

# **Arctic Maritime and Aviation Transportation Infrastructure Initiative**

**Providing a Comparative Analysis of Port and Airport Infrastructure in  
Arctic Nations**

**Proposal Developed by the Institute of the North  
Anchorage, Alaska, United States**

**June 2011**

# Arctic Maritime and Aviation Transportation Infrastructure Initiative

## **Coordinating Institution**

Institute of the North  
509 West Third Ave., Suite 107  
Anchorage, AK 99501  
United States

## **Lead Country**

United States

## **Co-Lead Country (proposed)**

Iceland, Canada and/or Norway

- Participation as co-lead country could mean a financial contribution, an in-kind contribution of staff/technical resources or agreement to host either the Arctic Port Response Infrastructure Conference or Arctic Aviation Experts Conference

## **Principal Investigator**

Nils Andreassen, Institute of the North

## **Steering Committee and Work Group members (potential)**

Composed of government, academic and private sector entities

*See attached for draft list*

## **Deliverables**

- Guidance document to include benchmarking and baseline assessment of port and airport infrastructure
- Web-based, interactive map of current maritime and aviation infrastructure
- Arctic Aviation Experts Conference and Arctic Port Response Infrastructure Conference

## **Accountability**

Outcomes will be communicated regularly to the Sustainable Development Working Group of the Arctic Council.

Deliverables will better illustrate gaps in knowledge and capacity; and may propose guidelines for addressing both. Any formal recommendations produced from this process will be reviewed by SDWG members for approval.

Deliverables will be included for submission as a product of SDWG under the 2011-2013 Swedish Chairmanship.

## Overview

The Arctic Maritime and Aviation Transportation Infrastructure Initiative (Initiative) is a result of the work of the Arctic Council's Arctic Marine Shipping Assessment (AMSA) and the on-going work of a multi-agency (including DOT, FAA and Transport Canada) effort that sponsors the Arctic Aviation Initiative (AAI). It builds on and responds to past efforts and projects of two working groups within the Arctic Council – PAME's AMSA (2009) and the SDWG's Circumpolar Infrastructure Task Force (CITF), which acted as a platform for the Arctic Aviation Experts Workshop in 2005 and 2006. More directly, it follows on the strategic plan set forth at the 2010 Arctic Aviation Experts Conference (AAEC).

It is important to recognize the intermodal nature of transportation challenges in the Arctic – and an increasingly busy circumpolar North – and the AAEC and AMSA highlighted the unique needs and opportunities for Arctic transportation. Increased resource extraction to support economic and community development; increased shipping traffic through the Northern Sea Route and activity in the Northwest Passage due to a lessening of sea ice extent; and increased passenger traffic for the same reason, have resulted in the corresponding need for an increased capacity to respond by sea and by air. Response, which would include Search and Rescue (a response to human safety needs in the Arctic maritime environment) and Oil Spill Response (or more broadly any environmental disaster), is most effective when addressed through a strategic, intermodal approach that includes marine and air ability. Arctic ports and airports act as an important base for response capability; with each serving as a gateway anchor that supports SAR; resource extraction and development activities; pollution prevention and environmental safety; and community health and security. These can be considered critical components of sustainable development and the resiliency of Arctic peoples and communities.

The Initiative seeks to address the infrastructure deficit – a lack of ports and airports that have adequate infrastructure and response capabilities (and in some nations a lack of ports in general) - by inventorying maritime and aviation assets in the Arctic that impact the region's ability to respond. This will be accomplished by developing guidance for a robust, effective transportation system in the North. By setting benchmarks for what capacity and capability should look like and establishing a current baseline of Arctic maritime and aviation transportation infrastructure, the Initiative will be able to produce a gap analysis that more efficiently facilitates the application of resources by federal, regional and local governments, as well as international bodies. In this, the intermodal approach helps to avoid duplication, leverages a multiplicity of efforts and provides efficiencies to infrastructure development in a region that often struggles with economies of scale.

As part of the scope of this Initiative, it is envisioned that a multi-year campaign take place. In the first year, a budget of \$440,000 (see Annex 1) establishes a foundation to work from and begins the benchmarking process as well as gathering baseline data. Much of this has been done on the marine side by the AMSA, which will be updated and correlated with current and best aviation information. Baseline data will be fed into both a final guidance document and a revised version of the Institute of the North's Arctic Aviation Database, an updated form of which will be a deliverable from this effort; it will include port infrastructure and be renamed to reflect this expanded scope. The **Arctic Maritime and Aviation Infrastructure Database** will include a

web-based, searchable map that illustrates the overlapping spheres of responsibility and capacity as well as perceived gaps in the system as a whole. Arctic nations' ability to respond will be coordinated, intentional and built upon a well-established understanding of both need and capability.

A second deliverable will be the **2012 Arctic Aviation Experts Conference**, which will review and assess the aviation portion of the guidance document. This is the only venue to date in the world dedicated to Arctic aviation and provides an invaluable service in connecting stakeholders from across the Arctic to one another and critical issues. A corresponding **2012 Arctic Port Response Infrastructure Conference** will take place to evaluate the maritime transportation portion of the final document. A draft version of the Guidance Document will then be delivered to the Arctic Council's SDWG for review and input.

In the second year of the project, the Guidance Document will be refined and finalized, with results of the Initiative disseminated and work groups identified to address individual projects identified in the final document. At the same time, the Arctic Maritime and Aviation Infrastructure Database will be launched and outreach conducted. Similar funding needs are anticipated for this phase (see budget, in Annex 1).

## **Background**

### *AMSA as a Foundational Document*

Released in 2009 by the Arctic Council, the focus of the AMSA is marine safety and marine environmental protection, which is consistent with the Arctic Council's mandates of environmental protection and sustainable development. The Arctic Council's PAME Working Group was an instrumental driver in the delivery and production of the AMSA, which provides a useful framework for the Sustainable Development Working Group (SDWG) in its approach to addressing the human dimension of AMSA.

Two recommendations from AMSA that directly relate to, or have impacts upon, Arctic peoples and communities are found within one of AMSA's three major themes, that of **Building the Arctic Marine Infrastructure**. Specifically, the following two recommendations can be addressed through a sustainable development approach:

**III A. Addressing the Infrastructure Deficit:** That the Arctic states should recognize that improvements in Arctic marine infrastructure are needed to enhance safety and environmental protection in support of sustainable development.

**III C. Circumpolar Environmental Response Capacity:** That the Arctic states decide to continue to develop circumpolar environmental pollution response capabilities that are critical to protecting the unique Arctic ecosystem.

A well-developed Arctic infrastructure ensures that Arctic nations have the capacity to address community needs and environmental response. An Arctic Maritime and Aviation Initiative that has as its goals to benchmark and conduct a baseline assessment of aviation and maritime infrastructure and capacity lends itself to sustainable development in the Arctic.

Furthermore, specific findings within AMSA point to the need for an intermodal approach to maritime infrastructure in the Arctic. It is worth highlighting that

Emergency response capacity for saving lives and pollution mitigation is highly dependent upon a nation's ability to project human and physical resources over vast geographic distances in various seasonal and climatic circumstances. The current lack of infrastructure in all but a limited number of areas, coupled with the vastness and harsh environment, makes carrying out a response significantly more difficult in the Arctic. Without further investment and development in infrastructure, only a targeted fraction of the potential risk scenarios can be addressed. (AMSA, 2009)

An intermodal approach to a nation's and region's ability to respond to this challenge is necessary and the Arctic Council has an opportunity to address this through this Initiative.

#### *CITF and the Arctic Aviation Experts Conference*

In 2005, as Chair of the Circumpolar Infrastructure Task Force – a project of the SDWG – the Institute of the North hosted the Arctic Aviation Experts Workshop held in Khanty-Mansiysk Autonomous Okrug, Russia. As a follow up to that workshop, with support from LPS Aviation and the Government of Manitoba, the Institute was able to host the first Arctic Aviation Experts Conference in 2006.

The outcomes from that event continue to resonate today, and the importance of the issues addressed is highlighted in the growing demand for Arctic-specific conversations. That demand resulted in the 2010 Arctic Aviation Experts Conference (AAEC), where many previous recommendations were re-explored and evaluated. The most recent AAEC:

- addressed growing social, political, and economic needs for air transportation and the challenges to sustaining and improving transportation in the north;
- acknowledged the unique economic pressures on arctic aviation, as well as the application of technological advances in the unique northern environment;
- discussed ways to improve the reliability and safety of arctic aviation and airport operations;
- facilitated conversations that further the deployment of advanced aviation technology to enhance safety, capacity and connectivity in the Arctic;
- compared the response of circumpolar communities to the emerging sustainability, climate and environmental challenges of arctic transportation; and
- worked to develop an overarching process for change that addresses the interdependency of the social, economic, environmental, technological, and safety aspects of Arctic aviation.

From the 2010 Arctic Aviation Experts Conference (AAEC) that was hosted in Fairbanks, Alaska a better understanding of the unknown has been realized. Key to this has been the development of an increased awareness of parallel activities, programs and resources being delivered/expended throughout the Arctic that impact Arctic aviation policy, technology, and infrastructure. The Institute of the North and AAEC participants identified an urgent need for

coordination, collaboration, and networking of aviation related systems if Arctic nations are to improve aviation access and transit within the Circumpolar North to its fullest potential.

At the AAEC, participants identified numerous current and future infrastructure and service projects intended to improve aviation, which are essentially isolated projects, confined to local areas of implementation and local use. Many of the activities and infrastructures are paralleled with other ongoing activities that could be linked together in some manner to provide a more seamless service to a broader audience and across borders. Collaboration and coordination of parallel activities such as Automatic Dependent Surveillance Broadcast (ADS-B), weather data networks, camera networks, Search and Rescue (SAR) services and methods, and other systems, could provide broader, more effective services and achieve greater success if they were 'connected'. This connectivity could provide great socio-economic benefits and savings; and could improve the quality of services to governments, communities, and airports, as well as improving the delivery of passengers and cargo throughout the Circumpolar North.

Numerous technologies, engineering and construction methods and best practices are in place in Arctic nations, as well as efforts on research and development projects. Many of these are isolated knowledge bases, which have great potential to benefit a much broader aviation related audience than they do today. Put simply, it is evident that those working to address these issues could do so more effectively with a coordinated, intermodal approach.

Increased activity in the Arctic brings with it human impacts. The aviation industry must be positioned to respond to the need for an expansion in the delivery of services, whether they are related to Search and Rescue, community resupply, development efforts or an environmental disaster. This expansion brings with it an increasing need for the facilitation of shared knowledge, collaboration of services, and coordination of activities amongst the eight Arctic nations.

### **An Arctic Maritime and Aviation Transportation Infrastructure Initiative – the Project**

There is – clearly – a need for the Arctic Maritime and Aviation Transportation Infrastructure Initiative to facilitate the development of aviation and port policy, infrastructure, and technology throughout the Circumpolar North for the benefit of all of the Arctic nations. Recognizing an increasingly busy Arctic – driven in part by climate change and economics – the Institute of the North's Arctic Maritime and Aviation Transportation Infrastructure Initiative provides a platform for addressing Arctic marine and air transportation infrastructure challenges and opportunities. In order to ensure the continuity in the discussion and to be able to actively work toward recommendations from past efforts, this Initiative is best approached through the Arctic Council's Sustainable Development Working Group.

The Initiative will approach Arctic air and maritime transportation policy, education, and research from many different vantage points and will facilitate ongoing and increased communication and collaboration throughout the Arctic. It will act as a coordination point for conducting research to identify gaps in port and airport infrastructure; and will facilitate technology transfer within and between Arctic nations in order to ensure best practices in infrastructure development. It is important to keep in mind the impact that climate change will have on infrastructure; and to work toward future infrastructure that prevents pollution and is

climate resilient. At the same time, the Initiative will provide an education and outreach role in developing a robust maritime and air transportation industry in the Arctic, able to meet community, environmental and economic needs. This effort will be focused on highlighting the ongoing efforts to address the infrastructure deficit by educating policy makers and administrators, community leaders, and the general public.

The Institute of the North will develop and manage the Arctic Maritime and Aviation Transportation Infrastructure Initiative with the following in mind, to be referenced throughout the life of the Initiative and reflected upon/updated by all stakeholder/partners as it evolves.

***Mission Statement:*** To initiate a strategic approach to the development of a sustainable, resilient maritime and aviation transportation infrastructure in the North.

***Founding Principle:*** To promote Arctic maritime and aviation transportation policies and technologies that support critical infrastructure while enhancing safety and environmental protection in support of sustainable development .

***Vision:*** To create a safe, environmentally sensitive and effective maritime and air transportation system in the Arctic.

The Initiative's mission will be accomplished through the guidance of an international steering committee, as well as two expert groups comprised of subject matter experts. These groups will convene regularly to re-engage in the recommendations and action items from previous efforts. The task of each expert group will be to accomplish the intended outcomes – as described here-in – that work together to develop and support the mission, objectives, and goals of the Arctic Maritime and Aviation Transportation Infrastructure Initiative.

These two expert groups will address separately the Arctic Maritime and Port Infrastructure; and Arctic Aviation and Airport Infrastructure. Groups will work to

- Identify, define and promote Arctic maritime and aviation transportation policies that affect infrastructure development, through reciprocal education and communication with stakeholders and partners.
- Accelerate implementation of available/emerging technologies and operational practices into the maritime and aviation infrastructure, for improved services that support community safety and access as well as the protection of the Arctic environment.
- Provide guidance to Arctic nations to build, improve and maintain infrastructure that supports increased and changing maritime and aviation activity in the Arctic, balancing the social, economic, and environmental needs of local communities by incorporating lessons learned from across and beyond the Arctic.

These three missions will be accomplished in the initial phase of the Initiative through research and analysis that accurately depicts current conditions and informs future conditions of Arctic maritime and aviation infrastructure.

With regard to current and future Arctic maritime and aviation policy, technology, and infrastructure, each expert group will provide a Gap Analysis Report and deliver a Summary of Findings to improve maritime and aviation transportation capacity within the Circumpolar North to its fullest potential. Upon completion of these deliverables, an Arctic Maritime and Aviation Transportation Guidance Document will be produced.

This Phase One activity will develop a comparison of actual conditions with its potential future conditions. At its core are three questions: "Where are we?", "Where do we want to be?", and "How do we get there?" These questions will be addressed with the completion of three Phase One Deliverables:

- Expert Group Gap Analysis Reports
- Expert Group Summary of Findings
- Arctic Maritime and Aviation Transportation Guidance Document

Each Expert Group will deliver a Gap Analysis Report and a Summary of Findings. Upon completion of these deliverables, the project Steering Committee in conjunction with the Expert Groups will develop the final Arctic Maritime and Aviation Transportation Guidance Document.

### ***Gap Analysis***

This Gap Analysis will be a formal study and assessment of maritime and aviation transportation and infrastructure capacity (including critical support functions such as meteorological forecasting, marine/ice conditions, and communications) in the Arctic. This technical analysis will be divided into three milestone events: develop a benchmark; research current conditions; and produce a gap assessment. The outcomes of this Analysis will be used to develop the Expert Group Summary of Findings as a deliverable of this phase of work.

The Benchmark is intended to describe the desired and potential future conditions of aviation and maritime transportation in the Arctic. The Current Conditions milestone will define the current conditions of Arctic marine and air transportation – specifically, this will assess, describe and map port and airport infrastructure. The Gap Assessment will identify and articulate the gaps, deficiencies, and differences between current conditions and the potential future conditions.

This study and assessment should include analysis of findings from AMSA, as well as the recommendations of the 2005 and 2006 CITF Arctic Aviation Experts Conferences and those of the 2010 AAEC.

### ***Summary of Findings***

Upon completion of the Gap Analysis each Expert Group will develop a Summary of Findings that will describe actionable items found within the Gap Analysis. This document will provide an overall 'picture' of the current conditions of the Work Groups' specific focus. The Summary of Findings document will include conditions, activities, and projects that are planned or in progress in various locations, or areas, of the Arctic, as well as to identify future possibilities.



These documents will remain as “living documents” to be updated as new information becomes available from ongoing research and other activities and can be analyzed for potential use in future projects and Initiative course changes or corrections.

### ***Arctic Maritime and Aviation Transportation Guidance Document***

The Arctic Maritime and Aviation Transportation Guidance Document will be developed from the outcomes of the Gap Analysis and Summary of Findings documents that will be delivered by each of the Expert Groups of this phase of work.

The Guidance Document will be a stand-alone document that can be used as a roadmap to the future of Arctic air and maritime transportation infrastructure in the North and can be used to set the international benchmark for the development of well-crafted policy, best and latest technology, and effective infrastructure; as well as a communications and sharing format for Arctic maritime transportation and aviation system providers, users, stakeholders, sponsors, and other interested parties.

This document will:

- Identify the ongoing parallel projects, plans, policies, and technologies that could be combined or shared for the use and benefit of a broader Arctic maritime transportation and aviation audience.
- Point to potential methods, actions, and collaborations.
- Develop an overall picture of the gap between the future of Arctic air and maritime transportation and the current conditions of Arctic air and maritime transportation infrastructure.
- Provide the recommendations and information necessary to achieve the goal to improve capacity, access and services in the Arctic while enhancing human safety and the environment in support of sustainable development.

### ***The Arctic Maritime and Aviation Transportation Database***

With inputs from Civil Aviation authorities, the Arctic Council’s CITF and the Institute of the North compiled a database of over 600 airports north of 55 degrees in all circumpolar countries: United States, Russia, Canada, Greenland/Denmark, Iceland, Norway, Sweden, and Finland.

The web-based data describes the location and infrastructure for the airports along with statistics and contact information. The information is meant for investigation and planning purposes and not for air navigation. This data needs to be updated to more accurately reflect increased activity – and corresponding needs – in the Arctic.

In addition to updating the airport information, it is envisioned that adding port infrastructure to what becomes an Arctic Maritime and Aviation Transportation Database will better demonstrate the capacity Arctic nations have to respond to environmental safety concerns, community needs, and development activity. This will be a significant contribution to the Arctic community’s understanding of aviation and maritime infrastructure. These data sets could be added to the Arctic Portal for a comprehensive examination of Arctic challenges and opportunities.

## **Significance and Justification**

The Arctic Maritime and Aviation Transportation Infrastructure Initiative has the potential to be an incredibly successful platform for addressing critical needs in the Arctic's aviation and maritime environment. At the same time, it demonstrates international cooperation and collaboration by translating prior Arctic Council efforts into a comprehensive approach to infrastructure development. It also works to incorporate and leverage new efforts such as the multi-agency Regional Response Team (RRT) in the U.S.; the U.S. National Ocean Policy and Arctic Strategic Action Plan; EPPR's proposed Arctic Region Oil Spill Response Resource and Logistics Guide; the State of Alaska's Arctic Ports Study; the Arctic ERMA; SAON (Sustaining Arctic Observing Networks) and other initiatives taking place in other Arctic nations.

AMSA's impact on Arctic policy will be felt well into the future. Its relevance to a connected, intermodal approach to Arctic air and maritime transportation is clear. The Arctic Maritime and Aviation Transportation Infrastructure Initiative is a next step in that approach and by leveraging international resources, global interest and local input the Arctic Council's SDWG will be fulfilling its mission and responding to the human condition.

Aviation and marine shipping infrastructure in the Arctic are inextricably linked in their ability to deliver goods and services, respond to needs, produce community and economic development, and protect the environment and human health. Not only that, but they link Arctic nations and peoples and build a resilient North. Partners and stakeholders from the eight Arctic nations – Sweden, Norway, Denmark, Finland, Iceland, Canada, Russia and the United States – can jointly work to address an infrastructure deficit in the Arctic. At the same time, this Initiative responds to more recent efforts such as the Search and Rescue Agreement signed by Arctic nations at the Arctic Council Ministerial in Nuuk, Greenland.

## **Timeline (draft)**

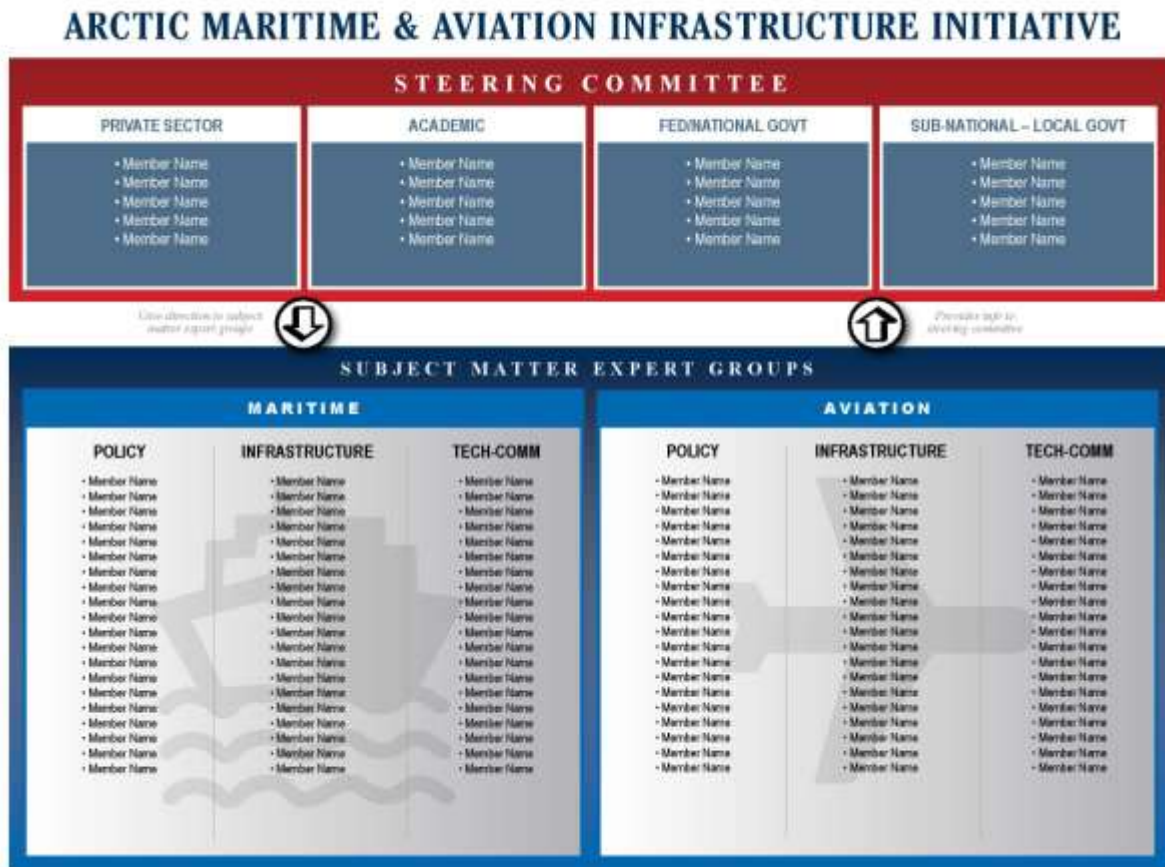
### **Year 1:**

- 1) Obtain SDWG Project Approval
- 2) Enlist participating countries and form Steering Committee/SMEGs
- 3) Develop Project Management Plan and Scope of Work
- 4) Develop database and identify web-based platform
- 5) Host Arctic Port Response Infrastructure Conference and Arctic Aviation Experts Conference
- 6) Brief SDWG twice a year on progress/milestones

### **Year 2:**

- 1) Compile and organize data from participating countries
- 2) Test and launch pilot Arctic Maritime and Aviation Infrastructure Database
- 3) Brief SDWG twice a year on progress/milestones and conduct demonstration of system
- 4) Produce hard copies of Guidance Document and Database
- 1) Obtain SDWG/SAO review/approval of final deliverables
- 2) Publicize & disseminate Guidance Documents and Database

## The Steering Committee and Project Timeline/Process



AMATII's Steering Committee will reflect the overall commitment to balanced, informed discussion that incorporates economic, social and environmental perspectives from four sectors – private industry, academia, local/sub-national government, and national government agencies. Twenty high-level committee members will be selected based on established relationships developed during AMSA and the AAEC, with input from the co-lead countries.

The purpose of the steering committee is to:

- Establish and maintain a transparent, inclusive consultation process
- Establish and maintain consistent goals for Subject Matter Expert Groups
- Establish timeline for meeting goals and project deliverables
- Reconcile differing views; taking into consideration cross-sectoral issues and working toward their resolution
- Review and approve assessment, benchmarking and gap outputs
- Provide regular updates and reports to SDWG

**Arctic Maritime and Aviation Transportation Infrastructure Initiative**  
Draft Budget

***NOTE: At this point all pledges of support are tentative. No binding commitments have yet been made.***

**Potential/Anticipated Income**

AUTC (Alaska University Transportation Center)	\$25,000
MARAD (U.S. Maritime Administration)	\$50,000
U.S. Dept. of State	\$25,000
State of Alaska	\$30,000
State of Alaska DOT&PF	\$25,000
Transport Canada	\$75,000
University of Alaska Fairbanks	\$30,000
Shell Oil	\$10,000
Co-lead country (TBD: Iceland, Canada)	\$75,000
To be determined	\$55,000
Conference Attendees	\$35,000
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Total	\$440,000

**Expense**

Travel	\$55,000
Communications and IT/web design	\$25,000
Consultants	\$75,000
Graphic Design and Printing	\$25,000
Staff and administration	\$85,000
Infrastructure Response Scenarios Dialogue	\$45,000
Port Response Capacity Conference	\$65,000
Arctic Aviation Experts Conference	\$65,000
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Total	\$440,000