



11<sup>th</sup> Arctic Regional Hydrographic Commission Meeting  
09-10 November 2021  
Video Conferencing (VTC)

**Status Report of the Arctic Regional Marine Spatial Data Infrastructures Working Group  
(ARMSDIWG)**

Submitted by: Chair ARMSDIWG, United States of America

Executive Summary: This report contains the current status and planned actions of the ARMSDIWG in its fifth full year of operation. Through another year of virtual meeting due to the novel coronavirus outbreak, ARMSDIWG reassessed their expired workplan, additional worktasks and external activities against their Terms of Reference and renewed and reorganized their approach pending ARHC feedback and approval. Relevant information on related projects and groups is provided in this report.

Related Documents: *Joint Statement of Intent between the Arctic SDI Board and the Arctic Regional Hydrographic Commission (2020)*  
*MSDI Aggregated Data Web Service Checklist for the ARHC*  
*ARMSDIWG Terms of Reference*  
*ARMSDIWG Work Plan 2021-2026*

Related Groups/Projects: Arctic Spatial Data Infrastructure (Arctic SDI)  
<http://arctic-sdi.org/>  
Federated Marine SDI  
<https://www.ogc.org/projects/initiatives/fmsdi>

**ARMSDIWG Workshop (Virtual) No. 5**

Amid the novel coronavirus outbreak, the Arctic Regional Marine Spatial Data Infrastructures Working Group Workshop No. 5 (ARMSDIWG5) was held virtually over multiple days, in lieu of the annual in-person meeting:

- ARMSDIWG 5.1, 09 NOV 2020
- ARMSDIWG 5.2, 12 NOV 2020
- ARMSDIWG 5.3, 10 MAY 2021
- ARMSDIWG 5.4, 20 MAY 2021
- ARMSDIWG 5.5, 30 JUN 2021
- ARMSDIWG 5.6, 30 SEP 2021

The meetings consisted of attendees from the Hydrographic Offices (HOs) of Canada, Denmark, Finland, Iceland, Norway, and United States of America.

Highlights of the ARMSDIWG work included an assessment of Arctic Voyage Planning Guide (AVPG) feasibility with limited resources, an information session on automatic identification system (AIS): Global Maritime Traffic Density Service, planning for participating in the Federated MSDI-Pilot activity organized by Open Geospatial Consortium (OGC), potential collaboration to Arctic Council Arctic Data Policy with Arctic SDI, reporting national MSDI progress towards ARHC activities, and a 5-year reassessment of the working group.

**ARMSDIWG 5-Year Reassessment**

Since its founding in 2016, ARMSDIWG has achieved several milestones in progressing its purpose and establishing itself in the broader geospatial community as the facilitators of mostly hydrographic data in the Arctic:

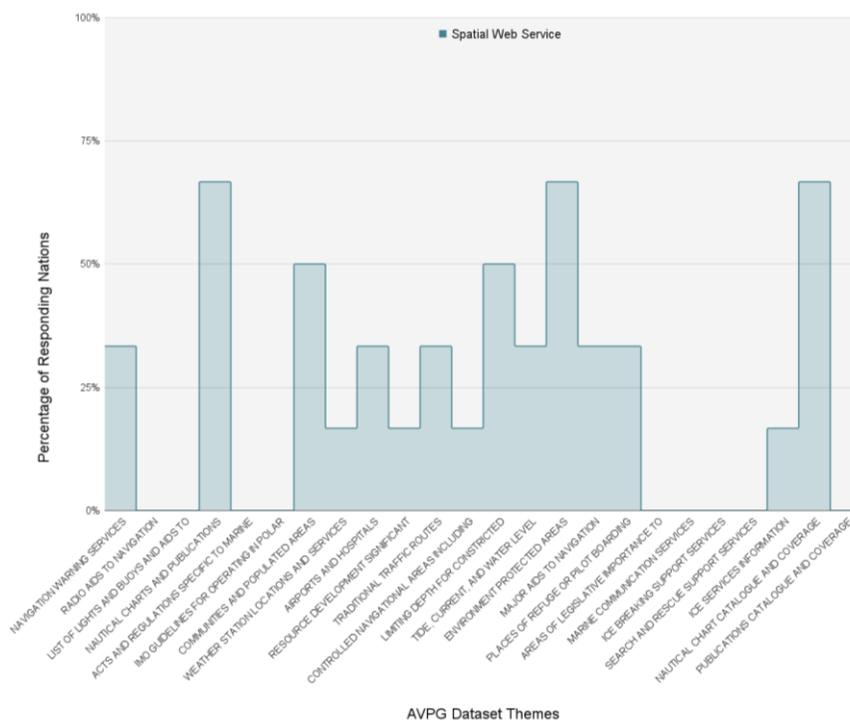
- Established a common understanding of MSDI between ARHC Member States (MS) (ref. ARMSDIWG White Paper)
- Established a collaborative relationship with the terrestrial National Mapping Agencies of the Arctic SDI

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- Coordinated reuse of International Bathymetric Chart of the Arctic Ocean (IBCAO), and the GEBCO Sub-Committee on Undersea Feature Names (SCUFN) digital gazetteer service of the names in the Arctic Region for the Arctic SDI geoportal.
- Initially surveyed ARHC MS and Associate Members for available data and inventoried data available to support:
  - General Arctic Hydrographic Office Data
  - Arctic Voyage Planning Guide (AVPG)
  - User Survey Report (data to support Arctic Council user groups)
- Engaged with several working groups of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM):
  - Working Group on Marine Geospatial Information
  - Working Group on Legal and Policy Frameworks for Geospatial Information Management
- MS coordination and/or participation in several international, structured projects:
  - Arctic Spatial Data Pilot
  - OGC-IHO Marine SDI Concept Development Study
  - User Survey Report: Better access to geographic data for Arctic marine and ocean areas

As ARMSDIWG continues to engage with Arctic SDI and work developmental, resource & technology-required tasks from ARHC, it becomes more evident to the group that their current resources and organizational breadth and structure are very limited in capacity and cannot equally mirror that of Arctic SDI as well as support operational tasks that may be desired by ARHC, such as the AVPG. ARMSDIWG's previous Terms of Reference (ToR) was not initiated with an operational component, so the last few years of ARMSDIWG interpreting AVPG criteria/requested data, inventorying available datasets, attempting to align data standards and formats between contributing agencies, and deciding on the hosting of a common technology platform offered by some members has been a lengthy process without achieving a prototype stage at the very least. If achieved, the AVPG prototype would have been a potential foundation/catalyst to meet other requirements by user groups in the Arctic, such as the Norwegian-led *User Survey Report*. However, only a collective 21% of the AVPG datasets are currently available as geospatial web services from across ARHC's Hydrographic Offices (HOs) (see Figure 1 below).

**Current Web Service Availability for AVPG Themes (2020)**



**Figure 1** Area chart representing the 2020 status of spatial web services currently available from CAN, DNK, FIN, ISL, NOR, USA. Only 21% of AVPG Datasets are collectively available as a geospatial web service. No single theme is fully covered by ARHC HOs.

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Rather than focus on specific projects, and limiting to their curated views of data, a true federated approach is optional where ARHC's HOs assess their own data holdings against a list of requirements needed to comply with a minimum FAIR<sup>1</sup>-level to make them fit-for-purpose. Much work has already been done in IHO, OGC, Arctic Council, and ARMSDIWG to understand what data is needed by the broader user base in the Arctic. ARMSDIWG could be the aggregator of these requirements for ARHC (ref. *MSDI Aggregated Data Web Service Checklist for the ARHC*).

The truth today is that an Arctic user still does not currently have a central or common way to find authoritative Arctic marine spatial data from ARHC's HOs, nor do they have a total set (i.e. gaps in coverage) of usable web services available to them for the majority of themes they've asked for in various studies and surveys.

Marine geospatial data and services are mainly produced and provided nationally through relevant authorities, including HOs, upon requests of user needs and granted by their government. ARMSDIWG, at its current capacity, can help organize affordable reuse of available data and services, and monitor progress from a collective Arctic HO perspective.

If ARMSDIWG is meant to provide technology, and resources to operationalize data from the Arctic HO collective, then significant technology, time and personnel resources must be allocated, and HOs must take additional responsibilities for components of the required technology (e.g., storage, hosting, content curation, software development/configuration).

After 5 years of ARMSDIWG's existence and meeting the threshold of their current capacity, ARHC may want to reassess what they would like to achieve with regards to MSDI in the region, and how ARMSDIWG could realistically support that at its current capacity, or what might be needed to achieve a regionally-coordinated technology and data service infrastructure.

With this report, ARMSDIWG has provided an updated ToR and aligned Work Plan given their current capacity and resources for ARHC consideration. If approved, the Work Plan has been designed to internally assign volunteer leads from ARMSDIWG to each of the Work Plan Tasks for efficient tracking and execution of overall Tasks.

### **Federated MSDI-Pilot**

The recently initiated Federated-MSDI Pilot, organized by OGC, is another excellent opportunity for collaboration of stakeholders across the marine domain, and for potential participation amongst IHO Member States, to demonstrate applied technologies along with the practical use of OGC and IHO standards through Marine SDI. This project builds upon the foundation of the OGC-IHO MSDI Concept Development Study (CDS) that included the participation of several ARMSDIWG member organizations.

Multiple members of ARMSDIWG are currently, or in the process of, supporting the Federated MSDI-Pilot, and potential exists to explore use cases of voyage planning with a land/sea interface component in the Arctic, as well as other use cases in other regions. Supporting members will continue to update ARMSDIWG participants, encourage participation where opportunities exist, and keep ARHC informed of developments on this Pilot project.

### **Cooperation with Arctic SDI**

The approved *Joint Statement of Intent between the Arctic SDI Board and the Arctic Regional Hydrographic Commission (2020)* has been provided with this report in PDF format for posting to the ARHC web page. Arctic SDI suggested the possibility for a press release from ARHC to promote the Joint Statement.

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<sup>1</sup> Findability, Accessability, Interoperability, Reusability

Arctic SDI reached out to ARMSDIWG looking for recommended sea ice web services that could be incorporated into the Arctic SDI geoportal. ARMSDIWG confirmed that the Copernicus Marine Service sea ice web services are available, and the US representation from ARMSDIWG began a dialog with the U.S. National Ice Center (USNIC) and the National Snow and Ice Data Center (NSIDC) about potential for future high-quality sea ice web services sourced from NSIDC for reuse.

Arctic SDI is continuing with a project to harvest Arctic related data, and invites ARMSDIWG to participate in helping refine the harvest to collect relevant marine data services for the region.

### **Invited Actions of ARHC**

The ARHC members are invited to:

- Take note of the report.
- Discuss the question: what would ARHC like to achieve with regards to MSDI in the region?
  - Review, discuss, and/or approve the updated *ARMSDIWG ToR* (provided under separate cover).
  - Review, discuss, and/or approve the *ARMSDIWG Work Plan 2021-2026* (provided under separate cover).
  - Consider adopting the *MSDI Aggregated Data Web Service Checklist for the ARHC* (provided under separate cover) as a standard mechanism to report annually the progress towards individual HO provisioning of data web services to support an Arctic federated MSDI approach in response to the various user-driven activities identified by ARHC MS.
- Approve the posting of the *Joint Statement of Intent between the Arctic SDI Board and the Arctic Regional Hydrographic Commission (2020)* document (provided under separate cover) to the ARHC website Basic Commission Documents (<https://iho.int/en/basic-commission-documents-1>).
  - Consider a press release avenue to promote the *Joint Statement of Intent*, possibly with the IHO News Archive.
- Take action as seen appropriate.