



TRILATERAL EU · US · CANADA WORKSHOP

Trilateral EU-US-Canada Workshop

Arctic scientific cooperation in the framework of the Transatlantic Ocean Research Alliance

Tromsø, UiT The Arctic University, Wednesday 21 January 2015

Report



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1 Objectives

In the framework of the Transatlantic Ocean Research Alliance between EU, US and Canada, launched with the Galway declaration of 24 May 2013, two bilateral EU/US and EU/Canada Working Groups on the Arctic have been set-up in 2014.

This Trilateral Workshop aims at exploring potential areas of trilateral scientific cooperation among the similar fields of activity that each of the bilateral Working Groups has identified so far in their Statements of Purpose.

The three delegations for the Workshop are composed of scientists representing major networks and key on-going projects (in particular multilateral projects which already support international cooperation), together with science-policy officers representing governmental departments and funding agencies.

From an analysis of the draft Statements of Purpose of the two bilateral Working Groups, it is proposed to focus the discussion on three common potential areas of cooperation:

1. Arctic observing systems, data sharing and observing infrastructure;
2. The impact of arctic changes on the weather and climate of northern latitudes **in general and their impacts on northern infrastructure and communities in particular**
3. The impact of climate change on arctic systems and the related socio-economic risks, opportunities and requirements for adaptation and mitigation

2 Workshop Agenda Structure/Process

(Availability of power point presentations is acknowledged by (**)) and can be found on the ERA-Can+ website: www.era-can.net/canada/era-can-event-series-in-tromso-norway)

Trilateral Cooperation on the Arctic up to date:

This initiative grew from the Galway Declaration which was signed in May 2013. A marine and arctic research infrastructure symposium was held in Rome in September 2013, followed by this current workshop which included arctic scientists and researchers. A 2nd marine and arctic research symposium is being planned in September 2015 in Canada and may serve as a follow-up to some of the activities from this trilateral workshop which is exploring ways in which international cooperation can be used to solve global problems.

Introduction to the Workshop

Andrea Tilche (EC, DG RTD, Climate Action and Earth Observation) (**) opened the conference, giving an overview of Transatlantic Ocean Research Alliance, including four projects – Blue Growth 8, 13, 14 and 15 (the recently launched EU PolarNet). One of the objectives of the Tromsø workshop is to take advantage of the 2016-17 planning cycle opportunity to include arctic research and innovation coherent with the Galway process, recognizing that the H2020 approach aims to address and develop solutions to key societal challenges.

Martin Raillard (Canadian High Arctic Research Chair) remarked that to make difference in the Arctic there is the need for global cooperation. Canada is therefore setting itself up to welcome the global community; and several of the Canadian networks are preparing themselves for the international cooperation. Canada has a natural laboratory with diverse infrastructures and this workshop is a tool to tackle global problems and determine the steps needed to find solutions. He provided the four questions the co-chairs previously agreed would need to be addressed in the upcoming breakout groups:

1. Identify research projects that are currently happening, that would benefit by international cooperation
2. Infrastructure sharing - What does each country have to offer the international community?
3. What projects require international cooperation to succeed?
4. Identify which topics require this group to reach out to others that could lead to new partnerships?

Opening remarks by Fran Ulmer (Chair of the US Arctic Research Commission), replacing Simon Stephenson (US Office of Science and Technology Policy) as US co-chair, acknowledged the increased interest in research in the Arctic to better understand and prepare for the changes that are underway. Given the challenges and expense associated with research in the region, it is imperative that organizations and nations collaborate together to expand research and observing in effective and practical ways.

1. *Networking and Coordination:*

Nicole Biebow (Alfred-Wegener-Institute) (**) presented the EU-Polar-Net project, which is a new initiative funded by the European Commission. It has 22 partners from 17 nations, includes all relevant European infrastructure providers for arctic research, and has established relationships with major networks and actors outside Europe. The benefit for the polar community is the creation of an EU polar expert network of scientists and stakeholders who should establish a community for clustering and coordinating on-going activities, as well for helping the design of future research programmes. The goals of the project are:

- An Integrated European Polar Research Programme
- Continuous stakeholder dialogue
- EU's international commitments
- Implementing the Transatlantic Ocean (and Arctic) Research Alliance
- Enhance coordination with third countries
- Monitoring and modelling programmes and related infrastructures
- Interoperability of observing systems and research infrastructures and open access

Craig Lee (University of Washington) (**) presented SEARCH which seeks to understand the extent and future development of the system-scale change presently seen in the Arctic. It was initiated by the arctic research community in 1997 and is a bottom-up, grassroots initiative and community based. "Action teams" are a new development in SEARCH and the "observing change panel" has been the advising body for the SEARCH network.

Martin Raillard (**) presented on the Canadian Polar Research Networks. There are various players to take into account: Several organisations, three territories, cross-cutting groups. The (Canadian Network of

Northern Research Operators) brings together all key players. The Network is supported by the federal government and the three territories as well as from various cross-cutting groups. CHARS tries to support existing facilities, science and technology programs and a strong research presence. CHARS will be receiving an extra \$25M in research funding. CHARS and the Canadian Polar Commission together will form a natural entry point into Canada but this does not preclude other networks to be addressed directly, if contact points are known.

2. State of Play

Each of the co-chairs led a discussion with their respective country participants to provide an overview of the various programs, networks and/or activities.

EU-State of Play (**)

The EU-participants presented the on-going activities of research infrastructure, earth observation, and research and innovation actions:

1. Research Infrastructures

Anna-Maria Johansson (EC, DG RTD, Research Infrastructures for the Environment) said that their division supports equipment in two major ways: one is to support the creation of new infrastructure of EU interest, the other is to optimize the use of existent ones. They seek to facilitate open access, to collaborate and complement facilities EU-wide and internationally. New infrastructures are SIOS and EMSO, to the existent ones belong INTERACT, EUROFLEETS 2 (it has an arctic component which seeks to optimize arctic icebreaker availability and facilitate access to polar regions), FIXO3 (+EUFAR: atmospheric research).

Margareta Johansson (Lund University) presented INTERACT, a multilateral cooperation between 73 terrestrial stations offering transnational access that in the last three years allowed the exchange of more than 500 researchers (Pan-Arctic support) for about 10,000 research days. The EU funding is complemented by other sources such as NSF.

2. Earth Observation

Jon Børre Ørbæk (The Research Council of Norway) gave an overview of SIOS. The Svalbard Integrated Arctic Earth Observing System involves 14 countries; most of the observation points are in four locations, trying to connect the different facilities. SIOS' goals are better access, data sharing and logistical coordination. It will now continue for another three years.

Stein Sandven (Nansen Environmental and Remote Sensing Center) presented ACOBAR which uses acoustic technologies for thermometry, such as to monitor integrated temperatures in the Arctic ocean.

Mark Drinkwater (European Space Agency) presented the operational European Earth Observation programme Copernicus which is supported by ESA. The programme pursues a free and open data policy. Several new satellites are being launched until 2030, with the first one in polar orbit since April 2014 (Sentinel 1A, an all-weather SAR mission) and which provides radar images for the arctic and it also assists with ice surveys.

3. Research and Innovation Actions

Thomas Jung (Alfred-Wegener-Institute) summarized the recently held “International workshop on polar-lower latitude linkages and their role in weather and climate prediction” in Barcelona, with 80 participants of 20 nations, organized by the SPECS project.

Hugues Lantuit (Alfred-Wegener-Institute) presented PAGE21, a large EU-funded permafrost research project that is running until the end of 2015. They have established good partnerships with ADAPT and Arctic Net and published over 50 publications. The project wants to expand its research on the coastal systems: coastal erosions, fish stocks, subsea permafrost.

Jean-Claude Gascard (Université Pierre et Marie Curie) gave a look into ACCESS, which has its final assembly next month and will provide a synthesis report. The three main topics for the project are: Marine Transportation and Tourism, Aquaculture and Fisheries, environmental aspects of Oil and Gas exploration.

ICE-ARC was presented by Jeremy Wilkinson (British Antarctic Survey). The project looks at the cost of Arctic Change to the global community. The project aims to achieve: 1. Capacity building - cohesion on priorities and fund those, 2. Sustainability - long term investments and funding, and 3. Inclusiveness - bring in social scientists and economists.

David Vaughan (British Antarctic Survey) presented Ice2Sea. He states that ice sheets is still an area which requires more attention. The project brought glaciologists together in response to the needs of better define the contribution of land-ice melting to sea-level rise. They fed into IPCC projections. Potential cooperation is seen in sea level rise impacts.

Elisabetta Vignati (EC, DG JRC, Air and Climate) gave an overview of the work of the JRC in arctic research, in particular on the impact of black carbon on the Arctic feedback, and compiled a survey on maritime transport.

US-State of Play

The US-participants presented the following activities:

Fran Ulmer explained the role of the Arctic Research Commission in coordinating and prioritizing Arctic research goals for the US. She also described the work of the Interagency Arctic Research and Policy Committee which has just released a five year Arctic Research Plan for federal agencies; it created 12 teams to assist in the implementation of the research plan.

Julie Morris (US Global Change Research Program) presented the global change research programme: FY15/16, where 18 federal organizations come together to develop joint priorities in arctic research, which could also be helpful to “protect” the budget in this area. It focuses on three main areas: advancing knowledge of global change (Aerosols), Permafrost evolution (challenging and modelling approach) and developing infrastructure. They are integrating models and building in social and economic dynamics, and looking at small to long term timescales, assessing risks and vulnerabilities. Julie also presented the Global Change Information System: e.g. GCRS, it is a metadata tracer and helps to provide deep links to topics and information (if you have information about a certain topic, you will be through this programme directly led

to another related side). The Global Change Information System is publicly available. It assesses co-benefits and conflicts in adaptation and mitigation strategies. She also talked about the Linking Physics to Biology, the distributed biological observatory (DBO), funded by NOAA, which provides sea-ice data from Alaska.

Tom Armstrong represented SAON, AMAP and AACA:

SAON has 2 Action Groups: 1. data and information system, (Peter Paulser, Colorado) and 2. the observation network itself and coordination (Lisa Lisetto, Canada). One element is the development of pilot indicators across the arctic and the second element is a strategy on how they can serve as an advocate for the initiatives in the network and what needs to be sustained for the long run, for the benefit of people who make decisions. SAON data committee has merged with IASC data committee. SAON was accepted as the arctic wing from GEO.

AMAP is about unmanned air craft systems. They seek the development of guidelines for low flights, two white papers that follow the ACEO guidelines, and which were accepted and ratified by all arctic nations (Arctic Council).

AACA undertakes a sustainable assessment (3 regions high resolution assessments). When products are developed and then they engage with decision makers and see whether this development has been useful for their decisions (if not, they do adjust). They are looking into: What could we do so we are providing them with what they need? What can we do so that the data is accessible and usable for those who work with it?

Craig Lee talked about the US-Navy efforts and their arctic programme, which was cut back but is now being invigorated. New observing technologies are being explored and they actually look for areas to invest in and at items that may improve models. They are seeking and funding expertise wherever it lies. ONR Global for coordination activities can support investigators in US and outside.

George Hunt presented ESSAS, a regional program under the international IMBER program. ESSAS conducts and facilitates comparative studies of subarctic and arctic marine ecosystems with the aim of assessing how climate variability is affecting their ability to provide ecosystem services. ESSAS addresses issues at all levels in arctic ecosystems from climate to phytoplankton, zooplankton, fish, seabirds and marine mammals. He emphasized that there is a need to understand how arctic change will impact the people dependent on the arctic marine ecosystem for subsistence. We need to know more about the temporal and spatial variability of organisms such as zooplankton and fish. This information lack could be partially addressed by the placement of more biological sensors on the moorings and gliders that are being deployed throughout the Arctic.

Fran Ulmer reflected on the theme of the IPY meeting in Montreal "From Knowledge to Action" as a prescription for bringing more support for research funding: if research is focused on benefiting society and helping decision makers make good decisions about resource management, it will be seen as an investment in the future of the region. Unfortunately, many of the research networks and observing systems discussed at this workshop lack resources and long term funding. They need more capacity and continuity, which could be strengthened with more attention to governance, structure and combined funding. One possibility is an international agreement among countries (Arctic plus others) to build the coordinating structure and ensure long-term funding.

Volker Rachold shortly talked about the Scientific Committee on Antarctic Research, SCAR which has a data community and they are linked to IXU, they had a recent meeting in Japan and there will be another in Canada in October 2015 to link Arctic and Antarctic.

Canada-State of Play (**)

Martin Raillard gave an overview of the recent developments in Arctic Canada. He underlined the logistical challenges, as the arctic covers 40% of Canada's landmass and "they feel like a Northern country". The native Aboriginal population has recently settled land claims and they are now "co-governors" in these territories. The interaction works very well and many agreements have been reached. Together, they go to the fields and analyze the results. It has become a different approach now. Canada's Northern Strategy states that the social and economic development is very important and that science underpins this. They are assessing which methods work well for them in a sustainable way for environmental protection. The report of Canada's State of Northern Knowledge, an inventory on what the needs are for Canadians that live in the North, has 4 themes: Preparing for large-scale resource development, increasing community sustainability, strengthening resilience, understanding environmental change.

The Polar Continental Shelf program looks after logistics for anyone traveling to the north/arctic. CHARS's mandate is to increase research presence across the entire north with over \$200M in research funding and yearly funding of \$26.5M (for operations?) starting in 2018 with no end date. This reflects the discussion held earlier that in order to be sustainable, funding must be long term. Canada's S&T arctic priorities are alternative and renewable energy for the north, baseline information and preparedness for development, marine monitoring and surveillance and research, community health and wellness, predicting impacts of climate change and infrastructure needs of communities.

Andrew Applejohn presented on the arctic priorities of the Northwest Territories. Five pillars are similar to CHARS; the very first priority is sustainable communities. Cultural sustainability is very important and they always list it on top because they want to see their community well represented. Health and wellness (also mental health) are huge priorities, long term positive outcomes for individual households, resource extraction industries (other sources can be discussed but these drive the economies) including costs for providing energy, sustainable energy systems, predicting the impacts, sustainable extraction and sustainable communities, transportation systems. Andrew also mentioned that for the science agenda, they asked experts about what was important in making decisions in the north. The results showed that researchers and communities were negatives to each other.

Soren Rysgard introduced the Churchill Marine Observatory. It is a national centre with an international mandate. It would be Canada's first arctic deep water port, located in the Hudson Bay and it is now in the final planning stages, with no budget yet identified.

Martin Fortier highlighted that it is difficult to have "one entry point to Canada", as there are differences between the federal funders. One needs to understand who the players are and their area of responsibility and to date, the Polar Commission has been able to provide this service. While CHARS funding is for all, usually funding is targeted to academics but Canada is now ensuring industry can also access funds. Martin also presented ArcticNet which manages the Amundsen. This is a federally owned vessel and an

announcement is expected for January 23 identifying another \$8M grant for infrastructure (through NRC). The Amundsen has an international cooperation focus and previous programmes attracted a lot international researchers.

Russel Shearer proposed to map out a process for people outside of Canada to work in the Canadian arctic – to enable easier access to Canadians sites. In this regard a sharing of knowledge is critical for the process and the governance would need to be rethought. Every federal department has some sort of climate change program and it would be beneficial if the Arctic Council assists in adapting the governance structure.

Break-out Sessions

Before leaving into the break-out sessions, it was agreed by all participants to combine Groups 1&2 “Arctic observing systems, data sharing and observing infrastructure” and “The impact of arctic changes on the weather and climate of northern latitudes” due to a small number interested in group 2. The Co-Chairs agreed on four questions that should be answered during the break-outs:

1. Identify research projects that are currently happening, that would benefit by international cooperation
2. Infrastructure sharing - What does each country have to offer the international community?
3. What projects require international cooperation to succeed?
4. Identify which topics require this group to reach out to others that could lead to new partnerships?

It was first concluded that the term observing systems should be understood in its wider sense as it includes not only satellites, but also land sites, stations, cruises.

Break-out Group 1: Arctic observing systems, data sharing and observing infrastructure and the impact of arctic changes on the weather and climate of northern latitudes

Participants: Andrea Tilche, Julie Morris, Fran Ulmer, Jean-Claude Gascard, Wolfgang Wittke, Anna Maria Johansson, Margareta Johansson, Tom Armstrong, Craig Lee, Lars-Otto Reiersen, Elisabetta Vignati, Karin Lochte, Stein Sandven, Vito Vitale, Phil Mundy, Thomas Jung, Michael Rixen, Mark Drinkwater, Soren Rysgard, David Scott, Jon Borre Orbaek, Kim Holmen, Martina de Sole, Vera Kammann, Johanna Füllmann

The discussion evolved around the following points:

- Programming the next EU calls: Andrea Tilche said that the goal should be to give directions to EU-US-Canada as how to better use the funds that are available. The EU has the amount of about 40M Euro available for the next 2016-17 calls on the Arctic, of which about 15MEuro could be dedicated to an integrated Arctic observing system. With this in mind, it is possible to invest in setting up observation systems that are long lasting and sustainable.

The participants highlighted several issues to be taken into account, such as:

- Interlinkages between different types of observation
- Improvement of the observing systems through calibration/validation processes.

- The “Year of Polar Prediction”: If there are better predictions in the Arctic region, this will improve other areas as well.
- Business opportunities in the Arctic to get them onboard with funding.
- Collection, Standardisation and Sharing of observing systems and their data (Standardised catalogue in Canada (CHARS)). Development of a meta-database. This calls for people and money.
- Long-term tracking of decision making in adaptation and mitigation is lacking. Identification of a valid indicator of tracking decisions by politicians.
- Engagement of communities and information usage, format and dissemination
- Multi-disciplinary approach. Identification of indicators that can cover the interaction of different components (disciplines/divisions)
- Funding for long-term observation
 - o institutionalised solutions, e.g. an international agreement between the most important countries. Identification of a model agreement.
 - o Synchronization of the funding sources
 - o Shift from research to industries, example of Stream Gage.
- Identification and promotion of the value and outcomes of the arctic science, e.g. SAON bulletin
- Multi-purpose of observation systems/sensors.
- Socio-economic effects and their benefits, e.g. Copernicus.

Wrap-up and conclusion

Andrea Tilche wrapped up the discussion with the following points:

- First of all we need proof that the objectives we are assessing are objectives of scientific and societal relevance.
- The year of polar prediction should be used to fill the data desert.
- With the money that is available, it is not possible to establish new observing systems. It is necessary to use the existing observing systems and databases and try to integrate them, to identify key issues that could add value to the data, and produce value to allow use of information to provide services.
- The arctic is changing rapidly, this creates urgency. We have to track changes and deliver services to population, business community and those who are researching the quality of the environment.
- The level of ambition should be based on considerations of sustainability.

Michel Rixen complemented the multi-purpose idea of having instruments that can serve various services, which might make easier to have observations for the long-term.

Julie Morris summarized several major threats:

- climate predictability (arctic climate and teleconnections)
- climate impacts
- arctic ecosystems and socio-economic effects,

- adaptation and mitigation.

Fran Ulmer emphasized that research questions that are tied to decisions that need to be made provide utility and improve choices. An example might be an agency trying to decide where to allow oil and gas drilling in a region. It would be useful to know which areas within that region are the most biologically productive and/or most vulnerable to human activity, and that should be avoided for adverse impacts.

The group agreed that these four points are the summary of the break-out session number one.

- YOPP opportunities, filling the data desert
- Four main areas of action about predictability:
 - o arctic changes
 - o teleconnections,
 - o ecosystem and socio economy impact
 - o effectiveness of adaptation and mitigation strategies
- Data interoperability, QA/QC, data bases, free and open access, standardization, integration of key parameters for delivering services
- Key issue to co-design and co-deliver these points together with stakeholders

Break-out Session Two: The Impact of climate change on arctic ecosystems and the related socio-economic risk and opportunities

Participants: Martin Raillard (Canadian Co-Chair), Hugues Lantuit, Wolfgang Wittke, Nicole Biebow, Andrew Applejohn, Debbie Kemp, Russell Shearer, Manuel Mulas, Christine Leroy, Jeremy Wilkinson, George Hunt

Participants suggested that it be noted that the discussions in this break-out group will reflect only the participants present and in order to be inclusive, additions from other workshop attendees would be required. It was mentioned that the EC is currently developing its next 2 year work programme and now is the time to suggest topics to be considered for inclusion. The group agreed that one large integrated project valued at approximately 10M Euros would be a good starting point. The EC was represented by Wolfgang Wittke and he suggested the Call-Headline could be “Canada-US cooperation is strongly encouraged”. The responses to the 4 questions are:

1. Identification of current research projects which would benefit from international collaboration

It was decided to break this question into two categories:

- Marine, terrestrial and freshwater impacts
 - o Permafrost and coastal impacts
 - o Comparative studies on marine systems
 - o Ocean acidification
 - o Use of autonomous platforms for long term monitoring including biochemistry
 - o Focus on large interdisciplinary systems
- Social economic impacts
 - o caribou
 - o shipping routes

- o fishing impacts and changes (contamination)
- o address economic development (identify Canadian industrial interests)
- o understand impacts on infrastructure
- o involve communities in decision making process
- o food safety

2. Research Infrastructure Sharing

The following items were identified as potential opportunities to share resources and expertise:

- EU is open to share ice breakers – interested to integrate vessels better
- Canada and US should also commit to join the sharing of vessels/network (role for FARO)
- Canada's Amundsen is already open for international collaboration,
- Important to have smaller coastal ships to get in closer to communities and shorelines
- CHARS is considering establishing a small fleet of vessels for smaller coastal areas
- Small planes are also needed, Germany has 2 DC3s
- US has new vessel
- Drilling in arctic via icebreaker requires strong international cooperation, no one can do it alone
- Use ice breaker for ice
- Develop "Marine Interact" similar to the Arctic Interact project
- Space agencies- interaction and cooperation
- AUV/UAS coordination
- Ice camps on sea ice expertise to be shared
- Provide strong support to "Interact"
- Operational agencies coordinate well and should continue to do so

3. Projects that need international cooperation

It was discussed and agreed that international cooperation projects require international funding. Typically it would best be presented as an holistic approach which would eventually transpire into a large, multi-disciplinary, full system project. The following begins to outline what is required:

1. Fund research of integrated project
 - a. US approx \$20M
 - b. EU 10M Euros
 - c. Canada has committed \$ 25 M annually through CHARS
2. Need commitment from country to each topic (must fit into strategies and priorities)
3. Ask for collaboration directly in the Call criteria
4. Trilateral call unlikely as is difficult for a tri-party alignment
5. Develop integrated science plan and agree on appropriate funding, with preference on identical funding amounts - common pot preferred but unlikely
 - a. Build on results from existing projects

- b. Timing is critical
 - c. Coordinated funding pot may be useful
4. Projects to expand beyond trilateral relationship
Recognized projects are always open to additional international partnerships (Russia, Asia)

The group agreed that these four points are the summary of the break-out session number two.

1. Develop integrated science plan
2. Joint priorities
3. Integrated funding
4. Integrate infrastructure use

The results from the break-out groups were presented to all of the participants. During the final discussion Craig Scott presented a rather new instrument, which is the lead agency funding, that has been established between NSF and the UK. Anna Maria Johansson added the Joint Programming Initiatives, which could be comparable to this. Andrea Tilche stressed that the instruments that are available should be discussed in a next meeting.

As the last part of the agenda, the Co-Chairs Andrea Tilche and Martin Raillard as well as Fran Ulmer, on behalf of the Co-Chair Simon Stephenson, signed the Statements of Purpose (to be found in the Annex).



3 Outcomes/conclusions and next steps

Before Martin Raillard was to conclude the workshop, Andrea Tilche highlighted that the EC programme is also policy oriented, and not just science oriented. The focus is on what is best for the society to be achieved. Simon Stephenson (via skype) acknowledged the huge ground that was covered during today's workshop and welcomed the implications for governmental funding agencies in EU, US and Canada. Following the workshop, the Co-Chairs will exchange and identify the next steps together. Simon suggested a series of workshops that could be organized by some of the participants.

Martin Raillard concluded that the presentations provided throughout the workshop were a helpful tool which brought all workshop attendees up-to-date on project activities. The following provide an overview of the types of activities that the Tri-lateral WG should address:

- Development of themes: The theme of observation was already mentioned several times.
- Data Integration: It is needed to determine how to make data usable and accessible. SAON data committee has merged with IASC data committee.
- Integration of Science Plans: All agreed on the importance of integrating or developing common science plans and agendas. Since the EU is now developing its EU Polar Research Programme through the EU-Polar-Net, this offers some good opportunities.
- Funding Integration: it is to assess how to align national funding programs with project funds or other types of funds.
- Governance Integration: It has to be ensured that the money spent provides useful outcomes to society.
- Sustainability: it is a major issue. Long term investments need to occur in order to achieve results. The stop and go process does not work.
- Inclusiveness: It is necessary to bring in social scientists and economists, as well as the communities. Science is also needed for the people that live in the arctic.
- Big picture perspective: any attempt should serve to all of the society's needs.

ANNEX

- **Agenda**
- **List of Participants**
- **Statement of Purpose European Union – Canada**
- **Statement of Purpose European Union – United States**



TRILATERAL EU · US · CANADA WORKSHOP

WORKSHOP AGENDA

Tromsø, UiT The Arctic University, Wednesday 21 January 2015

TIME	LOCATION		
12:00 13:00	LAVVU Sami style tent on the Campus	NETWORKING LUNCH	
13:00 13:30	ROOM 4.213 Teorifagbygget	INTRODUCTION TO THE WORKSHOP Chair: Andrea TILCHE	Andrea TILCHE , EU co-Chair Simon STEPHENSON , US co-Chair Martin RAILLARD , CANADA co-Chair
13:30 14:00		NETWORKING AND COORDINATION Chair: Simon STEPHENSON	EU: Karin LOCHTE and Nicole BIEBOW (EU-PolarNet) US: Craig Lee (SEARCH) CANADA: Martin FORTIER (ArcticNet)
STATE OF PLAY AND PERSPECTIVES			
14:00 14:30		EUROPEAN UNION	EU DELEGATION
14:30 15:00		UNITED STATES	US DELEGATION
15:00 15:30		CANADA	CANADA DELEGATION
15:30 16:00	COFFEE BREAK		
BREAKOUT GROUPS FOR DISCUSSING OPPORTUNITIES FOR JOINT ACTIVITIES (each group should end with a written summary on key action(s))			
16:00 18:00	ROOM 4.213	1. Arctic observing systems, data sharing and observing infrastructure Chair: Simon STEPHENSON	
	ROOM 4.251	2. The impact of arctic changes on the weather and climate of northern latitudes Chair: Andrea TILCHE	
	ROOM 4.254	3. The impact of climate change on arctic ecosystems and the related socio-economic risks and opportunities Chair: Martin RAILLARD	
18:00 19:00	ROOM 4.213	WRAP-UP AND CONCLUSIONS Chair: Martin RAILLARD	Breakout groups Chairs
19:00		SIGNATURE OF THE STATEMENTS OF PURPOSE	Workshop Chairs
19:30 21:00	Restaurant EMMAS DRØMMEKJØKKEN	WORKING DINNER	
21:30 22:30	TBC	POST-DINNER DISCUSSION ON NEXT STEPS	Workshop Chairs, policy officers + coordinators of main networks (Eu-PolarNet, SEARCH, ArcticNet, ...)



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TRILATERAL EU · US · CANADA WORKSHOP

DELEGATIONS			
	EU	US	CANADA
OFFICIALS	<p>Andrea TILCHE, co-Chair (EC, DG RTD, Head of Unit, Climate Action and Earth Observation)</p> <p>Elisabetta VIGNATI (EC, DG JRC, Head of Unit, Air and Climate)</p> <p>Anna Maria JOHANSSON (EC, DG RTD, Research Infrastructures for the Environment)</p> <p>Wolfgang WITTKE (EC, DG RTD, International Cooperation, US and Canada)</p> <p>Mark DRINKWATER Head, Mission Science Division (EOP-SM) European Space Agency (ESA)</p>	<p>Simon STEPHENSON, co-Chair (OSTP) (via skype)</p> <p>Fran ULMER, Chair of the US Arctic Research Commission</p> <p>Julie MORRIS, USGCRP</p>	<p>Martin RAILLARD, co-Chair, (CHARS)</p> <p>David SCOTT, Executive Director of the Canadian Polar Commission</p> <p>Andrew APPLEJOHN, Senior Science Advisor, Government of the Northwest Territories</p> <p>Russel SHEARER, Director, Northern Contaminants Program</p>
SCIENTISTS	<p>Karin LOCHTE, Nicole BIEBOW, Thomas JUNG (EU-PolarNet, AWI)</p> <p>Margareta JOHANSSON (INTERACT)</p> <p>Jon Børre ØRBÆK, Vito VITALE, Kim HOLMEN (SIOS)</p> <p>Stein SANDVEN (ACOBAR)</p> <p>Jean-Claude GASCARD (ACCESS)</p> <p>Jeremy WILKINSON (ICE-ARC)</p> <p>Hugues LANTUIT (PAGE21)</p> <p>David VAUGHAN (Ice2sea)</p>	<p>Craig LEE, University of Washington</p> <p>Tom ARMSTRONG, AMAP</p> <p>George HUNT, University of Washington</p>	<p>Martin FORTIER, Executive Director of ArcticNet</p> <p>Soeren RYSGARD, University of Manitoba</p>
INVITED	Lars-Otto REIERSEN (AMAP), Volker RACHOLD (IASC), Michel Rixen (WHO), Phillip Mundy (NOAA), Manuel Mulas (DFATD), Christine Leroy (DFATD)		
Observers	Johanna Füllmann (ERA-Can+), Martina de Sole (ERA-Can+), Debbie Kemp (ERA-Can+), Vera Kammann (BILAT USA 2.0)		

**EUROPEAN UNION-CANADA
JOINT SCIENCE AND TECHNOLOGY COORDINATION COMMITTEE
ARCTIC WORKING GROUP**

STATEMENT OF PURPOSE

The EU-Canada Joint Science and Technology Coordination Committee (JSTCC) established an Arctic Working Group at the 11th JSTCC meeting on March 6, 2013 in Brussels to further the proposed work on selected Arctic research issues under the EU-Canada Science and Technology Agreement. This cooperation is intended to increase our joint knowledge of the Arctic and its rapidly changing environmental systems, and its interactions with lower latitudes particularly the North Atlantic Ocean, and should support the implementation of the Transatlantic Ocean Research Alliance established among the EU, Canada and the US in Galway on 24 May 2013. The Working Group will also work with the EU-Canada Marine Working Group to ensure alignment of activities that involve the Atlantic.

Work would focus on six areas of cooperation¹:

1. Support research and innovation to develop an improved understanding of the integrated Arctic environmental and human systems also with input by and for the benefit of Arctic residents:
 - a. Support shared investments in research, innovation, synthesis and modelling;
 - b. Support joint mid-scale investments to support process studies critical for system understanding;
 - c. Support effective environmental stewardship through greater knowledge of natural and human systems and their interconnections;
 - d. Support greater understanding of changes in the Arctic climate and the links to global systems, while also strengthening research on potential mitigation efforts and increasing the capacity to adapt to these changes;
 - e. Support research in human health and wellness in light of rapidly changing Arctic environment;
 - f. Utilize the best available knowledge, including scientific information and traditional and local knowledge, and make decisions based on that information;
2. Develop an integrated observation and monitoring system to support system scale studies and provide context to shorter-term process studies:
 - a. Support a broad range of observational and monitoring platforms and approaches²;
 - b. Develop an interoperable e-science (or cyber) infrastructure;
 - c. Contribute to the implementation of the Group on Earth Observation System of Systems (GEOSS) and the coordination efforts of the World Meteorological Organization (WMO) Executive Panel of Experts on Polar Observations, Research and Services (EC-PORS) promoting relevant WMO programmes;
 - d. Identify opportunities to facilitate data distribution and data sharing;

¹ There are still other areas for collaboration which have not been yet explored and broadly discussed

² This does not include satellite measurements per-se, as they are coordinated by existing international coordination mechanisms among space agencies, but it is recognized that the science supported will require use of space-based observations.

3. Develop research on renewable energy sources in Arctic environments;
4. Support research on the potential for sustainable economic development in the Arctic and support baseline information and preparedness for this development;
5. Identify opportunities to share research facilities and logistical infrastructure and the necessary mechanisms to do so;
6. Improve Arctic science and technology awareness in Europe and North America.

To move forward on JSTCC discussions, Canada and EU agreed to a three step process:

7. Share information on each other's existing investments related to priority actions;
8. Engage in joint priority setting of actions for the 6 areas of cooperation listed above;
9. Seek to align and integrate when possible and appropriate the planning, funding and programming of research activities.

Throughout the group's work and discussions, effort should be made to leverage existing work already underway individually by the EU and Canada and reinforce existing international efforts to advance our knowledge of the Arctic, such as the planning activity of the International Arctic Science Committee.

MEMBERSHIP AND THIRD PARTY PARTICIPATION

The group will be co-chaired by representatives – one from each party. Other members of the working group will consist of experts on the focused topic areas listed above in the Statement of Purpose, or any additional topics that may be subsequently added. Working group membership may change at any point so that the appropriate experts for the focused topics are present for each meeting.

The working group may hold special meeting sessions or seek feedback from non-members, such as third party countries, members of the academic community, or members of the private sector, with the approval of both the EU and Canada nominated co-chairs.

The EU and Canada co-chairs will report formally to the JSTCC meetings on the progress achieved. The EU and Canada co-chairs may also be called upon to report on the activity of working group at other mutually-agreed occasions (e.g. bilateral EU-Canada events).

Signed in Tromsø on 20 January 2015 in two originals in the English language



ANDREA TILCHE

European Commission
 Directorate-General for Research and Innovation
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Disclaimer: the signature of this Statement of Purpose does not impose any legally binding commitment on funding of the described research topics on any party.

**EUROPEAN UNION-UNITED STATES
JOINT CONSULTATIVE GROUP ARCTIC WORKING GROUP**

STATEMENT OF PURPOSE

The European Union (EU) and United States (US) Joint Consultative Group (JCG) established an Arctic Working Group at the 12th JCG meeting on February 12, 2013 to further the proposed work on selected Arctic research issues under the EU-US Science and Technology Agreement. This cooperation is intended to increase our joint knowledge of the Arctic and its rapidly changing environmental systems, and its interactions with lower latitudes particularly the North Atlantic Ocean, and should support the implementation of the Transatlantic Ocean Research Alliance established among the EU, Canada and the US in Galway on 24 May 2013.

Work would focus on four areas of cooperation¹:

1. Support research to develop an improved understanding of the integrated Arctic environmental systems and its impact on lower latitudes:
 - a. Support shared investments in synthesis and modelling;
 - b. Support joint mid-scale investments to support process studies critical for system understanding.
2. Develop an integrated observation system to support system scale studies and provide context to shorter-term process studies:
 - a. Support a broad range of observational platforms and approaches²;
 - b. Develop an interoperable e-science (or cyber) infrastructure.
3. Identify opportunities to share logistical infrastructure and the necessary mechanisms to do so;
4. Improved Arctic science and technology knowledge in Europe and North America.

To move forward on JCG discussions, the US and EU agreed to a three step process:

1. Share information on each other's existing investments related to priority actions;
2. Engage in joint priority setting of actions for 4 areas of cooperation listed above;
3. Seek to align and integrate when possible and appropriate the planning and programming of research activities.

Throughout the group's work and discussions, effort should be made to leverage existing work already underway individually by the EU and US and reinforce existing international efforts to advance our knowledge of the Arctic, such as the planning activity of the International Arctic Science Committee.

¹ There are still other areas for collaboration which have not been yet explored and broadly discussed

² This does not include satellite measurements per-se, as they are coordinated by existing international coordination mechanisms among space agencies, but it is recognized that the science supported will require use of space-based observations.

MEMBERSHIP AND THIRD PARTY PARTICIPATION

The group will be co-chaired by representatives – one from each party. Other members of the working group will consist of experts on the focused topic areas listed above in the Statement of Purpose, or any additional topics that may be subsequently added. Working group membership may change at any point so that the appropriate experts for the focused topics are present for each meeting.

The working group may hold special meeting sessions or seek feedback from non-members, such as third party countries, members of the academic community, or members of the private sector, with the approval of both the EU and US nominated co-chairs. The working group will also work closely to align activities and share progress with the JCG Arctic Working Group.

The EU and US co-chairs will report formally to the JCG meetings on the progress achieved. The EU and US co-chairs may also be called upon to report on the activity of working group at other mutually-agreed occasions (e.g. bilateral EU-US events) may.

Signed in Tromsø on 20 January 2015 in two originals in the English language



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