REPORT OF THE MARINE SPATIAL DATA INFRASTRUCTURES WORKING GROUP (MSDIWG)

1. **Chair:** Jens Peter HARTMANN (Denmark), since 2012
   Vice-Chair: Vacant (Ellen VOS until 2016)
   Secretary: John PEPPER (OceanWise)

2. Membership:

Member States: Argentina, Australia, Brazil, Canada, Cuba, Denmark, Estonia, Finland, France, Germany, Indonesia, Japan, Malaysia, Nigeria, Netherlands, Norway, Philippines, Portugal, Republic of Korea, Romania, Slovenia, Spain, Singapore, Thailand, Ukraine, United Kingdom and United States.

Expert Contributors: CARIS, Envitia, ESRI, Geosciences Australia, GSDI Association, OceanWise, Open Geospatial Consortium (OGC).

IHO Secretariat:

3. Meetings:

MSDIWG8:   Vancouver, Canada (31 January - 2 February 2017)
MSDIWG7:   Tokyo, Japan (27 - 29 January 2016), preceded by a two-day MSDI Demonstration Workshop and Open Forum
MSDIWG6:   London, United Kingdom (4 - 6 March 2015), preceded by a one-day MSDI Open Forum
MSDIWG5:   Silver Spring, Maryland, USA (5 - 7 February 2014), preceded by a one-day MSDI Open Forum
MSDIWG4:   Copenhagen, Denmark (31 January - 1 February 2013), preceded by a one-day MSDI Open Forum, Copenhagen, Denmark

4. Agenda Items:

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 (SDI)
c) MSDI training and education
d) Facilitate (external) MSDI communication
e) Maintain and extend the IHO publication MSDI C-17
f) Ensure that MSDI is a standing agenda item for RHCs' meetings (IHO Res 2/1997, as amended, refers)
g) Presentation of the result of the Questionnaire about MSDI.

5. Difficulties encountered and challenges yet to be addressed:

a) Reporting of MSDI activities by Member States to Regional Hydrographic Commissions (RHC)

The level of reporting of MSDI activities by Member State to RHCs remains inconsistent. Some RHCs receive comprehensive inputs from Member State while others have yet to give MSDI sufficient visibility as a standing agenda item. The MSDIWG have limited access on 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 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 practice" 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.

d)   Data Centric Operations and Workflows

Data are 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 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 neighboring HOs.

e)   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.

f)   Appointment of RHC Ambassadors for MSDI

RHCs still need to identify and appoint "ambassadors" who would be willing and able to take the MSDI message to Member State 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 Member State 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 Member State for submission to every RHC incorporating the status of MSDI, plans for involvement in MSDI and challenges facing the HO.

6.   Achievements/outputs/conclusions:

a)   Change from HSSC to IRCC

The MSDIWG has been moved from HSSC to IRCC on 1 January 2015 and the IRCC7 approved the adjusted MSDIWG Terms of Reference.

b)   Revision of C-17

MSDIWG prepared a draft Edition 2.0.0 of the IHO Publication C-17 *Spatial Data Infrastructures: "The Marine Dimension" - Guidance for Hydrographic Offices* to include guidance on mechanisms that can be established to improve national access to bathymetric and related hydrographic data originally collected for commercial or scientific purposes, business planning and cases, presents steps required to be taken by HOs to make MSDI happen, identifies challenges faced by HOs. The new draft edition introduced many improvements and is now available for Member States at:

www.iho.int → Standards & Publications → Download → Draft Publications for discussion

c)   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. The IHO Capacity Building Programme for 2013-2017 supported Member State 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.

d)   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" (Annex A). *Note: optionally make the white paper available in the website.*, available from the IHO website at:

www.iho.int → Committees & WG → MSDIWG → Body of Knowledge

e)   Amendments to the IHO Resolution 5/2009 Marine Spatial Data Infrastructure (MSDI) Policy

The MSDIWG considers appropriate for the IHO Assembly to consider to amend the IHO Resolution 5/2009 *Marine Spatial Data Infrastructure (MSDI) Policy* as presented in the Annex B.

f)   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

g)   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

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

        In March 2015, the Canadian Hydrographic Service (CHS), through the IHO, undertook a research study to ascertain the current situation of MSDI across the hydrographic 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 are available at:

        www.iho.int → Committees & WG → MSDIWG → Body of Knowledge

i)   Creation of an OGC Ad-hoc Maritime Group

        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 a Marine Domain WG was created within OGC with an aim of developing an OGC compliant MSDI Conceptual Model. Its first meeting took place in November 2016.

7.   Proposals for the consideration of the Assembly:

a)   Note the report
b)   Acknowledge the work done on the draft Edition 2.0.0 of the IHO Publication C-17
c)   Agree the amendments to the IHO Resolution N. 5/2009 as suggested in paragraph 6
d)   Acknowledge what has been achieved by the IHO/MSDIWG since 2008
e)   Acknowledge the role of the MSDIWG and its revised action plan and in doing so, endorse the IHO stance in promoting and facilitating the modernization of the hydrographic community to ensure it remains fit for purpose and relevant, not only supporting navigation, but to the wider marine and maritime world
f)   Note the development of the OGC Candidate Standard to replace Coordinate Reference Systems (CRS)
g)   Note the outcomes of CHS sponsored Status Update of Marine Spatial Data Infrastructure (MSDI) Implementations.
h)   Note the impending publication of a new MSDIWG White Paper
i)   Note the creation of the OGC Maritime Domain WG.
j)   Endorse the need to include MSDI agenda items in National reports to RHCs and to nominate RHC MSDI ambassadors to provide such reports.

        ~~Annex A:~~
        ~~MSDIWG White Paper (Realizing the benefits of Spatial Data Infrastructures in the Hydrographic Community)~~

        Annex ~~B~~:
        Proposal to Amend the IHO Resolution 5/2009 "*MARINE SPATIAL DATA INFRASTRUCTURE (MSDI) POLICY*"

Annex ~~B~~

Proposal to Amend the IHO Resolution 5/2009 "MARINE SPATIAL DATA INFRASTRUCTURE (MSDI) POLICY"

MARINE SPATIAL DATA INFRASTRUCTURE (MSDI) POLICY	5/2009	A-1	K4.7

1   The IHO ~~will~~ should continue to support Member States in the identification, development and implementation of an appropriate role in national Spatial Data Infrastructure (SDI) and MSDI initiatives. This will be achieved through:

a) Continuing to update ~~The development and maintenance of~~ IHO Publication C-17 ~~that will provide a definitive~~ procedural guide to ~~establishing the role~~ reflect progress made, whilst identifying ongoing challenges and providing a clear pathway to successful engagement of the national hydrographic authority in MSDI.

b) Developing further the~~an~~ MSDI capacity building ~~plan~~ framework comprising knowledge transfer, ~~and~~ training and mentoring noting the need for all ~~to~~ Member States to be sufficiently educated in MSDI whilst energizing the latest generation workforce to support this process.

c) The publication of a White Papers in a timely manner to illustrate the value and benefit of MSDI and data management "best practice" governance and procedures using relevant case studies.

d) ~~Developing and managing~~ Managing a web-based facility and growing its body of knowledge to stimulate ~~encourage~~ knowledge transfer, development of best practice workflows and data management through the provision of online guidance and training material.

e) ~~Formalising~~ Strengthening existing, whilst at the same time identifying new relations between IHO and ~~other~~ SDI stakeholder groups and through actively participating in these groups to grow further the ~~strengthen~~ understanding and knowledge of the role of hydrography in MSDI.

2   IHO Regional Hydrographic Commissions are encouraged to monitor and report progress in Member States' MSDI engagement and development as a means of benchmarking the role of the national hydrographic authority in MSDI.

Note: proposed amendments marked in red.