonization of regulations (permits) for the barriers of access addressed in the Arctic science cooperation agreement, and little coordination between national funding systems and only a few initiatives for multi-disciplinary alignment and engagement in Arctic research.

#### *Good examples and recommendations:*

##### Inter-disciplinarity

The **MOSAIC expedition** (Multidisciplinary drifting Observatory for the Study of Arctic Climate - <https://follow.mosaic-expedition.org/>) was highlighted as a great example of a truly international and multi-disciplinary research project. The **SAS** (Synoptic Arctic Survey - <https://synopticarcticsurvey.w.uib.no/>) project was also mentioned as a good example of internationally coordinated efforts to study the marine ecosystems across national boundaries.

More projects focussing in inter-disciplinarity and cooperation across borders is recommended as a way forward and should be central to major funding bodies. A big step forward could simply be to synchronise and coordinate the scientific themes of research funding calls across countries. This requires lobbying among funding bodies/politicians/policy makers to advocate for increased coordination and cooperation between nations as key foci in future funding calls.

### *Implementation of international research agendas*

**ICARP** (<https://icarp.iasc.info/>) is an IASC led initiative seeking to identify common challenges and goals for both science and research infrastructure in the Arctic. Among the participants, little was known in relation to how this is implemented across disciplines and nations, and whether the implementation is monitored by anyone. This could be explored further.

Intergovernmental organisations, such as the Arctic Council and the United Nations' Intergovernmental Panel on Climate Change (IPCC), should seek to push countries in the same direction. Internationally agreed research roadmaps and agendas should serve as inspiration for implementation across the eight Arctic countries focussing both on research infrastructure challenges and science agendas.

Several intergovernmental initiatives in cross-border environmental protection and assessment have led to increased coordination in national research and monitoring efforts, e.g., the IPCC assessments on climate change and the reports from the Arctic Council Working Groups in implementing the goals of the Arctic Environmental Protection Strategy. These are good examples of cross border cooperation and implementation of common agendas in compiling environmental assessments, but better exchange with research and monitoring agendas developed by the scientific community could ensure that more actors move in the same direction to address societal, scientific, and research logistical challenges.

### *Lack of transparent permit systems*

#### *The barrier(s):*

While scientists are responsible for ensuring that they possess all relevant permits, navigating through the 'jungle' of all the different national permit systems appears to be a challenge. So far, no country provides a single-entry point for scientists or a central research coordination platform. Because of changing and complex regulations, many scientists identify this as a bottleneck to their research. Due to the Covid-19 pandemic, cross-border travels have become even more difficult.

#### *Good examples and recommendations*

Access to information and communication of regulations was identified to be key in addressing this issue. Providing easy access to updated information on national permit systems and possibly webinars could serve as important action points for governments and organisations to strive for improved information sharing.

An initiative that could be key to solving this issue is the Arctic Council *Agreement on Enhancing International Arctic Scientific Cooperation* (in force since 23 May 2018) that aims to increase international research collaboration and to support easier movement of researchers, research equipment, and samples across the Arctic region.

Participants recognised benefits of a reporting system where citizens of Arctic nations can report barriers to science cooperation experienced in other Arctic countries. Issues can then be raised

within the framework of the agreement. Participants highlighted the need for finding a solution where non-Arctic citizens can also report their barriers.

The Arctic Council agreement could also provide an overview of national permit systems that are distributed across many different national administrative units and websites. Only Svalbard seems to have a single-entry point for scientists. It is difficult for scientists to navigate and identify all relevant permits needed to conduct science in each Arctic country. Although infrastructure operators can help guide scientists, this remains a significant challenge. Whether the agreement can help solve this issue remains to be seen.

Under the framework of the INTERACT III project the **INTERACT Station Managers' Forum (SMF)** in collaboration with **APECS** have launched a platform of the most common types of permits needed to conduct science in arctic countries. The platform is hosted on the INTERACT website (<https://eu-interact.org/>), and it is the hope that scientists, international research infrastructure organisations, national authorities and Arctic Council members find it useful. INTERACT recognises the need for help from these communities to review the information and provide corrections or recommendations for changes to ensure that the information is up-to-date and remains a valuable resource for scientific, logistical, and governmental purposes.

In Svalbard information and regulations to conduct research can be found on the **SIOS** website.

Although regulations are subject to quick change, efforts should be made to make information available and accessible for scientists in order to help them reach their destination and obtain all relevant permits to comply with national legislation. A single-entry point website for scientists or a specific contact point in each of the Arctic countries could direct potential applicants to the relevant permits needed for a specific study.

Improved cooperation between the scientific and logistics communities and the Arctic Council, concerning implementation of the Arctic Council scientific cooperation agreement, is recommended to communicate challenges and find solutions. It is therefore recommended that IASC and FARO together reach out to the Arctic Council regarding a possible **one-stop shop** for Arctic permit systems. Directly approaching the Arctic Council would open opportunities to articulate challenges and develop solutions.

The Arctic Council Agreement on Enhanced Arctic Science Cooperation could be a key step in providing scientists with an entry point into national permit systems and already provides a mechanism for reporting barriers to transboundary science cooperation.

## Shipping and transport

### *The barrier(s):*

Similar to the permit systems related challenge discussed above, the import and export of samples and equipment has been mentioned as a big hurdle to international and cross-border research activities. Emphasis was laid on the potential of the Agreement on Enhancing International Arctic Scientific Cooperation and its positive effects for the community of scientists and operators,

though it is still unclear how the agreement will be implemented. The big term here was **'science diplomacy'** to break down barriers between countries and strive for sustainable transnational collaborations and free mobility of scientific samples across country borders.

#### *Good practices and recommendations:*

The group agreed that IASC and FARO should initiate communication with the Arctic Council, to elevate the practical challenges discussed by operators and scientists in this workshop into the bigger picture of international science cooperation at a political level.

#### Funding gap between short term and long-term funding

##### *The barrier(s):*

Both operators and scientists identified a funding gap between short and long-term funding (for both science and infrastructure) as another barrier. While International Transnational Access funding programmes are already available for short term funding (INTERACT and ARICE), there is a need to secure funding of long-term research and monitoring targeting societal challenges and international science agendas.

##### *Good practices and recommendations:*

Arctic groups need to promote the importance of long-term Earth observations for understanding ecosystem processes, documenting variability, and trends of key climate and ecosystem variables. The funding gap between short-term and long-term funding should be addressed by international and inter-disciplinary funding programs. International science and logistics organisations could work jointly to lobby among relevant major funding bodies and intergovernmental organisations that may influence national priorities.

SIOS (Svalbard Integrated Observing System) is a model that coordinates international observing systems for long-term measurements in and around Svalbard that could serve as inspiration for further increased cooperation in the road towards Sustaining Arctic Observing Networks. Securing funding for coordination efforts is also key to international collaboration, sharing of best practices, implementation of standards etc., benefitting long-term infrastructure operations and science coordination.

#### Data management and access: Funding, Standardisation/Harmonisation

##### *The barrier(s):*

Standardisation of field methodology and data harmonisation efforts are key to comparing data sets and producing robust science assessments. Several thematic scientific networks develop standard field methodologies or provide recommendations for data harmonisation within specific disciplines. The use of such standards for data collection should be expanded to facilitate robust assessments. Additionally, as methodologies may change over time, standardisation or harmonisation of data across time and between different countries is needed.

Sharing of data is key to maximising the output of scientific endeavours and several organisations work on developing standards for data management and sharing. However, funding for data



management is often not sufficient to ensure proper handling and sharing of data, both at a research station and at research project level.

The key words in this discussion were **standard methodologies/harmonisation, interoperability, and consistency** of metadata for improving its sharing.

#### *Good practices and recommendations:*

In relation to standardisation of data sampling, good examples, where standardized data leads to high standard impact publications, should be communicated to relevant agencies and funding bodies (by, e.g. IASC, scientific networks and infrastructure operator organisations). Here, cataloguing of data, instrumental and lab facilities was also highlighted.

The science community (IASC, scientific networks and infrastructure operators) should also lobby for adequate funding for data management and communicate this issue to relevant authorities and funding bodies.

The EU was mentioned as an important funder also working to ensure proper data management. The INTERACT Virtual Access Programme (<https://dataportal.eu-interact.org/>) developed with EU funding was mentioned as a good example and tool for improved open sharing of data from research stations.

As a classic example to be followed, the World Meteorological Organisation has been able to provide worldwide harmonised data, thus being able to produce reliable weather forecasts. IASC and SCAR were mentioned as organisations that could help to identify areas with insufficient data standards. Seminar participants recommended that a working group could be formed to develop standards, where these are lacking, for example under the auspices of Sustaining Arctic Observing Networks (SAON).

It should also be communicated clearly that scientists should have a plan for how to handle and share data, preferably using the FAIR principles (Findable, Accessible, Interoperable, Reusable), and that funding bodies could make it compulsory to share data and require a data management plan from applicants.

#### Environmental protection legislation

##### *The barrier(s):*

Changing environmental protection legislation may impact long-term data series. While strong environmental protection is in general welcomed, it should not limit or contradict the ability to conduct important research. Scientists in the breakout session identified a need for dialogue and transparency on those issues.

##### *Good practices and recommendations:*

When governments change or develop new priorities it risks influencing invaluable long-term data series important for studying ecosystem functionality and variability over time - data that often have a significant value for the scientific community and often also for the society. Governments

and scientists should therefore openly discuss new priorities and their potential impacts on the science conducted. This should provide an opportunity for scientists, early in the process, to argue for the continuation of their monitoring efforts and explain the importance for science and society. One recommendation was to communicate to the Arctic Council the societal value of specific research activities, encouraging the possibilities of continuing long-term efforts in a way that is compatible with environmental protection aims.

#### How can this dialogue continue to consistently capture and resolve challenges?

- Participants recognised the importance of having a forum to continue the discussions on these topics and raised the importance of ensuring representation of the political level.
- Participants appealed to the larger arctic non-governmental organisations with a focus on research (e.g. IASC and FARO) to bring this dialogue forward and continue to address barriers to arctic science across countries and disciplinary realms.
- Scientific and logistical domains should be brought closer together to break down silos and bridge infrastructure networks for sustainable and multi-disciplinary funding across disciplinary realms. This is an important task for the organisations themselves and funding bodies.
- FARO and IASC play a pivotal role in these efforts and ASSW was highlighted as a very relevant venue for continuing the dialogue.

## Report from marine-based group

Organised and facilitated by: Mats Granskog (ARICE), Arild Sundfjord (ARICE), Stig Flått (ARICE), Franziska Pausch (APECS), plus Kate Ruck (FARO) and Justiina Dahl (ARICE) for notes and report.

To get an overview of the interests of the participants simultaneous online polling with the Slido app was used, see results below:

Participants (total connected: 19/poll answers: 17)

- Ship operators: 24%
- Funding agency: 12%
- Research: 59%
- Other: 24%

### Break-out Group Introduction

The scope and plan of the two breakout group sessions were introduced to participants before opening a dialogue addressing the overarching aims of the group discussion. The interactive polling tool Slido was introduced, where the participants could submit their answers in real time through either their smartphone or PC.

**Session one** had the following main goals:

- Mapping existing practices with transnational access (TNA) on polar research vessels (PRVs) through the participants' experiences with TNA to PRVs in the Arctic.
- Identifying the main challenges/obstacles of joint (transnational) scientific cruises in the Arctic

The aims for **session two** were:

- To identify the major challenge(s) for TNA in the Arctic Ocean from perspectives of operators and scientists.
- To discuss possible solutions.

The breakout session began with a presentation by Anja Sommerfeld (AWI) about MOSAiC as an example of TNA to a PRV in the Arctic. This example was chosen since MOSAiC was a science driven expedition but had to have large multinational financial and logistical support to be executed and could only be realized with a very long planning horizon.

Scientists from nations operating PRVs face different challenges in accessing PRVs than scientists from nations that do not operate PRVs (ARICE Deliverables 1.2 - [Guidelines on the conditions to access European PRVs](#) and 1.6 - [Modalities of European PRVs' ship time collaborations and exchanges](#)).

To make sure that both perspectives were covered by the participants in the workshop, some additional polling was done with Slido after the presentation about the MOSAiC expedition. The polling confirmed that the breakout group included participants both from countries with and

without national PRVs and that the majority came from Arctic Council member states (Annex 1, p.4).

Equal percentages of participants had experience in participating in or facilitating TNA to PRVs as scientists or as operators, while less than a fifth had no experience with TNA (Annex 1, p.4). Even though most of the participants identified their primary role as research, the discussions were dominated by operative and funding perspectives.

#### Existing practices of TNA to PRVs

Participant experiences of TNA to PRVs ranged from low-level personal (scientist to scientist) collaboration to high-level contractual bi- and multilateral access. One respondent to the question in Slido from the United States highlighted how they had used “a variety of methods to establish a framework for funding based on bilateral agreements, for example, involving a government to government or a government to institution memorandum of understanding or cost sharing understanding, or other frameworks including institution to institution or contractor to vendor types of funding arrangements.” (Annex 1, p. 7) It was also mentioned that “personal contacts among operators and funding agencies are important, as well as scientist to scientist relationships.” (Ibid.)

Another participant emphasised the contrast between different types of access. Joining a pre-planned cruise was perceived as much easier than being in a leadership position on a cruise or being able to influence the cruise track. (Annex 1, pp. 7-8.)

Many experiences with TNA that were reported during the breakout session seemed to have been based on either bilateral contracts, personal/informal contacts between researchers, or larger projects such as EUROFLEETS and ARICE. If not part of an international project the funding was reported to come from national funds, which often covered travel and movement of the research equipment to and from the PRV, but not the cost of the berth (Annex 1, pp. 7-9).

The countries that were mentioned as having participated in offering TNA on PRVs amongst the participants were: United States, Germany, Canada, Denmark, Norway, Sweden, and Russia. One established form of international cooperation that allowed for regular discussion of ship opportunities was the Pacific Arctic Group.

It was noted that what the countries that perform best in Arctic science have in common is that they have engaged in long term research-planning that includes investment into research platforms and infrastructures. Because of the high purchase and operating costs of PRVs, committing to purchasing one is for example a sign of investment for the next two to three decades to come.

#### Major challenges of TNA to PRVs in the Arctic

The primary challenges and obstacles for TNA on PRVs mentioned by the participants were:

- Lack of sustained funding and suitable funding mechanisms to support TNA to PRVs.
- Lack of coordination, planning tools and information between countries.
- Diverse planning horizons for individual vessels and the long lead time needed for an Arctic expedition on any vessel.
- Capacity and availability of vessels.

It was discussed that national priorities often outweigh the provision of TNA and that even bilateral agreements are challenging to establish and maintain in the long run. This is reflected both in the lack of unified planning or information sharing tools amongst PRV operators and funding. In the words of one of the participants: “For some nations the ships are funded (and fully booked) and there is "only" a negotiation of how to distribute across national projects. While others have limited funds and/or no national access “ (Annex 1, p. 12).

National prioritization does not lead to more efficient use of PRVs. In a previous workshop that ARICE organized with European Research Vessel Operators (ERVO) this lack of coordination was reported to lead to duplication of efforts, not optimal use of vessels, and limitations in the temporal and geographical scope of research (<https://www.ervo-group.eu/np4/np4/44.html>).

Other obstacles that were listed in the discussion included: lack of incentives for operators to facilitate international berth sharing, integration of individual projects or work packages into the overall scientific programme of a cruise, lack of time to make arrangement for funding, logistics, language (especially for Russian cruises), transportation of samples, and permits (Annex 1, pp. 10-13).

With reference to the question of which party is the leading force in enabling TNA, two different lines of thought were discussed: “Science needs to lead the way, funding agencies will follow” vs. “Once the vessel is available science will come”. Both arguments had supporting examples (e.g. “when Germany provided Polarstern for MOSAiC, science flourished”), but it was a highlight from both sides that the availability of vessels is a key point. Different time scales were also identified as a crucial aspect for TNA to PRVs. It was mentioned that “funding agencies don’t want to commit to long term planning” and that Arctic science “should compete with other excellent science”. In addition, planning a long time in the future reduces the flexibility for ad-hoc projects.

One of the participants with a background in research funding highlighted that a major challenge was not finding resources to fund research, but sustaining the research infrastructure and guaranteeing access to it.

### Suggestions

The suggestions for overcoming the challenges focused on the establishment of mechanisms that would allow for:

- Truly joint planning (not just participation but also impact on route and Scope of Work)
- Funding and allocation of (international) ship time

- Joint funding calls for research by multiple national research funders
- Harmonization of planning schemes and timing of calls across PRVs
- More widespread use of remote access to vessels (which would increase the scientific value of cruises at low additional cost)

One concrete suggestion would be that PRV operators start to publish multi-year cruise plans - even if that meant that some of the plans were not yet fully funded (or fully confirmed). An existing example of this kind of information sharing is the “Tentative timetable for IB Oden” published by the Swedish Polar Research Secretariat (<https://www.polar.se/en/expeditions/timetable-for-expeditions/>).

Other suggestions for reaching the above-mentioned goals included (Annex 1, pp. 14-16):

- “An agreement on accepting each other’s proposal evaluation system on an international level could make the possibility of international third-party funding much more easy to implement”
- “Once a platform is supported nationally, with open berths, you can build international opportunities to address common science questions”
- Establishment of a funding system similar to the International Ocean Discovery Program (IODP) for PRV based research in the High Arctic
- Increased “science diplomacy by utilizing platforms like ASM to bring forward a scientific agenda”
- “Bringing national agencies together to discuss”

Science discussions need to be followed by proposals that can be peer reviewed and recommended for award. Once this happens, then vessel discussions can be implemented (Annex 1, pp. 14-16).

- “An international funder agreement to support national science toward common, high priority international science questions”
- “Two types of transnational calls could be considered - long-term, detailed scientific collaboration and more opportunistic offers of spare berths on already planned cruises available at short(er) notice”

The ongoing cooperation with IASC including the ongoing IARPC IV planning was highlighted as one possible platform for taking concrete steps towards more sustained TNA access and coordination: “Those IASC countries that want to, can commit multi-year funding to get time and berths on icebreakers. Such a mechanism would allow both smaller parties to join planned cruises but also larger joint projects with participants from several countries. Of course based on scientific excellence. And if there are no good proposals coming from groups in a given country in a given year, that country's funding is not used.” (Annex 1, pp. 14-15)

The participants highlighted that both the international scientific and science policy community had already started to take steps towards common prioritization of topics that could work as a basis for starting the higher-level negotiations necessary for the establishment of the

aforementioned tools. One of the recent activities that was highlighted in discussion was the United Nations Ocean Decade (<https://www.oceandecade.org/>) and its regional plan for the Arctic Ocean (<https://www.oceandecade.dk/>). A question was raised about how to connect this regional planning to the new framework programme Horizon Europe and associated initiatives such as Mission Starfish Europe 2030 ([https://ec.europa.eu/info/publications/mission-starfish-2030-restore-our-ocean-and-waters\\_en](https://ec.europa.eu/info/publications/mission-starfish-2030-restore-our-ocean-and-waters_en)).

One of the participants with a background in research funding noted that instead of focusing on existing funding streams it might be most beneficial to aim to access new funding streams. This will be a longer process that will require a lot of coordination between different national funding horizons. In the United States, for example, a funding agency must put in a budget request three years in advance before they can access the money. As such it is recommended to have at least two levels of planning towards the aforementioned goals: one for existing funds which with the community could carry out smaller efforts and then targeting the longer-term funding to larger joint proposals, such as joint cruises like the MOSAiC campaign. To achieve something like this the operators of vessels need to come up with a frame of reference on how much a berth on-board a vessel costs in different conditions and geographical regions. Even though this varies, the funders cannot work with hypothetical berths. They need a budgetary frame. The decision-makers will also need concrete suggestions for different models of joint-funding.

The complete set of Slido questions with poll results are available as an Annex at the end of the minutes.

## Plenum

The last plenum discussion was about finding cross cutting themes that came out of the two breakout sessions and developing recommendations and next steps.

From the input from the two breakout groups, some differences and similarities were found between the land based and marine based infrastructure:

### Differences:

1. Operational costs and national priorities between the two types of infrastructure are different.
2. Very different planning horizons exist between the two types of infrastructure.
3. INTERACT has a good data information sharing platform, while ship-based information is passed on a more personal level. The future plans for ships are not always openly shared or communicated, while operations of land-based stations are well established with the community.

### Similarities:

1. Some needs are beyond the scope of what individual organisations can do, and appeals need to be made to higher organizing bodies.
2. Gaps in funding between short- and long-term projects and for coordination.
3. Permit information needs to be collated in one place for easy reference.
4. Data management, sampling, standardization.
5. Breaking down silos between different disciplines.

### Additional Discussion:

One of the benefits of the MOSAIC funding model was that transnational access was organized based on a cost per berth, per day. This model has also historically been used by the Ocean Facilities Exchange Group (OFEG). It may serve as a flexible model for organizing transnational access on future joint research cruises. The research funders highlighted that having a known cost for berths on vessels is a prerequisite for their planning.

ARICE participants noted that the previous ARICE Deliverable 1.5 ([https://arice.eu/images/Intranet/deliverables/ARICE\\_D1\\_5\\_Report\\_on\\_investments.pdf](https://arice.eu/images/Intranet/deliverables/ARICE_D1_5_Report_on_investments.pdf)) includes a rough estimate of the six ARICE transnational access vessels costs. However, due to the variation in operating costs from year to year dependent e.g. on weather and ice conditions, cost of petrol, geographic location and the status of onboard sampling equipment, vessel operators do not normally make this type of information public. In general, it is very difficult to decide what the price will be for ships, and a lot of that uncertainty is related to the fluctuations in fuel prices. The high operating costs of PRVs in comparison to research vessels that operate in ice-free areas provide an additional challenge in deciding the cost of berths in advance.

Another important point is the status and sustainability of the two transnational infrastructure networks presented in the workshop. ARICE is a new (starting community) project while INTERACT (advanced community) has been running for multiple years.

Q: What is the plan when INTERACT EU funding ends?

A: There is a need to secure long-term funding for research and infrastructure operations and coordination. INTERACT now operates on an EU grant but is preparing for the future by making a



non-profit association where INTERACT activities could continue with funding from one or more donors/funding agencies. Should EU funding cease, the activities will need to be aligned with the funding that can be secured from other sources. INTERACT also find it important to bridge across different infrastructure networks to improve coordination and achieve better integration between realms.

#### Next steps and recommendations:

- Condensing requests/recommendations that cannot be executed by the individual groups and appealing to higher organizational bodies for movement forward. Through funding strategies, science diplomacy and setting priorities.
- Cross cutting meetings to bring groups together should continue in the future – and ASSW is the ideal place for this. Arrange a meeting every year where marine and terrestrial groups are represented.
- Move ahead quickly with some of these comments from this workshop. FARO should play a role in bringing together infrastructure operators and reach out to IASC as well. FARO will bring this to the next FARO ExCom meeting.
- Focus on earth system sciences, and the connectivity/linkages between the terrestrial and marine realms. This could be a unifying force. Also linking with atmosphere and cryosphere, and social and human aspects.

## Breakout group participants:

### ▼ Land-based Infrastructure

- Darek Ignatiuk, SIOS-KC
  - Elmer Topp-Jørgensen / INTERACT
  - Femi Thomas
  - Frej Dichmann/Denmark
  - Gonçalo Vieira
  - Hannele Savela / INTERACT
  - Harry Penn - Kluane Lake Research Station, Yukon Canada
  - Svalbard Science Forum Helén Johanne Andersen
  - Jim Drummond (Canada)
  - Joaquin Bastias
  - Katharina INTERACT
  - Liu Zhizhao (Hong Kong Polytechnic U)
  - Magnus Augner, Sweden
  - Maribeth Murray Arctic Institute
  - Marie Frost Arndal ,FARO Secre
  - Morten Rasch, Station Manager, Denmark, University of Copenhagen
  - Naomi Whitty, Polar Field Services, USA
  - Phil Wookey - INTERACT TA Access Board Member
  - Pjotr Elshout (EPB)
  - Svenja Holste
  - Teresa Cabrita, PROPOLAR, Portugal
-

▼ **Ship-based Infrastructure**

[Join](#)

- 1. Anna H. Olafsdottir, Iceland, IASC, FARO
- Anja Sommerfeld
- Anna Gebruk
- Anna-Maria Perttu, Polarforskningssekretariatet
- Arild Sundfjord
- Åsa Lindgren, Swedish Polar Research Secretariat
- Carin J Ashjian
- Colin Stedmon
- Frank Rack (USA, NSF)
- Franziska Pausch
- Inger Jennings - SIOS-KC
- Jackie Grebmeier
- JustiinaD
- Mats
- Mats Granskog
- mikiojeda
- Monika Kedra (POLAND)
- Nicole Biebow (EU-PolarNet 2/ARICE)
- Pauline Snoeijs
- Renuka Badhe (EPB)
- Room B - Management (Bernardo Tostes)
- Stig Flått
- Verónica Willmott (ARICE), AWI, Germany

Workshop participants

Jackie Grebmeier	Kate Ruck	JustinaD	Frank Rack (USA...)	Jennifer Mercer, FA...
Mats Granskog	Leonid Yurganov	Josefine Lenz (A...)	Inger Jennings -...	Verónica Willmott (...)
agnus Augner...	Darek Ignatiuk, ...	Elmer Topp-Jørgen...	Franziska Pausch	mikiojeda
Svenja Holste	Marie Frost Arn...	Nicole Biebow (...)	Katarina Gårdfe...	Anja Sommerfeld
Dirk Mengedoht	Katharina INTER...	Naomi Whitty, P...	Phil Wookey - INTE...	Jim Drummond...
mikiojeda	Svenja Holste	Marie Frost Arn...	Nicole Biebow (...)	Katarina Gårdfe...
Anja Sommerfeld	Dirk Mengedoht	Katharina INTER...	Naomi Whitty, P...	Phil Wookey - INTE...
resa Cabrita,...	Carin J Ashjian	Anna Gebruk	Eva Ayash Silva	kondo.yutaka
Arctic Summ 2021	Arild Sundfjord	Mats	Anna-Maria Per...	Thomas Y. Chen...
Joaquin Bastias	Harry Penn - Kl...	Otso Suominen	Lars Henrik Sme...	Femi

## Annex 1: Slido Poll Results from the Marine Break-Out Session



# Marine break-out (ASSW workshop on infrastructure access)

18 - 24 Mar 2021

Poll results

## Table of contents

- Who do you represent? (your primary role, you can select 1 or 2)
- Do you represent or reside in a country (can select up to 2)
- Do you have experience in participating in or facilitating transnational access (to PRVs)
- If you have accessed PRVs transnationally, how was the access arranged, how was it funded ? Bilateral or multilateral? Personal contacts? Other? (short open text comments).
- What are the main challenges/obstacles of joint (transnational) scientific cruises in the Arctic? (give keywords, or a short sentence). Followed by discussion.
- From the first break-out, of the "obstacles" that were mentioned, which do you consider the most critical for transnational?
- What are possible solutions for funding (national, cycles, costs...) - what type of mechanisms - Brief open text answers



## Who do you represent? (your primary role, you can select 1 or 2)

0 1 7

Ship operator



Funding agency



Research



Other







# Do you represent or reside in a country (can select up to 2)

0 1 7

(1/2)

in the EU



outside the EU



with an icebreaking research vessel



without an icebreaking research vessel



Arctic nation





**Do you represent or reside in a country (can select up to 2)**  
(2/2)

0 1 7

non-Arctic nation



## Do you have experience in participating in or facilitating transnational access (to PRVs)

0 1 7

Yes, as operator



Yes, as funder



Yes, as scientist



Not



**If you have accessed PRVs transnationally, how was the access arranged, how was it funded ?  
Bilateral or multilateral? Personal contacts?  
Other? (short open text comments).**

008

(1/3)

- In the US we have used a variety of methods to establish a framework for funding based on bilateral agreements, for example, involving a government to government or a government to institution memorandum of understanding
  - or cost sharing understanding, or other frameworks including institution to institution or contractor to vendor types of funding arrangements. Personal contacts among operators and funding agencies is important, as well as scientist to scientist relationships.
  - I suppose it also depends on the type of access. Joining a preplanned cruise or leading

**If you have accessed PRVs transnationally, how was the access arranged, how was it funded ?  
Bilateral or multilateral? Personal contacts?  
Other? (short open text comments).**

008

(2/3)

or at least influencing the cruise track. The first is easy. The second more difficult.

- Informal collaboration. Berth made available for guest scientists.
- During Pacific Arctic Group meetings we discuss potential ship opportunities (berths, science collaboration) that has facilitated joint science efforts.
- Both bilateral (AWI, US, Canada,

Denmark) and multilateral (ARICE).

- My transnational access was via EUROFLEETS in a similar mode as ARICE uses: I accessed also Russian vessels via bilateral agreements
- Nationally funded projects with international collaborators.
- Personal contact. Berth was not paid. Travel and shipping expenses paid with national project funds.

**If you have accessed PRVs transnationally, how was the access arranged, how was it funded ?  
Bilateral or multilateral? Personal contacts?  
Other? (short open text comments).**

(3/3)

- As part of the Distributed Biological Observatory we have a collaborative agreement between Canadian DFO and my home institution (UMCES). Funding by NSF.
- Personal contacts often pave the way for accessing across countries

## What are the main challenges/obstacles of joint (transnational) scientific cruises in the Arctic? (give keywords, or a short sentence). Followed by discussion.

0 1 0

(1/2)

- Establishing frameworks with sufficient flexibility to allow for options to be implemented
- Funding for (international) ship time
- Successful transnational scientific cruises would be facilitated by joint funding calls for research by national funders.
- Challenges related to long-term planning, beyond annual funding cycle
- Lack of a sustained mechanism that allows Transnational access and the planing of international cruises
- Few/limited funding mechanisms, few incentives for operators to invite people.
- Availability of funding for ship time and other costs (travel to and from port etc.) - who pays?
- To integrate the project/work package into the oversll science programme.
- requires sufficient lead time

## What are the main challenges/obstacles of joint (transnational) scientific cruises in the Arctic? (give keywords, or a short sentence). Followed by discussion.

0 1 0

(2/2)

- to allow arrangements to be made, both for funding and logistics
- National priorities outweigh international access
- No unified planning tools - different countries and vessels have different planning schemes and time horizons.
- Timing of calls
- 1 - funding 2 - permissions 3 - language (certainly for Russian cruises)
- National support is needed to participate in an internally-developed research cruise.
- Clear communication and detailed planning
- too many proposals too little infrastructures
- Funding



## From the first break-out, of the "obstacles" that were mentioned, which do you consider the most critical for transnational?

0 1 3

(1/2)

- The idea of "build it, they will come" goes for ship-based science. Once a platform is supported nationally, with open berths, you can build international opportunities to address common science questions.
- Need for international agreements for coordinated activities and funding.
- funding
- Joint (international) funding pool for international joint initiatives
- Funding model. For some nations the ships are funded (and fully booked) and there is "only" a discussion of how to distribute across projects. While others have limited funds and no national access.
- Logistics including transportation of samples
- The discrepancies between different ship operators' planning horizons, AND different national and international funding schemes.

## From the first break-out, of the "obstacles" that were mentioned, which do you consider the most critical for transnational?

0 1 3

(2/2)

- Lack of transnational coordination of research needs and research capacity at sea.
- Coordination
- Criticality of each obstacle will be quite particular to aspect of transnational access being discussed. Mismatching Funding cycles, mismatching calendars of ship cruises, are two that I can identify.
- Funding
- Lack of sustained mechanism for transnational access
- Coordination activities at international level
- Science coordination needs to lead the transnational discussion, for example having a science workshop to identify the need for international coordination
- funding
- Funding
- Capacity

## What are possible solutions for funding (national, cycles, costs...) - what type of mechanisms - Brief open text answers (1/3)

- All operators should publish multi-year cruise plans, even if they are not complete for every coming year.
- There is probably great potential for more widespread use of remote access to vessels, which would increase the scientific value of cruises at low additional cost.
- An agreement on accepting each others proposal evaluation system on an international level could make the possibility of international third party funding much more easy to implement
- Those IASC countries that want to, can commit multi-year funding to get time and berths on icebreakers. Such a mechanism would allow both for smaller parties to join planned cruises but also larger joint projects

## What are possible solutions for funding (national, cycles, costs...) - what type of mechanisms - Brief open text answers (2/3)

with participants from several countries. Of course based on scientific excellence. And if there are no good proposals coming from groups in a given country in a given year, that country's funding is not used.

- international cooperation
- Joint calls for proposals can be coordinated on a bilateral or multilateral basis.
- Something similar to the IODP application system!
- At the end, additional national

funding has to be mobilised, which works only via excellent and high-priority science

- Long-time planning.
- Science diplomacy - utilizing platforms like ASM to bring forward scientific agenda
- Science discussions need to be followed by proposals that can be peer reviewed and recommended for award. Once this happens, then vessel discussions can be implemented.
- An international funder

## What are possible solutions for funding (national, cycles, costs...) - what type of mechanisms - Brief open text answers (3/3)

- agreement to support national science toward common, high priority international science questions is one solution.
- Sustained Arctic funding. If you want high quality research then an area needs long term funding so that a competitive community can develop and the best science be done. Sporadic funding does not allow the best science to necessarily come through.
  - 2 types of transnational calls could be considered - long-term, detailed scientific collaboration and more opportunistic offers of spare berths on already planned cruises available at short(er) notice
  - Long lead time is essential for planning and coordination.