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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 of the ARMSDIWG in its seventh full year of existence. Following decisions from ARHC12, ARMSDIWG has spent the year restructuring their working group to better align with their resource capacity with a renewed Work Plan and Terms of Reference. Relevant information on key tasks, related projects, and related groups is provided in this report.
Related Documents:	*MSDI Aggregated Data Web Service Checklist for the ARHC*
Related Groups/Projects:	Arctic Spatial Data Infrastructure (Arctic SDI) http://arctic-sdi.org/ *Federated Marine SDI Pilot* https://www.ogc.org/initiatives/fmsdi4/ *Federated Marine SDI Pilot: Phase 3 – Connecting Land and Sea to Protect the Arctic Environment* https://www.ogc.org/initiatives/fmsdi3/

ARMSDIWG Workshops

Arctic Regional Marine Spatial Data Infrastructures Working Group Workshop year 7 (ARMSDIWG7) was held virtually over multiple days, in lieu of the annual in-person meeting:

- ARMSDIWG 7.1, 14 DEC 2022
- ARMSDIWG 7.2, 12 APR 2023
- ARMSDIWG 7.3, 09 AUG 2023

The meetings consisted of attendees from the Hydrographic Offices (HOs) of Canada (CAN), Denmark (DNK), Finland (FIN), Iceland (ISL), Norway (NOR), and United States of America (USA).

Revised Direction for ARMSDIWG

As presented to ARHC12, where ARMSDIWG identified its limited capacity and resources for technical projects, ARMSDIWG simplified its Work Plan and has spent the last year assigning leads and organizing within its functional 3 key tasks:

- Task A, Communication: Strategy, Collaboration, and Outreach
  - Leads: DNK & USA
- Task B, Technical: Standards and Technology Implementation
  - Leads: CAN & NOR
- Task C, Operations: IHO Strategic Plan, Target 2.1 Execution
  - Leads: CAN & USA

The intent is for all future work to be organized by the leads within each of these three key tasks and to focus the ARMSDIWG annual report to ARHC on these areas.

Communication: Strategy, Collaboration, and Outreach

The Communication Task Leads met to discuss a plan for outreach and messaging of ARMSDIWG activities to external organizations, authorities, and users. The Tasks Leads coordinated with IHO Secretariat a web space organized under the ARHC to finally secure a much-needed web-presence for ARMSDIWG to direct external audiences to a logical, easy-to-find location for all current and relevant information produced by ARMSDIWG. All ARMSDIWG information will be available at: https://iho.int/en/armsdi-wg

A communication plan (see Annex A) was developed for ARMSDIWG to be able to maintain effective communication with its parent organization, ARHC, with Arctic SDI, and with other, regional, external marine

data authorities and organizations, while also ensuring that their strategic documents are regularly reviewed and updated.

Cooperation with the National Mapping Agencies of the Arctic SDI in accordance with the *Joint Statement of Intent between the Arctic Spatial Data Infrastructure Board and the Arctic Regional Hydrographic Commission 2020* remains a top priority for ARMSDIWG. At the time of this report, the Arctic SDI is still pausing all official meetings until further notice. Meanwhile, ARMSDIWG representatives have continued discussions with their respective, national Arctic SDI counterparts, and is prepared to engage on the drafting of Arctic Council Data Policy with Arctic SDI, detailed in *the Strategy for ARMSDIWG's Engagement with Arctic SDI* (see Annex B).

Technical: Standards and Technology Implementation

The Federated Marine Spatial Data Infrastructure (FMSDI) Pilot is a currently ongoing OGC Innovation Program initiative with the objective to enhance Marine Spatial Data Infrastructures (MSDIs), to better understand MSDI maturity and demonstrate the power of FAIR (Findable, Accessible, Interoperable, Reusable) data in the context of the marine environment.

This Pilot directly responds to the recommendations from the OGC-IHO MSDI Concept Development Study (CDS) and is evidenced by the success of the OGC-IHO collaboration in the OGC-IHO Maritime Limits and Boundaries Pilot to initiate a full-scale Pilot to demonstrate a multi-country, federated MSDI under land/sea interface use-cases. This Pilot further builds on OGC Arctic Spatial Data Infrastructure Pilot results.

The third phase of the Pilot, supported by United States (NGA) on behalf of ARMSDIWG, started in JUL 2022 and concluded in FEB 2023. This phase focused on land/sea use cases in Arctic region and utilized previous work of the Arctic Voyage Planning Guide (AVPG) under ARHC, and invited all ARMSDIWG representatives to participate as observers.

This phase used “a sea-based, transportation, health and safety scenario involving an expedition cruise ship, with 200 passengers and crew, running aground in Kotzebue Sound on the west coast of Alaska. This area included national parks and several Large Marine Ecosystems (LMEs) with challenging navigational conditions. Sub-scenarios, developed by the participants, demonstrated how technology and data used with OGC and IHO standards, such as the OGC APIs and IHO S-100, could effectively aid in decision making during an emergency event.”

The availability, capability and shortcomings of current marine data services were examined and “the participants were equally divided between the provision of a fusion server or the provision of an advanced client. The server providers were responsible for providing access to the data via OGC APIs, primarily the OGC API – Features. This division of function ensured a demonstration of interoperability between the components.”

Despite limited data in the use case area, all participants were successful in implementing their respective server or client component. The available engineering report and video demonstrations documented and showcased how data can be discovered, accessed, used, and reused, shared, processed, analyzed, and visualized using OGC APIs, IHO S-100 data, Discrete Global Grid Systems (DGGS), as well as identifying gaps experienced and future recommendations for Digital Twins of the Arctic.

All information about this phase of the Pilot can be found at: https://www.ogc.org/initiatives/fmsdi3/

The FMSDI Pilot currently continues with three other relevant threads, particularly Thread 2: Digital Arctic Connecting Land and Sea – Canada which, “addresses data integration issues in the context of Digital Twins…with the loss of sea ice in the Arctic, continuing ocean warming, stronger winds and currents, and accelerated shoreline erosion affecting Arctic communities, efficient data usage and analysis is of the utmost importance for Canada.”

For more information on this thread, visit: https://www.ogc.org/initiatives/fmsdi4/

Operations: IHO Strategic Plan, Target 2.1 Execution

ARMSDIWG reps will continue to participate in IHO MSDIWG to understand IRCC's guidance on thematic layers that should be contributed to the existing IHO GIS infrastructure, for the Arctic region, to assist in implementation of IHO Strategic Plan, Target 2.1.

Previously, at ARHC 11, ARMSDIWG provided a *MSDI Aggregated Data Web Service Checklist for the ARHC*, which could still serve a guide, or furthermore, an annual checklist, if accepted by ARHC MS as an annual document for submittal along with Member State national. This checklist could also be revised with respect to support the targets of UN Sustainable Development Goal (SDG) #14 in the Arctic region through the goal of sharing core, marine/maritime, spatiotemporal data that is reusable, as defined in *ARMSDIWG Terms Of Reference*.

Invited Actions of ARHC

The ARHC members are invited to:

- Take note of the report.
- Take note of the *ARMSDIWG Communication Plan 2023-2026* provided in Annex A.
- Take note of the *Strategy for ARMSDIWG's Engagement with Arctic SDI* in Annex B.
- Reconsider revising and utilizing the *MSDI Aggregated Data Web Service Checklist for the ARHC*, to help implement IHO Strategic Plan, Target 2.1 from an Arctic regional perspective.
- Select a new ARMSDIWG Chair in accordance with *ARMSDIWG Terms Of Reference*.
- Take action as seen appropriate.

ANNEX A

ARMSDIWG Communication Plan 2023-2026

1. Goals and Objectives:

- Ensure effective communication between ARMSDIWG and ARHC when commission-level decisions are necessary outside of scheduled meetings.
- Provide regular updates to organization Arctic SDI.
- Maintain an informative and up-to-date presence on the ARMSDIWG webpage: https://iho.int/en/armsdi-wg
- Coordinate and report interactions with external marine data authorities.
- Regularly review and update strategic documents.

2. Target Audience:

- Internal Audience: ARHC
- External Audience: Arctic SDI, Arctic Council PAME, IHO MSDIWG, OGC Marine DWG, UN-GGIM WG-MGI, other RHCs, marine data authorities in the Arctic.

3. Communication Channels:

- Email: Primary channel for official communication and updates.
- Quarterly Reports: Sent to organization Arctic SDI.
- ARHC Webpage: For semi-annual updates and information sharing.
- Meetings: Regular meetings with external marine data authorities.
- Internal Meetings: Regular meetings within ARMSDIWG to review strategic documents.

4. Communication Schedule:

Activity	Frequency	Responsible Party
Submit Yearly Report to ARHC	Yearly (Aug/Sep)	ARMSDIWG Chair
Provide Summary Updates to Arctic SDI	Quarterly	ARMSDIWG Communication Task Leads
Update ARHC Webpage	Semi-Annually	ARMSDIWG Communication Task Leads
Log Interactions/Coordination with External Marine Data Authorities/Organizations	Semi-Annually	ARMSDIWG Communication Task Leads
Review Strategic Documents	Semi-Annually	ARMSDIWG Communication Task Leads

5. Responsibilities:

- ARMSDIWG Chair:
    - Overall responsibility for coordinating and executing the communication plan.
    - Ensures timely submission of reports, updates, and reviews.
    - Coordinates interactions with external marine data authorities.
- ARMSDIWG Communication Task Leads:
    - Manages communication logistics, including email distribution and webpage updates.
    - Gathers input from ARMSDIWG members for reports and updates.

- Ensures quarterly reports are sent to Arctic SDI.

6. Metrics and Evaluation:

- ARHC Leadership: Provides feedback on the quality and relevance of yearly reports.
- Arctic SDI: Feedback on the usefulness of quarterly updates.
- Webpage Analytics: Measures engagement and traffic on the ARMSDIWG webpage.
- External Authorities: Assess effectiveness of coordination efforts.

7. Continuous Improvement:

- Regularly solicit feedback from ARHC leadership, Arctic SDI, and external authorities to refine the communication process.
- Adjust communication content and frequency based on feedback and changing priorities.

By following this communication plan, ARMSDIWG will be able to maintain effective communication with its parent organization ARHC, Arctic SDI, and other, regional, external marine data authorities and organizations, while also ensuring that their strategic documents are regularly reviewed and updated.

ANNEX B

Strategy for ARMSDIWG's Engagement with Arctic SDI

In the vast expanse of the Arctic, marine data holds the key to understanding complex ecosystems, supporting sustainable resource exploitation, and navigating the challenges posed by climate change. For ARMSDIWG, which specializes in marine data, engaging proactively with comprehensive regional platforms like Arctic SDI becomes paramount. The Arctic SDI, equipped with significant resources and a broader audience reach, presents an opportunity for ARMSDIWG to amplify the significance of marine data and champion its rightful place in the Arctic's future strategies. By influencing Arctic SDI's data policy, ARMSDIWG can ensure marine data's visibility, accurate representation, and utility are prioritized in broader Arctic agendas.

Strategy for ARMSDIWG's Engagement with Arctic SDI on their work with an Arctic Council Data Policy:

1. **Initial Analysis**
    a. Review ARMSDIWG's own data principles and priorities to align with organizational objectives.
    b. Ascertain Arctic SDI's current stance on data and their phase in the new policy development.

2. **Stakeholder Engagement**
    a. Identify key individuals within Arctic SDI who are instrumental in shaping the new data policy.
    b. Schedule dialogues with these stakeholders to gather insights and articulate ARMSDIWG's perspectives.

3. **Drafting Recommendations**
    a. Drawing from ARMSDIWG's priorities and the insights from dialogues, develop a list of recommendations and concerns regarding the new data policy.
    b. Ensure recommendations are articulate, succinct, and substantiated.

4. **Engagement with ARHC**
    a. Liase with ARHC to ensure alignment between ARMSDIWG's proposals and ARHC's guidelines and objectives. This preemptive alignment check will also offer ARMSDIWG an assurance of broader organizational backing.
    b. Present ARMSDIWG's draft recommendations to ARHC for their review and feedback. Incorporate any suggestions or concerns raised by ARHC to further solidify the proposal's robustness.
    c. Keep ARHC updated periodically on the progress and discussions with Arctic SDI, ensuring transparency and building trust within the broader organizational framework.

5. **Advocacy and Presentation**
    a. Submit the recommendations to Arctic SDI through formal channels.
    b. Consider hosting seminars, workshops, or sessions where ARMSDIWG can elucidate the importance of the proposed recommendations.

6. **Collaboration and Partnership**
    a. Propose to Arctic SDI a working group or task force from ARMSDIWG to assist in embedding recommendations into the final data policy.
    b. Equip this group with necessary resources and knowledge to represent ARMSDIWG's interests effectively.

7. **Follow-up and Revision**
    a. After initial submission, engage periodically to understand Arctic SDI's trajectory regarding their data policy.
    b. Be prepared to refine recommendations based on Arctic SDI's feedback to ensure a harmonious fit.

8. **Communication with Members**

a. Keep ARMSDIWG members informed about the process and any progress regarding Arctic SDI's data policy.
b. Gather member feedback to ensure ARMSDIWG's position continuously reflects the collective interest of the organization.

Through this strategy, ARMSDIWG will be well-positioned to make a lasting impact on Arctic SDI's data policy, ensuring marine data is at the forefront of Arctic's strategic considerations.