

**6th Meeting of the Arctic Regional Hydrographic Commission
3 and 6 October 2016
Iqualuit, Nunavut, Canada**

Report of the IHO Marine Spatial Data Infrastructures Working Group (MSDIWG)

Meetings Held During Reporting Period

The sixth meeting of IHO Marine Spatial Data Infrastructures Working Group (MSDIWG) took place in Tokyo, Japan, hosted by JCG from 27-29 January 2016. 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 25 January by a Demonstration Workshop at which MSDIWG Expert Contributors showed how their software, hardware and tools can assist HOs develop capability to engage in MSDI and secondly on 26 January by a MSDI Open Forum meeting entitled "Contributing to the successful delivery of MSDI".

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

Next Planned Meeting

The IHO MSDIWG expects to hold a three day-long MSDIWG8 meeting January 31 to February 2 - 2017, to be hosted by the Canadian Hydrographic Service (place and venue to be confirmed).

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 at https://www.iho.int/srv1/index.php?option=com_content&view=article&id=483&Itemid=370&lang=en.

Work Programme

2015-20 Work Programme was developed at MSDIWG6 based on the outcomes of the revised Terms of Reference agreed by IRCC. In order to deliver this Work Programme namely to:

- A. Identify and promote national and regional best practices
- B. Assess the existing and new standards in the provision of marine components of spatial data infrastructures
- C. MSDI training and education
- D. Facilitate (external) MSDI communication
- E. Maintain and extend the publication IHO MSDI C-17 (IHO Task 2.9.2 refers)
- F. Conduct annual meetings of MSDIWG, arranged back to back with 1-day MSDI Open Forum (IHO Task 2.9.1 refers)
- G. Ensure that MSDI is a standing agenda item for RHCs' meetings (IHO Res 2/1997, as amended, refers)

MSDIWG-7 Action List

A new Action List was compiled as a result of discussions at MSDIWG 7 in Japan and can be found at https://www.iho.int/srv1/index.php?option=com_content&view=article&id=483&Itemid=370&lang=en

Progress on IRCC7 and HSSC7 Action Items

IRCC7/45 b) support the CBSC to increase the number of trainers for MSDI through Training for Trainers (TFT) courses. MSDIWG is currently reviewing the options and opportunities regarding the appointment of MSDI “ambassadors” and provision of “training for trainers”. A copy of our conclusions will be forwarded to CBSC Chair when our discussions are complete.

IRCC7/47 request HSSC7 to consider the technical issues raised in the MSDIWG Report (Ref: IRCC7-08E).

HSSC7-07.1A: The Committee noted the report and the requests of the IRCC including the concerns expressed by the MSDIWG about interoperability issues with spatial data infrastructure standardization (INSPIRE European Directive for instance) and agreed on appropriate actions, notably as regards to S-65 and S-102.

Actions:

1. HSSC7/32: S-65 ENCWG to review S-65 for alignment with the WEND Principles and Guidelines as amended.
2. HSSC7/33: Chair of S-102 PT to consider the issues of interoperability with SDI standards (such as INSPIRE elevation data specification, etc.).
3. HSSC7/34: Repository of S-100-based product specifications. IHB will maintain the S-xxx product specifications list and make it available on the IHO webpage including use-cases and business-cases as appropriate.

IRCC7/49: MSDIWG to present examples of best practice MSDI at IRCC 8. CHS, in 2015, undertook a programme of market research, the results of which have been reported. CHS will present its findings at IRCC8.. Report from CHS is attached at Annex D. MSDIWG7 identified examples of best practise that will be incorporated in revised publication C-17 v2.0.(e.g. Danish MSDI, New Zealand (LINZ) GeoStrategy)). A copy of the Danish SDI document is provided at Annex G.

IRCC7/67: IRCC agreed that MSDIWG prepare a supplement or additional chapter, as appropriate, to C-17-Spatial Data Infrastructures: “The Marine Dimension” - Guidance for Hydrographic Offices to provide guidance on mechanisms that can be established to improve national access to bathymetric and related hydrographic data originally collected for commercial or scientific purposes.

IRCC7/68: MSDIWG to submit to IRCC8, a draft revision to C-17 resulting from the work under Action 67 to IRCC for review and endorsement prior to any formal adoption by Member States.

MSDIWG C-17 v2.0 Drafting Group has identified the changes necessary to C-17 to reflect the current status of HO involvement in MSDI; the challenges to engagement and participation in MSDI and has defined ways of improving cross-sector data access and data sharing citing existing best practise examples.

Progress on other IRCC Action Items

Action IRCC4/23: Investigate the possibility to deliver MSDI courses with IOC and/or other organizations. This action remains open as MSDIWG has identified courses to run, requested funding support but such funding was rejected by CBSC. IHB is assessing options for funding outreach activities.

Inputs to IRCC-8

Revised version of IHO Special Publication C-17:

A small drafting group was convened in Copenhagen for 3 days in late February 2016 to identify the changes necessary to this important publication. In view of its limited impact upon the IHO community since 2009, the decision was taken to retain the elements of the content that are still valid but to supplement and update some of the background and policy information elements to better reflect the current level of MSDI knowledge and understanding. It will also provide a forward view of the changes that will likely impact on the role of the HO in the knowledge economy. C-17 v2.0 will include a section on "Making the Business Case for SDI". Whilst a business case template is worthwhile, work still needs to be done to enable the HO community to develop its governance models to enable it to meet the requirements of data and information providers. A draft version of the document has been provided to IRCC8 for consideration and comment

Paper for submission to the XIXth International Hydrographic Conference in 2017.

It is nearly ten years since United Kingdom and Germany provided a submission to XVIIth IH Conference, May 2007 concerning the development of MSDI in the HO community. The proposal was accepted by conference and its recommendations endorsed by delegates. This led to the creation of the MSDIWG in summer 2007. At MSDIWG7 in January 2016, the membership endorsed a suggestion that it should provide a paper for consideration by IRCC for submission at further at XIXth IH Conference. A draft version of this paper has been provided to IRCC8 for consideration and dependent upon the response will be submitted to Conference in due course.

Training Syllabi – Guidance to IRCC

The Data Management, Database Design and MSDI training and capacity building course syllabi was uploaded to the MSDIWG website in 2015. The syllabi are based on several year of experience of working with RHCs with sponsorship provided as well as direct with HOs as self-funded activities. Over 100 students have taken advantage of the IHO sponsored training courses since 2010. Such training has end of course assessments with the student performance results and feedback forwarded to the sponsoring RHC and IHO. Having a governance structure around the learning process has meant that, with very few exceptions, the enthusiasm and eagerness to learn has been excellent throughout. However, these courses have been organised by a relatively few RHCs (namely EAHC, NIOHC, SAIHC and SWAtHC) with one-day courses in MACHC sponsored by MSDIWG Expert contributors, as part of its RHC meetings.

Guidance has been sought by IRCC to encourage feedback by RHCs as part of their national reports on the effectiveness of such training but it is recommended that IRCC seeks out the course feedback and assessment results for past-courses to measure the effectiveness of the training, course content, level of instruction and understanding. The fact that students, trained in 2010-12, are now achieving promotions in the workplace as decision makers and, in some cases driving the MSDI evolution in their HOs is testament to the system working. Reaching other RHCs is more difficult as the CB coordinators are the ones that can identify the need and enable the finances to be released for the training to take place.

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:

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

IRCC8 was requested to forward this document to HSSC8.

Status Update of Marine Spatial Data Infrastructure (MSDI) Implementations related to a Marine Spatial Architecture

In March 2015, the Canadian Hydrographic Service, through the IHO, undertook a research study to ascertain the current situation of MSDI across the HO community. The intention of the study was to determine the relative level of advancement of various countries in the development of their MSDI. It also explored what was and could be offered within a given resource framework with questions intended to scope the scale of the MSDI resources required in their development, It also identifies areas of best practice. The results of the survey were presented by MSDIWG Secretary at MSDIWG 7 held in Japan and the results questionnaire, responses and results can be found at https://www.iho.int/srv1/index.php?option=com_content&view=article&id=483&Itemid=370&lang=en.

Other Tasks

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 last 6 years, this document has become somewhat dated. As a result it is reviewed to reflect the growing body of knowledge that now exists across the marine domain and provide short case studies of best practice from MS.

Creation of an OGC Ad-hoc Maritime Group

MSDIWG has been cooperating with the Open Geospatial Consortia (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 10th March at which the MSDIWG was represented. The objective is to look to form a Marine DWG within OGC with an aim of developing an OGC compliant MSDI Conceptual Model. The motion to approve formation of the Marine Domain Working Group (DWG) and accept its charter was made at the 99th OGC Technical Committee meeting on 23 June 2016. The Marine DWG is now a formal DWG under the OGC TC.

Link to Marine DWG can be found here:

http://external.opengeospatial.org/twiki_public/MarineDWG/WebHome

HO Challenges in respect of MSDI

Reporting of MSDI activities to RHC's

The level of reporting of MSDI activities by MS to RHC's remains inconsistent. Some RHC's receive comprehensive inputs from MS while others have yet to give MSDI sufficient visibility as a standing agenda item. This activity therefore remains a “work in progress” with more efforts needed by RHC's to mandate a standard response to MSDI at its meetings. A greater sense of urgency is now required to 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. HO's 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.

RHC's still need to identify and appoint "ambassadors" who would be willing and able to take the MSDI message to MS to energize them in taking the actions necessary to bring about governance reviews and more efficient work practices (e.g. data centric workflows). A vital element of this work would be to collect and collate responses from MS on MSDI prior to each RHC meeting. It is becoming more important to consider taking MSDI as a RHC agenda item therefore we hope to see a National MSDI report prepared by each MS for submission to every RHC incorporating the status of MSDI, plans for involvement in MSDI and challenges facing the HO.

Education and Learning

Demands continue to be placed on a very few members of MSDIWG to attend IHO sponsored events such as RHC's and MSDI meetings (e.g. Baltic Sea RHC MSDIWG) as well as organising and delivering MSDIWG meetings. Providing MSDI Awareness short courses, attending meetings with other regional bodies, invitations to speak at industry seminars and meetings on the subject of MSDI; are all being provided at zero cost to the IHO.

The IHO's Capacity Building Programme for 2013-2017 supports MS 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.

The way Capacity Building plans are defined at present means that the focus on data and information management resides somewhere between Phases 2 and 3. MSDIWG suggests it should take place earlier in the cycle of basic hydrographic understanding and involve elementary "data management best practise" training sessions. Emergent HOs are proving better equipped and more adept in understanding the value of data management and MSDI. The MSDIWG therefore suggest that CBSC should consider this in the light of the experience MSDIWG members and expert contributors have witnessed delivering Capacity Building Training in MSDI.

At the HO operational level, we are seeing the emergence of a highly skilled, IT literate, motivated and questioning workforce; keen to see innovation and change happen. It is becoming apparent that potentially all HOs need an element of training and education in MSDI and Data Management best practise as those HO's potentially needing the support are not necessarily those applying for CB funds for capacity building purposes. The responsibility to adapt rests with everyone in the organisation.

Data Centric Operations and Workflows

Data are the second most important asset in an organisation 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 organisation 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 are 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 for the nation but potentially across borders with neighbouring HO's.

Action required of ARHC IRCC

The ARHC6 is invited to note the MSDIWG report and to take appropriate actions.