

**Status report of Baltic Sea and North Sea Marine Spatial Data Information Working Group
(BS-NSMSDIWG)**

Submitted by:	Chair of BS-NSMSDIWG, Denmark
Executive Summary:	This report reviews the work group's findings, status and the planned next steps.
Related Documents:	C-17 - Spatial Data Infrastructures: The Marine Dimension - Guidance for Hydrographic Offices
Related Projects:	Arctic SDI, ARHC MSDIWG, IHO MSDIWG, Maritime Economical Information Programme (MEIP)

This report contains the current status and planned actions of the 1) BS-NSMSDIWG, 2) IHO MSDIWG and the 3) ARMSDIWG

1) BS-NSMSDIWG

Meetings held during reporting period

The Baltic Sea Marine Spatial Data Infrastructure Working Group (BSMSDIWG) Workshop No 5 took place in Rostock December 6-8, 2016. MS from the North Sea Hydrographic Commission and the Baltic Sea Hydrographic Commission was invited to participate in the workshop. Members from the HELCOM and the VASAB secretariat participated in the workshop on the second day.

The overall aim of the workshop was to create a common MSDI framework and to evaluate the BSMSDIWG work plan which focuses on how the BSHC and NSHC MS can benefit from a regional approach to MSDI. The workshop also focused on how to cooperate and coordinate with HELCOM and VASAB in a forward looking perspective especially with a focus on the implementation of MSP.

For more information see <http://www.bshc.pro/working-groups/msdiwg/>



Figure 1. The BS-NSMSDIWG members attending the workshop

Next meetings planned

The next meeting no 6 of the BS-NSMSDIWG is planned to take place in Poland at the Polish Hydrographic Offices in 2017. All MS from BSHC and NSHC will be invited to participate in the meeting.

BS-NSMSDI Draft Work Programme

At the 5th meeting of the Baltic Sea North Sea Marine Spatial Data Infrastructure Working Group, the work group adjusted the draft work program. The work plan is now divided in 6 work items and there are relevant milestones and coordinators for each item. The work program focuses on tasks that are foreseen to be important and challenging from a regional and a national perspective. At the BSHC21 meeting the work programme was approved.

Marine Spatial Planning

In order to achieve the goal of the Regional Baltic MSP Roadmap (to draw up and apply maritime spatial plans throughout the Baltic Sea Region by 2020 which are coherent across borders and apply the ecosystem approach), VASAB and HELCOM has established the Baltic Sea Region MSP Data Expert Sub-group (MSP Data Expert sub-group) as a sub-group to the joint HELCOM-VASAB MSP Working Group.

The aim of BSR MSP Data Expert sub-group is to support data, information and evidence availability for MSP processes with regard to cross-border / trans-boundary planning issues to ensure comparability of maritime spatial plans in the Baltic Sea Region. The BSR MSP Data Expert sub-group facilitates the work of the HELCOM-VASAB MSP WG, as well as helps with implementation of the Regional Baltic MSP Roadmap 2013-2020.

Core members of the Baltic MSP Data Expert Group are MSP experts / planners representatives from all the Baltic countries and Data / GIS / SDI (Spatial Data Infrastructure) experts from relevant authorities/agencies in the Baltic countries. Additional members/experts may participate in meetings by invitation by the chair of the group depending on issues to be dealt with such as representatives of other organizations, technical experts, etc.

Deliverables of the group shall be (among others):

- List of National MSP Data Contact Points and contact persons
- List of additional relevant institutions, contact persons / data experts
- List of main / most relevant MSP issues in a cross-border / trans-boundary context in relation to data and information
- Compilation of minimum requirements for Maritime Spatial Plan Data: “Output Data” and sharing of this data
- Compilation of minimum requirements for “Input Data” and sharing of this data which has relevance for trans-boundary / cross-border planning issues
- Overview on (national / regional) situation of MSP Data which has been identified as being relevant with regard to cross-border/trans-boundary (planning) issues in BSR
- Terms of Reference for a Baltic Sea Region Spatial Data Infrastructure for MSP
- Regular reports to HELCOM-VASAB MSP WG

2) **IHO MSDIWG**

Meetings Held During Reporting Period

The MSDIWG8 meeting of IHO Marine Spatial Data Infrastructures Working Group (MSDIWG) took place in Vancouver, Canada from 31 January to 2 February 2017. The outcome of the meeting is available from the IRCC section of the IHO Website under the MSDIWG. The MSDIWG meeting was preceded firstly on 30 January by an OGC Marine Domain WG meeting.

The aim of the MSDIWG8 meeting was to focus on MSDI and to propose ways to progress MSDI implementation within the Organisation and its Member States.



Figure 2. The IHO MSDIWG members attending the meeting.

Next Planned Meeting:

The IHO/MSDIWG will hold a day-long Open Forum and the ninth MSDIWG meeting on 29 January - 1 February 2018, hosted by the Brazilian Hydrographic Service. Logistics and meeting details are available at: https://www.iho.int/mtg_docs/com_wg/MSDIWG/MSDIWG9/MSDIWG9.html

The IHO/MSDIWG will retain the option to facilitate an Open Forum which would allow non-MSDIWG stakeholders (e.g. regional RHC MS, government, academia, industry, funding bodies and NGO's) to attend to see what the MSDIWG and the commercial partners can offer. Attendees at the Open Forum would then be encouraged to stay on for the MSDIWG9 meeting. This approach is being developed in consultation with the hosts.

The Open Forum meeting will be followed by a three day-long MSDIWG9 meeting at the same venue and the meeting will include WG Work Plan task group break-out sessions. The MSDIWG9 meeting will also be arranged as a back-to-back meeting with the OGC Marine Domain WG meeting on 2 February 2018. The IHO/MSDIWG will further investigate the possibility to arrange a back-to-back meeting with the newly established IHO-UN-GGIM WG on Marine Geospatial Information

The key interest for the IHO is enabling MS to ensure MSDI provides a framework for the provision of hydrographic information beyond the traditional field of surface navigation.

Terms of Reference of MSDIWG:

The MSDIWG Terms of Reference remain unchanged from 2015 and can be found on the IRCC section of the IHO Website under the MSDIWG.

Work Programme

2017-2020 Work Programme was redeveloped at MSDIWG8 based on recent changes and change in focus on MSDI from a regional and national perspective. In order to deliver this Work Programme there are established 8 MSDI Tasks:

- A. Communication and dissemination
- B. Operational - Data sharing and management
- C. Policies and governances – RHC. (Ensure that MSDI is a standing agenda item for RHCs' meetings (IHO Res 2/1997, as amended, refers))
- D. Standards (OGC and HSSC)
- E. Innovation – Future perspectives (2021 - 2023)
- F. Training and education
- G. Maintain and extend the publication IHO MSDI C-17 (IHO Task 3.9.2.1 refers)
- H. Conduct annual meetings of MSDIWG, arranged back to back with 1-day MSDI Open Forum (IHO Task 3.9.1 refers)

The work programme can be found on the IRCC section of the IHO Website under the MSDIWG.

MSDIWG-8 Action List:

The existing action list was updated and renewed as consequence of the new work plan.

Progress on IRCC8 and HSSC8 Action Items

IRCC8/15 Finalize the ongoing revision of the IHO Publication C-17 and submit to IHB to seek comments from MSs (7e).

This action item was completed by October 2016 (CL 59/2016). Comments were received and reviewed during MSDIWG8 and revised draft New Edition 2.0.0 of C-17 is being submitted to IRCC9 (doc. IRCC9-07E2 refers).

IRCC8/18 Finalize the white paper to be presented at the next Conference/Assembly and to submit to IRCC for intersessional endorsement (7e).

The white paper was produced by the MSDIWG and submitted to the IRCC Chair as part of the MSDIWG report to the Assembly (see paragraph 6c).

IRCC8/20 Follow up the developments at the OGC Maritime Domain Working Group and report back to IRCC (7e) MSDIWG IRCC9.

HSSC8/31 MSDIWG invited to consider the concept of Ecological Marine Units promoted by ESRI. HSSC report to IRCC-9.

At the MSDIWG8 meeting the concept of Ecological Marine Units was presented by ESRI and the MSDIWG discussed the concept. The MSDIWG will follow the development of concept for Ecological Marine Units.

HSSC8/64 HSSC and MSDIWG invited to pass wider geospatial research topics to the OGC Marine Domain WG (Marine DWG) for inclusion in its work programme.

The OGC Marine DWG meeting was arranged as a back-to-back meeting with the MSDIWG8 meeting and relevant geospatial research topics were passed to the OGC Marine DWG.

HSSC8/65 HSSC to invite MSDIWG to liaise with OGC Marine DWG. HSSC report to IRCC-9.

The MSDIWG has established close cooperation with the OGC Marine DWG, several MS are now members of both WG's.

Problems Encountered

a. Reporting of MSDI activities by MS to Regional Hydrographic Commissions (RHC).

The level of reporting of MSDI activities by Member States to RHCs remains inconsistent. Some RHCs receive comprehensive inputs from Member States while others have yet to give MSDI sufficient visibility as a standing agenda item. The MSDIWG has limited visibility about how Member States engage with government, commerce, academia and the third sector to enable and deliver access to, sharing and re-use of hydrographic data to a wider user community. Hydrographic Offices (HOs) are in a great position to supply core reference datasets to national and regional SDI initiatives as HO data is critical to activities such as marine planning, coastal zone management, disaster mitigation and response, and conservation.

b. Engagement on MSDI related activities.

Demands continue to be placed on a very few members of MSDIWG to attend IHO sponsored events such as RHCs and MSDI meetings, organizing MSDIWG meetings, providing MSDI Awareness short courses, attending meetings with other regional bodies and speaking at industry seminars.

c. Education and Learning

The way Capacity Building plans are defined at present means that the focus on data and information management resides at Phases 2 and 3. MSDIWG suggests it should take place earlier in the cycle of basic hydrographic understanding and involve elementary "data management best practice" training sessions.

Emergent HOs are proving better equipped and more adept in understanding the value of data management and MSDI. The MSDIWG therefore suggests that CBSC should consider this in the light of the experience MSDIWG members and expert contributors have witnessed when delivering Capacity Building Training in MSDI.

Any Other Items of Note

a. Data Centric Operations and Workflows

Data is the second most important asset in an organization after the people it employs and is now often referred to as the "new oil" or the "new electricity"! Data therefore needs to be treated as an enterprise-wide, national and even global asset with tremendous intrinsic value not only to the organization that captures and / or manages it but to other potential users as well. In the maritime sector, we have been promoting the term "collect once, use many times" for many years in respect of the wider value and utility of, for example, bathymetry data. But there is other important data held by the HO that also have additional or residual value once used to support the business of charting. The term "data centric" means managing your operations and workflows as close to "source" as possible rather than as products. Enabling efficient data sharing exchange and re-use across government, academia, and commerce thereby stimulating economic and socio-economic benefits, not only to the nation, but potentially across borders with neighbouring HOs.

b. OGC Candidate Standard to replace Coordinate Reference Systems (CRS)

This initiative specifies the core of an OGC Discrete Global Grid System (DGGS) encoding standard. This OGC standard defines the DGGS core data model and the core set of requirements to which every OGC DGGS encoding must adhere. Extensions to the DGGS core standard add further functionality to the core requirements. In particular, DGGS extensions to the core will be required to support additional functional capabilities and interoperability using OGC Web Service (OWS) architectures, such as OGC Web Coverage Service (WCS) and Web Coverage Processing Service (WCPS) interfaces. This standard defines:

- i. A concise definition of the term Discrete Global Grid System as a spatial reference system;
- ii. The essential characteristics of a conformant DGGS; and,
- iii. The core functional algorithms required to support the operation of a conformant DGGS.

Conclusions and Recommended Actions

a. Revision of C-17

MSDIWG has prepared a draft Edition 2.0.0 of the IHO Publication C-17 Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices that is being submitted to IRCC9 in doc. IRCC9-07E2.

b. Education and Learning

The RHCs that promoted training in MSDI now have students achieving promotions in the workplace as decision makers and, in some cases, driving the MSDI evolution in their HOs providing testament on the return of investment in training. The IHO Capacity Building Programme for 2013-2017 supported Member States to improve their corporate governance in respect of data management, database design and MSDI through a variety of training courses and briefing sessions, ranging from half-day workshops and briefings to more comprehensive 5-day residential courses aimed at all levels of staff from practitioners through to directors.

c. Preparation of a new MSDI White Paper

The existing "promotional" MSDI White Paper "The Hydrographic and Oceanographic Dimension to Marine Spatial Data Infrastructure Development: 'Developing the capability'" was authored and published by Caris and OceanWise in May 2010 and later adopted by the MSDIWG. As knowledge and understanding of SDI and MSDI has developed in the past 5 years, the MSDIWG worked on a revised document named "Realizing the benefits of Spatial Data Infrastructures in the Hydrographic Community" which is available at the IHO website at: https://www.iho.int/mtg_docs/com_wg/MSDIWG/MSDIWG_Misc/MSDIWG-BOK.html

d. Best Practices and List of Standards related to SDI/MSDI

MSDIWG produced a compilation of best practices and a list of standards related to SDI/MSDI. These documents are available at: [www.iho.int / Committees & WG / MSDIWG / Body of Knowledge](http://www.iho.int/Committees%20&%20WG/MSDIWG/Body%20of%20Knowledge)

e. GIS layer on existing SDI/MSDI around the world

The IHO Secretariat established a GIS layer representing existing SDI/MSDI around the world. This layer can be accessed at: [www.iho.int / Committees & WG / MSDIWG / SDI/MSDI portals around the world](http://www.iho.int/Committees%20&%20WG/MSDIWG/SDI/MSDI%20portals%20around%20the%20world)

f. Creation of an OGC Marine Domain Working Group (DWG)

MSDIWG has been cooperating with the OGC, the world-wide body responsible for developing de-facto standards for the geospatial industry and has contributed to the development of an OGC compliant Conceptual Model for Oil Spill Response. OGC has recently facilitated a Maritime Ad-Hoc meeting in Washington on 10 March 2016 at which the MSDIWG was represented. As a result the Marine DWG was created within OGC with an aim of developing an OGC compliant MSDI Conceptual Model. Its first meeting took place in November 2016.

Concept Development Initiative - Defining the Future of Marine Spatial Data Infrastructure.

The proposal to launch an IHO Concept Development Initiative was presented at the IRCC9 meeting. At the MSDIWG meeting in Vancouver 2017, the MS discussed the possibility to create an OGC study that could establish the framework for future development of MSDI. After the MSDIWG meeting OGC has developed a proposal for a concept development study for MSDI, with the ultimate intent after completion to propose to IHO a full pilot timed for 2018 to be funded by the IHO. See attached structured proposal for a concept development study for MSDI at Annex D.

The proposal presents the Open Geospatial Consortium's (OGC) approach for evaluating the current state and defining the potential future of MSDIs. The initiative will emphasize on the rapid evolution of technologies and methodologies for generating non-navigational, location-based information of value to a broad range of users.

The following are objectives outlined in the proposal:

- Document the current state of MSDIs
- Document the needs for a MSDI based on current emerging technologies
- Document strategies to interoperate with other Spatial Data Infrastructures
- Develop a common interoperability reference architecture
- Engage with experts from across the user community as well as from the community of technology / information and services providers, including hydrographic offices, industry, government, research, and other SDOs.

USA/NGA briefed the meeting on the special agreement with OGC and that it may be able to support the study with funds and human resources (expertise). The importance of the concept study proposed by the MSDIWG was supported by the meeting and Canada offered to contribute to the study. HSSC Chair stressed the importance of cooperating with OGC with respect to standards.

3) **Arctic Regional Hydrographic Commission MSDI WG (ARMSDIWG)**

During its 5th meeting, the ARHC tasked Denmark and the United States to propose “how to proceed with MSDI from an ARHC perspective.” Denmark and the United States returned to the 6th ARHC meeting with a proposal “to consider the establishment of an Arctic Regional MSDI Working Group (ARMSDIWG) in order to move forward with MSDI activities in the region and contribute to the Arctic Voyage Planning Guide (AVPG).”

The ARMSDIWG was formally established at the 6th ARHC meeting and, under the supervision of the ARHC, should function in the following ways:

- Identify and assess the statuses of individual MS (Member State) MSDI implementation.
- Consider MSDI policies in related international projects and cooperate specifically with the Arctic SDI.
- Analyze how maritime authorities can contribute their spatial information and the necessary updates, so information can easily be collated with other information to create a current overall picture for the region.
- Focus on how ARHC in the future can benefit from a regional approach.
- Monitor the development of SDI (specifically the Arctic SDI) that could be relevant for the region.
- Monitor the development of relevant and applicable OGC standards and activities through association with the OGC Marine DWG.
- To present a yearly report to the ARHC at their meeting. This report should include a description on the current status, recommendations on how to proceed with the MSDI implementation, and if deemed necessary, an action plan with specified time schedule for future ARMSDI actions.

ARMSDIWG Workshop No. 1 and Joint Meeting of the Arctic SDI and the ARMSDIWG

The Arctic Regional Marine Spatial Data Infrastructures Working Group Workshop No. 1 (ARMSDIWG1) was held in Copenhagen, Denmark 04-05 April, 2017. ARMSDIWG1 was attended by representatives from the following ARHC Member States and Associate Members: Canada, Denmark, Finland, Norway, and United States. The primary outcomes from this meeting were the following:

- Completion of ARMSDIWG White Paper.
- Submitted to ARHC Special Meeting at IHO-A1.
- Completion of ARMSDIWG Consolidated Work Plan 2017-2020.



Figure 3 Participants of ARMSDIWG1 - Copenhagen, Denmark

Upcoming ARMSDIWG Meetings

The next, half-year virtual meeting, ARMSDIWG1.5, will take place via Skype to continue progress of items from ARMSDIWG1. ARMSDIWG2 will be an in-person meeting with the intent to be combined with another Joint Meeting of the Arctic SDI and the ARMSDIWG, but the date and location is still to be decided.

ARMSDIWG Work Plan Tasks

During ARMSDIWG1, the representatives drafted a consolidated work plan for the 2017-2020 period. The workplan consists of tasks deemed important to the working group and aligned with the functions of the working group as outlined in the Terms of Reference:

- Common Understanding of MSDI in Arctic
- Spatial Data Interoperability, Sharing and Display
- Liaise with External Users of MSDI
- ARMSDIWG / Arctic SDI Collaboration
- Geospatial-enablement of Arctic Voyage Planning Guide (AVPG)
- Pan-Arctic Bathymetry Database
- Annual Meetings

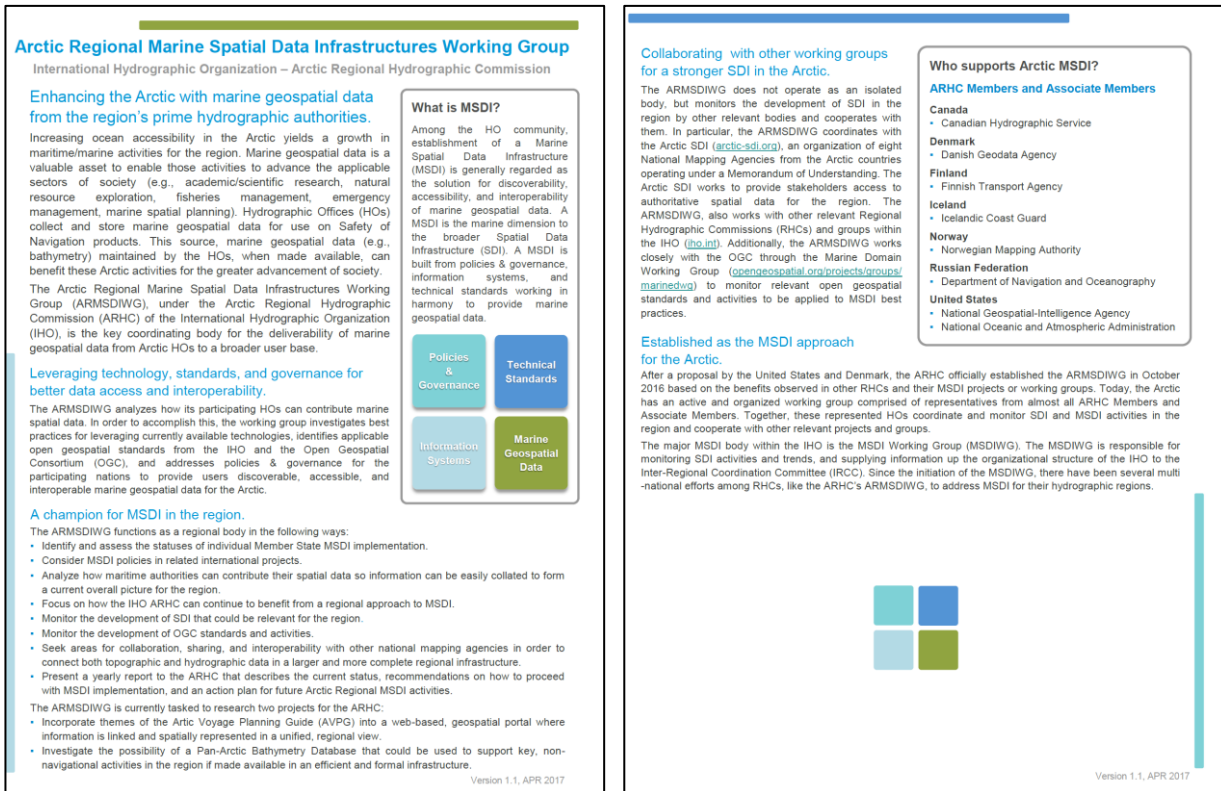


Figure 4 the ARMSDIWG White Paper.

Action required of BSHC22

The BSHC22 is invited to:

- a. Note the report;
- b. Take any other action as appropriate.