Arctic Spatial Data Infrastructure Strategic Plan

Vision

An Arctic SDI - based on sustainable co-operation between mandated national mapping organisations -will provide for access to spatially related reliable information over the Arctic to facilitate monitoring and decision making.

Introduction

The Arctic Spatial Data Infrastructure (SDI) was created by the Arctic Council’s Conservation of Arctic Flora and Fauna (CAFF) to be an essential tool in helping to understand the impacts of climate change on nature, biodiversity management issues, and the adaptability and sustainable use of all living resources in the Arctic. Successfull conservation of the Arctic environment while allowing for economic development will require a well functioning exchange of spatially referenced data for cross-geopolical boundary activities such as monitoring climate change, pollution, and changes in Arctic biodiversity. Furthermore, geospatial and other reference data can be used as a tool for integrated planning (for instance between oil and gas industry, environmental concerns and cultural heritage sites), and helping to make planning efforts more cost effective.

The Arctic SDI is intended to allow for the creation of a harmonised map covering the entire Arctic Region as defined by the Arctic Council members. This will facilitate a more robust management and manipulation of data for both research and management purposes

Preparations for establishing an Arctic SDI have been ongoing for a number of years. At the GeoNorth conferences in 2007and 2009 the establishment of an Arctic SDI was proposed. During the same period the Arctic Council Working Groupsreleased a number of reports which stressed the need for an Arctic SDI (CAFF 2008, CAFF, AMAP, and EPPR 2009).

This Arctic SDI is based on sustainable co-operation between mandated national mapping organisations and will provide for access to spatially related reliable information over the Arctic to facilitate monitoring and decision making. .

The Arctic SDI will be developed, maintained and administered by the circumpolar National Mapping Agencies. The mapping agencies will provide the Arctic SDI with the necessary experts, national geographic information and systems to allow the development of the Arctic SDI.

Background

The aim of the Arctic SDI project is to jointly develop an geospatial data clearinghouse that will include the following capabilities to support pan-Arctic science and societal decision support:

* Reference data as Web Map Services to establish a common image and vector base for the Arctic context at nominally 1:250,000-scale
* A searchable catalogue of map-able data resources - base maps and other geo-referenced thematic data and services
* A Web portal as primary user interface to search the catalogue and enable visual analysis of multiple base maps, thematic maps, and geographic data

With the current interest on climate change the Arctic has been subjected to intense scrutiny and as a result a wide array of data has been generated which is spatial in nature. The approach to managing much of this data has largely been national or dedicated to specific issues. As a result many of the existing datasets are distributed throughout many organisations. They are often not integrated or coordinated and it is difficult to find an environment in which these diverse datasets can be combined and analysed together.

Examples of the contributions the Arctic SDI could make include the following:

* Monitoring living resources – an Arctic SDI would allow for more effective circumpolar monitoring of biodiversity and common resources.
* Monitoring climate change – an Arctic SDI would allow for more effective interpretation and implementation of monitoring systems, e.g. with regards to climate change effects.
* Increased knowledge of the effects of climate change, pollutants and heavy metals in the Arctic and their consequences for human and animal living conditions, globally as well as in the Arctic Region.
* Preservation of arctic nature, natural qualities, biological diversity and sustainable use of the region's resources, as far as both renewable and non-renewable resources are concerned.
* Contributing to the development and improvement of the quality of life of the arctic population and the ecological and economic prerequisites for continued human settlement in the Arctic.
* Facilitate the development and effectiveness of circumpolar Search & Rescue operations and contingency plans.
* Emergency response – if there would be an oil spill in Arctic waters, the existence of an Arctic SDI could contribute significantly to facilitating the coordination and implementation of response measures between countries.

# Governance, Organization and rules of procedure

## Memorandum of Understanding

The foundation for the Arctic SDI is the “Memorandum of Understanding” (MOU) in which the spirit of the cooperation is detailed. The MOU expresses the intention of the signatories to collaborate and describes the objectives, the areas of interest and the forms under which the cooperation will be performed. Through the MOU, the signing participants will designate appropriate representatives to identify cooperative activities and details of implementations. The MOU is a **legally non-binding** instrument covering a period of five years from the date of signature. It may be amended or extended by written agreement. The MOU is attached in Appendix 3.

**Implementing Arrangements**

Not all activities of the Arctic SDI cooperation necessarily need legally binding agreements to provide resources and funding. To implement collaborative activities though, which require specific commitment between signatories or signatories and third parties, signatories of the MOU may enter into an Implementing Arrangement (IA) that can serve as a **legally binding** instrument. An IA provides the necessary framework for legally binding issues such as intellectual property, liability and copyright as well as long term commitment of resources and funding. Depending on the issues not necessarily all of the signatories needs to participate in an IA, however all signatories should provide “tacit approval” (e.g. via email) for the IAs. All IAs are agreements between signatories or signatories and legal third parties and will be added to the Appendix in chronological order.

## Arctic Council and the Senior Arctic Officials

To support the communication and to clarify the future affiliation with the Arctic Council it has been agreed to establish the link to the Senior Arctic Officials through the secretariat of the Arctic Council working group Conservation of Arctic Flora and Fauna (CAFF). Within the Arctic Council Greenland/Denmark has taken the lead to facilitate the Arctic SDI.

## Arctic SDI governance and organization

The governance and organisation of the Arctic SDI consist of the Board, the National Contact Points, Lead Countries, Supporting Countries and the Operational Task Force.



*Figure: Governance and organisation.*

**The Arctic SDI Board**

The decision-making body of the Arctic SDI cooperation is the Arctic SDI Board.

The Board formulates the vision, goals and strategy for the development of the Arctic SDI, organizes the affiliation with the Arctic Council and prepares the necessary Implementing Arrangements. The Board also identifies the tasks of the cooperation, organizes the work and provides the necessary resources, governance and competences to support the implementation of decisions.

The Board consist of one Director General / deputy Director General from each of the MOU signatories which countries are members of the Arctic Council.

The Chair of the Arctic SDI Board rotates every second year following the cycle of the Arctic Council chairmanship. The Chair is the board-member representing the National Mapping Agency from the same country that holds the Chair of the Arctic Council. The cycle of the Arctic SDI Board chairmanship begins 1 February of the year where the chair of the Arctic Council changes in May.

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| --- | --- | --- | --- |
| 1 Feb – 31 Jan | **Chair** | Previous Chair | Incoming Chair |
| 2014 2015 | **Canada** | Iceland | USA |
| 2015 2017 | **USA** | Canada | Finland |
| 2017 2019 | **Finland** | USA | Iceland |
| 2019 2021 | **Iceland** | Finland | Russia |
| 2021 2023 | **Russia** | Iceland | Norway |
| 2023 2025 | **Norway** | Russia | Denmark |
| 2025 2027 | **Denmark** | Norway | Sweden |
| 2027 2029 | **Sweden** | Denmark | Canada |

The Board shall meet no less than once a year. The board otherwise decides the frequency of meetings as appropriate.

The chair shall notify the board members of the date, venue and provisional agenda at least 4 month before the meeting is due to commence and at the same time set the deadline for submission of proposals or documents for discussion from the Board Members. The Board can decide on general procedures for the preparations and the conduct of board meetings as well as specific procedures for one specific board meeting. Being an equal cooperation between national agencies all decisions are made in consensus.

An Implementing Arrangement can mandate the Board to make decisions following special rules of procedures.

The board can invite observers to attend the board meetings and to make presentations as well as participate in the discussions under specific agenda items.

**The Board Executives**

The Board Executives consist of the present Chair, the former Chair and the coming Chair of the Board. The purpose of the Board Executives is to have a forum for exchange and transfer of experiences and for decision taking in between Board Meetings. The Board Executives can

* Be mandated by the Board to make decisions and launch actions concerning specific items in between the board meetings,
* Implement a written decision procedure or to convene an extraordinary Board Meeting including the necessary preparatory meetings.

**National Contact Points**

To prepare board-meetings and promote efficient decision making each Board Member appoints a representative from their institution to serve as the Arctic SDI National Contact Point.

The National Contact Points prepares the board meetings by proposing items to the agenda and by clarifying issues and differences in opinions in relation to meeting documents and draft decisions.

The National Contact Points meet prior to the board meetings no later than 2 weeks before the deadline for submitting documents and proposals to the Board. These meetings are chaired by the National Contact Point representing the institution holding the chair of the board.

**Lead Countries, Supporting Countries and the Operational Task Force**

The present status of the Arctic SDI cooperation is a voluntary cooperation between national mapping agencies. As such the resources necessary are composed by voluntary contributions from the participating institutions with the recognition of different level of engagement.

Unless other commitments are agreed upon in Implementing Arrangements the activities will be performed by Lead Countries joined by Supporting Countries. This includes both administrative and technical activities and operations as well as development and strategic activities. The activities can be organized in programs, projects or otherwise.

A Lead Country has the responsibility for the operation and progress of the activity. The tasks within the activities are divided between the Lead Country and the Supporting Countries and managed through meetings, video meetings and mail.

The Lead Countries refers to the Board. This includes the responsibility to report and submit documents and draft decisions to the Board, including compliance with deadlines and reflecting on the opinions expressed by the National Contact Points in the process of preparing the Board Meeting.

The group of lead countries forms the Operational Task Force to ensure the necessary coordination of activities and to facilitate and support the daily operations, secure progress and handle acute challenges through mail, video meetings and ordinary meetings. The Operational Task Force contributes to the preparation of board meetings by coordinating the preparation of documents and proposals prior to board meetings.

It is anticipated that the Lead Country representative predominantly is also serving as the National Contact Point. Thus the majority of the lead country representative normally will be present at the National Contact Points Meetings prior to the Board Meetings. If it this is not the case the Chair of the Contact Points can invite a Lead Country representative to attend when it is deemed necessary to facilitate the preparation of a Board Meeting.

Geographic Scope

The Arctic SDI is to cover the Arctic regions of the involved participating countries, as defined by the countries themselves.

Strategic Plan Overview

The Arctic SDI Strategic Plan provides a process used to set priorities, identify where energy and resources will best be spent, and ensure stakeholders working in the Arctic can better meet their goals and objectives in response to a changing environment. The Plan will be used to document and communicate the goals and objectives to achieve a highly desierable and accessable spatial data infrastructure, and actions needed to achieve those goals and other critical elements developed during the formation and future success of the Arctic SDI.

This Plan is structured by identifiying seven overall themes to be addressed, with identified anticipated outcomes, stated goals and objectives, and action items to be achieved for each.

# Theme 1: Geospatial Data and Associated Products

Anticipated Outcomes: Provide the most current and complete circum-Arctic geospatial and associated data available

Goal 1 - Provide baseline geospatial reference data from the 8-Arctic National Mapping Agencies

Objective 1.1 Provide seven baseline geospatial data layers that include: boundaries, elevation, bathymetry, hydrography, transportation, settlements, vegetation, land use, and place names

Action Item 1.1.1 - By October 2014 host the 8 Arctic National Mapping Agencies baseline geospatial data

Goal 2 - Provide access to remotely sensed imagery

Objective 2.1 Provide access to remotely senses imagery as part of the ASDI data holdings

 *Action Item 2.1.1*

Objective 2.2 Supply links to metadata of agencies that provide free data downloads of remotely sensed imagery

 *Action Item 2.2.1*

Objective 2.3 Host the CAFF Dedicated Pan-Arctic Satellite Remote Sensing Products

 *Action Item 2.3.1*

Action Item 2.3.1 - By December 2014 host the CAFF Modis derived Pan-Arctic Satellite Remote Sensing Products

Goal 3 - Sensor Data

Objective 3.1 Provide access real-time data feeds and sensor webs for improved monitoring, control, situational awareness, and decision making

Goal 4 - Data Models

 Objective 4.1

 *Action Item 4.1.1*

Goal 5 - Other Thematic Data

Objective 5.1 Provide linkages to other geospatial data feeds such as SAON, AON, etc.

Goal 6 - Semantic Data

Goal 7 - Volunteered data

Objective 7.1 Promote and support volunteered geographic information

Action Item 7.1.1 - By June 2018 create a Citizen Science plan that promotes the collection and uploading of citizen collecting field data useful for updating baseline geospatial information

# Theme 2: Communication

Anticipated Outcomes: Develop and implement a communication strategy and outreach plan to promote the benefits and use of the Arctic SDI data and the goals of the Strategic Plan

Goal 1 - Provide information and education on the Arctic SDI's ability to deliver geospatial information in a timely manner.

Objective 1.1 Provide guidance and instructions to governments, business and the public on the use of the Arctic SDI.

Goal 2 - Develop a process to track the use of the Arctic SDI.

Goal 3 - Solicit feedback from the user community on access, use, download functionality.

Goal 4 - Solicit the user community on potential future requirements, functionality, and data holdings of the Arctic SDI.

# Theme 3: Visualization

 Anticipated Outcome: Provide a web-based geospatial data portal that is easy to use and navigate by scientific and lay individuals.

Goal 1 - Develop capabilities that present data in a way that allow easy use and access to Arctic SDI data and features.

Objective 1.1 Provide government, businesses, and citizens a way to visualize and explore data to derive information and knowledge

Theme: Services

Goal 1 - Develop Capabilities for International Shared Services

Objective 1.1. Develop geospatial interoperability reference architecture.

Objective 1.2. Establish a geospatial platform that provides geospatial data, services, and applications Web-based service environment

Objective 1.3. Promote the use of international multi-agency geospatial data

Objective 1.4.Create an Arctic SDI geospatial portal that provides resources and services.

Objective 1.5. Provide for the discovery, access, integration, and application of geospatial data at a seamless location that serves the needs of government, the business community, and citizens

Goal 2 - Provide mechanisms for efficient and timely geospatial data purchases.

# Theme 4: Data and Metadata Standards

Anticipated Outcome: Examine and address the technical barriers to efficiently and effectively integrating and sharing data within and among participating organizations using internationally recognized data management and metadata standards.

Goal 1 - Leverage shared and open source standards.

Objective 1.1 Consult and collaborate with both existing and emerging geospatial communities to ensure common standards and approaches.

Objective 1.2 Develop strategic partnerships with existing standards development organizations

# Theme 5: Technology

Anticipated Outcome: Efficient, effective use of shared technology infrastructure to encourage and support efficient and accessible information sharing

Operations

Federated Architecture

Goal 3 - Develop Capabilities for Cloud Based Access

Objective 3.1 Assess Potential Options for Cloud Based Computing

Objective 3.2 Expand the use of cloud computing where appropriate.

 Anticipated Outcome: Development of processes and procedures that promote consistant results and encouragement of continual improvements towards the organization, application, and use of the Arctic Spatial Data Infrustructure.

# Theme 6: Best Practices

Goal 1 - Ensure Accountability and Effective Development and Management of Geospatial Resources through Implementing Arrangements

Objective 1.1 Promote and establish Terms of Reference.

Action Item 1.1 Approve Terms of Reference for the Secretariat, Board and Board Executive, Operational Task Force

Action Item 1.2 Approve Terms of Reference for Working Groups as they are created.

Objective 1.2 Identify potentially duplicative investments and opportunities for collaborative activities.

# Theme 7: Legal Processes

Anticipated Outcome: