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 Development of Spatial Data Infrastructures for Marine Data Management, OGC-IHO MSDI Concept Development Study (MSDI-CDS) https://portal.opengeospatial.org/files/?artifact_id=88037
Related Projects:	Arctic SDI, ARHC MSDIWG, IHO MSDIWG, Maritime Economical Information Programme (MEIP)

This report contains the current status and planned actions of the BS-NSMSDIWG and the IHO MSDIWG.

BS-NSMSDIWG

Meetings held during reporting period

The Baltic Sea and North Sea Marine Spatial Data Infrastructure Working Group (BS-NSMSDIWG) Workshop No 7 took place in Gdansk, Poland 20-21 2019. MS from the North Sea Hydrographic Commission and the Baltic Sea Hydrographic Commission was invited to participate in the workshop. Members from, Germany, Poland, Latvia, Norway, UK and Denmark attended the workshop.
The overall aim of the workshop was to create a common MSDI framework and to evaluate the BS-NS MSDI work plan for the Baltic Sea which focus on how the BSHC and NSHC can benefit from a regional approach to MSDI and to have a status on the different action items and agree how to proceed.

Day 1 of the workshop included general presentation from the IHO MSDIWG and national presentation from BSHC and NSHC member states on SDI, MSDI, MSP and INSPIRE and other relevant issues. One of the focus areas was how the BS-NSMSDIWG can have a more proactive and operational approach in a forward looking perspective.
Day 2 of the workshop the MS focused on reviewing the action plan and the way forward, updating the work program, and planed actions in order to address how the BSHC and NSHC can benefit from a regional approach to MSDI in the future.

Figure 4. The BS-NSMSDIWG members attending the workshop.

Next meetings planned
The next wg meeting of the BS-NSMSDIWG is planned to take place in Norway at the Norwegian Hydrographic Offices in 2020 April or May. All MS from BSHC and NSHC will be invited to participate in the meeting. It is planned to have a 2-day long MSDI work shop back to back with a 2-days Data Hackaton and a 1-day MSDI open Forum meeting. Other relevant stakeholders and organizations e.g. North See, OSPAR, EURO GOOS, INSPIRE, HELCOM, VASAB will be invited to participate in a two day Data Hackaton and a one day MSDI Open Forum meeting.

BS-NSMSDI Work Program and Action list
At the seventh meeting of the Baltic Sea North Sea Marine Spatial Data Infrastructure Working Group, the work group went through the existing work program that was approved at the BSHC21 meeting. The work plan is 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. It was agreed only to change the action list. For more information, see http://www.bshc.pro/working-groups/msdiwg/

Marine Spatial Planning
At the seventh MSDI work shop the implementation of MSP in Baltic Sea and North Sea was discussed. EU has published a directive of the European Parliament and of the Council dealing with establishing a framework for maritime spatial planning and integrated coastal management. The main purpose of the directive is to promote the sustainable growth of maritime and coastal activities and the sustainable use of coastal and marine resources by establishing a framework for the effective implementation of maritime spatial planning in EU waters and integrated coastal management in the coastal areas of Member States. The proposal establishes a framework for maritime spatial planning and integrated coastal management in the form of a systematic, coordinated, inclusive and trans-boundary approach to integrated maritime governance. It obliges Member States to carry out maritime spatial planning and integrated coastal management in accordance with national and international law. The aim of the action is for Member States to establish a process or processes that cover the full cycle of problem identification, information collection, planning, decision-making, management, monitoring of implementation, and stakeholder participation. Implementing acts will ensure consistent implementation of the Directive throughout the EU and facilitate reporting from the Member States to the Commission and, where relevant, the exchange of data between Member States and with the Commission. Article 10 in the proposed directive especially focuses on data collection and exchange of information. Article 12 and 13 describes Cooperation with other Member States and third countries.

As seen from a HO perspective a MSDI could support such varied activities as coastal zone management planning and maritime spatial planning including the management of energy production at sea, fishing, marine environmental protection and nature conservation, planning charts, navigation, civil and military preparedness, tourism, and maritime spatial planning.

Conclusions and Recommended Actions
A well-functioning MSDI ensures that relevant maritime authorities can contribute their spatial information and related updates, and that this information can easily be collected with other information to generate a current, overall picture. As a result, MSDI can support such varied activities as coastal zone management, planning of energy production at sea, fishing, marine environmental protection and nature conservation, planning charts, navigation, civil and military preparedness, tourism, and maritime spatial planning.

From a MSDI perspective, it is important that the MS should be the “providers of choice” for authoritative foundational marine/maritime information through engagement and participation in MSDI in addition to their existing navigational role. It is actively strengthening its understanding and knowledge of the role of hydrography in MSDI through its outreach programmes with other SDI stakeholder groups (such as the European Commission, UN-GGIM, OGC, ISO and IOC-IODE), globally, and through the IHO MSDIWG across the HO community.

From a more practical approach, there is a need for the HO to focus on and strengthen the maritime approach to MSDI and to ensure that maritime information is included. Some of the challenges from a national and regional approach for BSHC and NSHC MS in relation to MSDI are seen as:

- Ensuring that MS participate in the MSDI work
- Ensuring that regional MS HO have the possibility to contribute to the development of the regional MSDI and MSP
- Ensuring the use of data/information provided by HO is fit for purpose for wider dissemination
- Establishing access to Best Practises related to SDI/MSDI

Justification and Impacts

The work in the MSDIWG is progressing well and a supporting updated Action Plan has been established. The Work Programme creates the framework for the WG, in order to cope with the challenges in a forward-looking perspective.

IHO MSDIWG

Meetings Held During Reporting Period

Dates and venues of meetings held during the reporting period.

The MSDIWG10 meeting of IHO Marine Spatial Data Infrastructures Working Group (MSDIWG) took place in Busan, Republic of Korea, 4 - 5 March 2019. The meeting was followed by the OGC Marine DWG Meeting, 6 March 2019 and the UN-GGIM Working Group on Marine Geospatial Information (WGMGI1) Meeting, 7 - 9 March 2019.

Figure 2. The IHO MSDIWG members attending the MSDIWG 10 meeting

Members of the MSDIWG has represented the MSDIWG in other IHO WG meetings e.g. HSSC11, SPRWG1, CSBWG7, CBSC11 and in several Regional Hydrographic Commission meetings.

Dates and venue for next meeting.

The IHO/MSDIWG will arrange a MSDI Open Forum meeting, the MSDIWG11 meeting with an integrated OGC Marine Domain WG part in 2020 in Rostock, Germany 24-27 February.

Logistics and meeting details will be available at: www.iho.int/msdiwg

Work Program

Work Plan 2018–2021. The Work Programme was discussed and evaluated at the MSDIWG10 based on recent achieved results with a focus on MSDI from an international, regional and national perspective. In order to deliver this Work Programme, eight MSDI Tasks have been established.

The IHO/MSDIWG will continue to facilitate a MSDI Open Forum which would allow non-MSDIWG stakeholders (e.g., Regional Hydrographic Commission (RHC) Members, government, academia, industry, funding agencies and NGOs) to attend to identify what the MSDIWG and the commercial partners can offer. Attendees at the Open Forum would then be encouraged to stay on for the MSDIWG11 meeting. This approach is being developed in consultation with the hosts.

The key interest for the IHO is enabling Member States to ensure MSDI provides a framework for the provision of hydrographic information beyond the traditional field of surface navigation. The MSDIWG is working with the UN-GGIM Shared Guiding Principles for Geospatial Information Management as a framework and the principles are incorporated in the existing work program for the MSDIWG. The Shared Guiding Principles for Geospatial Information Management are available at the MSDIWG web page at: www.iho.int/msdiwg → Body of Knowledge

Progress on IRCC Action Items
MSDI Ambassadors.
IRCC9/18 (RHC Chairs to encourage Member States in the region to nominate RHC MSDI Ambassadors to promote MSDI and to help Member States to prepare the national reports with respect to the status of MSDI). A vital element of this work would be to collect and collate responses from Member State on MSDI prior to each RHC meeting. Several RHCs have now established regional MSDIWGs, and at the IHO MSDIWG10 meeting reports from RHC MSDIWG were presented.
It is important that RHC consider taking MSDI as a RHC agenda item and that National Reports should incorporate the status of MSDI, plans for involvement in MSDI and challenges facing the HO.
It is recommended that the National Reports include the topics from C-17, item 2.1 on what constitutes a MSDI:

- Policy and Governance
- People & Organizations
- Enablers (the framework for data acquisition, management, updating and dissemination)
    - Standards
    - Technology
    - Metadata
- IHO S-100 Universal Hydrographic Data Model
- Content
- Education and Learning

Education and Learning.
IRCC10/10 (MSDIWG to develop basic MSDI training material in order to allow RHCs to deliver trainings with their own personnel). At the latest IRCC meeting, MSDI was highlighted as an important component of the future development of hydrographic offices. It was concluded that there is either no, or very little, basic teaching material available for MSDI training that is free of charge for IHO Member States. IRCC therefore decided to task the IHO MSDIWG to establish basic MSDI training material, in order for IHO Member States and the RHCs to conduct basic MSDI education/training. The Danish Geodata Agency (DGA) volunteered to finance the development of the training material. The MSDI training material should be available free of charge from the IHO webpage and from the DGA webpage.
The establishment of MSDI training material, including the teaching material, will be divided into two phases:
Phase 1. MSDI orientation. The course is aimed at students who are marine-focused, but have very little experience of MSDI concepts or practice.
This course is modelled on the IHO MSDIWG standard orientation syllabus and is aimed at decision makers possibly at a senior level, not necessarily from a hydrographic background, but certainly involved in marine geospatial data.
Phase 2. Fundamentals of a Marine Spatial Data Infrastructure. The course is aimed at students who are marine geospatial professionals but who have very little experience of MSDI. It is designed as an introductory, one-day course in the fundamentals of MSDI concepts, theory, and practice.

The course is based on material in the public domain, the many sources of information about MSDI available, and includes notes on the accompanying slides and exercises to be considered as appropriately. These exercises would also be useful in a group context for the delivery of workshops supporting the course. There are two main uses of these documents in conjunction with the course slides themselves.
1. A participant who wants to download and self-learn from the materials provided.
2. A participant who wishes to deliver the materials in a group setting with stakeholders.

In phase 1, the actual MSDI and teaching material will be established, which could/should be based on the publication C-17 Spatial Data Infrastructures "The Marine Dimension", including Annex 1. Syllabus for Educational and Training Programs for Marine Spatial Data Infrastructures. There should be focus on the content specified in the two introductory teaching courses 1) MSDI orientation and 2) Fundamentals of

Marine Spatial Data Infrastructure (MSDI). The result/deliverables in this phase will be the actual MSDI training material and the teaching material for use by e.g. internal "teachers" in the hydrographic offices.

In phase 2, a MSDI e-learning program will be developed that should allow people to access MSDI teaching externally and even receive the teaching on-line. The MSDI teaching materials will be available on the IHO's website for free and on the DGA's own website. Progress will be summarized during the reporting period.

Any Other Items of Note

UN-GGIM WORKING GROUP ON MARINE GEOSPATIAL INFORMATION (WGMGI)

The first expert meeting of the Working Group was arranged as a back-to-back meeting with the IHO MSDIWG meeting. The meeting was attended by 42 expert representatives from Australia, Brazil, Denmark, Germany, Italy, Jamaica, Netherlands, Norway, Republic of Korea, Singapore, United Kingdom, United States of America, International Hydrographic Organization, Open Geospatial Consortium and UN-GGIM/Private Sector Network.

This meeting, among others, agreed that marine geospatial information must be made available, accessible and discoverable for a multiplicity of purposes within collaborative information systems nationally to deliver reliable, timely, and quality information necessary for citizens, organizations, and governments to build accountable actions and make informed/evidenced-based policies and decisions. For more information please visit the meeting web-page http://ggim.un.org/meetings/2019/WG-MGI-Busan. There is also a link to the meeting web-page from the Working Group's web-page at: http://ggim.un.org/UNGGIM-wg8.

Data integrity, marine boundaries from a MSDI perspective.

The MSDIWG has discussed data security from a MSDI perspective. The conclusion the MSDIWG came to when looking at these issues from the MSDI perspective was that one of the main priority is actually data "integrity", also dealt with comprehensively by IHO S-63. Data integrity establishes two pieces of knowledge for data users, (1) knowing who a piece of data came from and (2) the knowledge that the data has not changed in its journey to the end user.

This is important from a MSDI perspective because the core concept of MSDI is reuse of marine geospatial data outside its traditional use case of primary SOLAS navigation, and within a much broader sphere of activity. The nature of some of the datasets may well be sensitive, not because they are confidential, but because there is a high impact cost of them being wrong. If an MSDI provider wrongly attributes a dataset to a particular official body or incorrectly reproduces a dataset (either by visualizing it poorly or providing a copy of the incorrect data), the repercussions can be large.

By way of example, consider that one of the fundamental datasets recently under consideration are UNCLOS maritime limits and boundaries (other examples exist but this is a robust, simple example which is useful for the purposes of illustrating the problem). UNCLOS official limits and boundaries are a foundation dataset and often used to further denote other official limits and boundaries such as marine protected areas, fishing zones and many others, defining rights and responsibilities as part of a harmonized marine cadastral system. These datasets are simple, by comparison with the complex geospatial data which make up ENC, but because they represent the results of, often long standing, political agreements and treaties, their economic and political weight can be enormous and the impact of their incorrect reproduction within a MSDI environment is of concern.

The challenge technically is to provide the means and mechanisms, therefore, to protect the data integrity and assure the end user of the provenance of the data they are receiving.

Is there a ready-made solution?

- Ongoing the IHO and MSDI community needs to consider this issue
- Consider adapting existing mechanisms:
    - Stream based may not be suitable for "data centric" models
    - IHO S-63 (and S-101) relies on a specific end user system
    - Other standards exist but may need adaptation
    - All data integrity systems require a "trust network" to define identity.

MSDI Concept Development Study (MSDI-CDS)

During the IHO MSDIWG8 meeting in Vancouver 2017, the idea was formed to create an OGC study that could establish the framework for future development of MSDI and demonstrate to stakeholders the

diversity, richness and value of a Marine SDI – specifically data, analysis, interoperability and associated IT services - including web services - in addressing needs of the marine domain.

Beginning in July 2018, the OGC-IHO MSDI-CDS was supported by the National Geospatial- Intelligence Agency (NGA) - Maritime Safety Office (MSO), on behalf of the International Hydrographic Organization (IHO) and the IHO MSDI Working Group (MSDIWG), and executed by the Open Geospatial Consortium (OGC).

The study included an open Request for Information (RFI) with the objective to gather additional information to better support governments, agencies, nongovernmental organizations and citizens, unlocking the full societal and economic potential of the wealth of marine data at local, national, regional or international levels. The RFI results also provide information and insight on the current state of the Marine SDI. In addition to the RFI, a MSDI workshop and roundtable were held to gather additional information from both expert panel members and the audience. The final engineering report presents an analysis of RFI, workshop and roundtable responses and interactions which provided in depth information on requirements and issues related to stakeholders, architecture, data, standards of current and a possible future Marine SDI. In addition, the report will serve as the basis for improvement of SDIs' to support the marine domain. The responses will also be discussed with potential sponsoring organizations that would provide funding opportunities for possible Marine SDI Pilot(s) initiatives proposed for later this year, and in subsequent years. All RFI, workshop and roundtable responses will contribute to Marine SDI(s) moving forward. It will help to achieve greater interoperability, availability and usability of geospatial Web services and tools across different types of marine spatial data uses. In addition, these responses will provide identification of gaps, and definition of core components of an SDI to be referenced by IHO MSDIWG and used to define reference use-cases and scenarios for use in future pilot activities.

The final engineering report can be found on OGC's website here: https://www.opengeospatial.org/docs/er
Direct link to download PDF here: https://portal.opengeospatial.org/files/?artifact_id=88037

Justification and Impacts
The work in the MSDIWG is progressing well and a supporting Action Plan has been established. The Work Programme creates the framework for the WG, in order to cope with the challenges in a forward-looking perspective.

The creation of regional MSDIWGs will give the Member States direct possibility to actively participate in the development of a well-functioning MSDI within the region's hydrographic domain and its surroundings. Additionally, regional MSDIWGs benefit from both national and regional SDI activities in order to lead and address MSDI matters for the countries in the region.

Action required of BSHC 24:
The BSHC 24 is invited to:
a. Note the report;
b. Take any other action as appropriate.