

**16th MEETING OF THE IHO INTER-REGIONAL COORDINATING COMMITTEE
IHO-IRCC16
Santa Cruz Island - Galapagos, Ecuador, 10-12 June 2024**

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

Submitted by:	Chair, MSDIWG
Related Documents:	<i>Annex B:</i> MSDIWG Proposed Work Plan 2024 - 2027 <i>Annex C:</i> MSDIWG Actions List – June 2024 <i>Annex D:</i> List of RHC MSDIWGs and Ambassadors
Related Projects:	OGC Federated MSDI Pilot https://www.ogc.org/initiatives/fmsdi5/ UN-IGIF-H https://ggim.un.org/UNGGIM-wg8/#resources
Chair:	Caitlin Johnson, USA
Vice-Chair:	Chris Hemmingway, CAN
Secretary:	Julien Barbeau, Teledyne
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see <i>Annex A</i> for full details	

1. Meetings Held During Reporting Period

The fifteenth meeting of the Marine Spatial Data Infrastructures Working Group (MSDIWG15) of the International Hydrographic Organization took place in a hybrid format from 4 through 8 March 2024 in Bali, Indonesia and was hosted by the Indonesian Navy Hydro-Oceanographic Centre (Pushidrosal). The MSDIWG15 meeting was held back-to-back with the Open Geospatial Consortium (OGC) Marine Domain Working Group Marine (DWG) 2024 meeting and the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) Working Group on Marine Geospatial Information (WG-MGI) 6th expert meeting. The meeting was attended by ~44 attendees which included Members as well as observers from the OGC Marine DWG and UN-GGIM WG-MGI. IHO Director Dr. John Nyberg and IHO Assistant Director Mr. Yong Baek represented the IHO Secretariat.



The objectives of the MSDIWG15 meeting were to:

- Exchange knowledge through national, regional hydrographic commission, and expert contributor presentations; with a specific emphasis on sharing and enabling regional MSDI working groups' initiatives
- Discuss the IHO Strategy and goals from a MSDI perspective; specifically as it relates in IHO Strategic Plan Target 2.1 and what's next for the MSDIWG
- Celebrate the adoption of IHO publication C-17 version 3.0 and investigate options for future maintenance to keep the document current
- Discuss the Future MSDI and vision for 2030
- Continue collaboration with the UN-GGIM WG-MGI and OGC Marine DWG

The meeting received nine national MSDI reports, four Regional Hydrographic Commission MSDIWG reports, and numerous presentations from expert contributors.

Portugal offered to host the next meeting, MSDIWG16, in March 2025.

International Seminar

On 4 March, meeting participants attended the International Seminar on United Nations Global Geospatial Information Management with the theme “effective and integrated marine geospatial information management.” After a joint opening ceremony which included opening remarks from Singapore’s Ambassador for Oceans and Law of the Sea and the President of the Regional Committee of UN-GGIM for Asia and the Pacific, participants witnessed the signing of the Cooperation Agreement between the Geospatial Information Agency - Indonesia and the Indonesian Navy Hydro-Oceanographic Centre. The remainder of the seminar included presentations and roundtable discussions related to three main subjects: the availability and accessibility of marine geospatial information for effective governance of the seas and oceans; implementing the UN-IGIF-Hydro and advancing the conservation and sustainable use of marine resources; and partnerships and innovations for integrated marine geospatial information management. The seminar was extremely successful and helped to set the tone and spur discussion for the remainder of the week.

More information can be found at the event’s website here:

https://ggim.un.org/meetings/2024/WG_Marine_Geospatial_6th_expert_mtg/#seminar

2. Work Program

The existing MSDI WG Work Plan 2021 - 2024 approved by IRCC14 was evaluated at the MSDI WG15 meeting based on recently achieved results and many tasks found complete. In order to develop an updated Work Plan, MSDI WG15 meeting participants conducted an interactive session to reimagine the Work Plan where they brainstormed what a successful MSDI WG would look like and what they would like to achieve in the future. They considered the real-world objectives of the broad MSDI, the targets of the IHO Strategic Plan, the MSDI WG Terms of Reference, and the current Work Plan themes. Considering the Work Plan themes, the MSDI WG was able to draw clear linkages to the United Nations Integrated Geospatial Information Framework's (UN-IGIF) nine strategic pathways and decided to reformat the MSDI WG Work Plan in coordination. Meeting participants broke up into groups representing each pathway and came up with potential tasks for each pathway/ theme. Then, the groups shared their tasks and all members voted for the three tasks in which they were most interested. The tasks with the highest number of votes and thus interest from the WG are represented on the Work Plan 2024 – 2027. As such, not all UN-IGIF pathways are represented in the WG's agenda for the next three years, but we expect the pathways to ebb and flow as the Work Plan is updated and refined.

The latest Work Plan 2024 - 2027 is provided for IRCC16 approval and can be found in **Annex B** of this report.

New Work Plan Tasks include:

- Create a story map to demonstrate the value of MSDI
- Publish the SWPHC data value proposition document
- Collaborate with innovation centres to explore potential use cases
- Conduct exploratory study to identify and document existing and potential uses of AI
- Promote the land-sea interface
- Simplify standards for novice users with various needs
- Map S-100 with ISO19115 and other relevant standards
- Maintain IHO C-17 in accordance with UN-IGIF-H
- Present and discuss national MSDI initiatives and achievements
- Collaborate with and enable RHC MSDI working groups
- Conduct annual meetings with OGC Marine DWG and UN-GGIM WG-MGI

In relation to the List of Actions, the existing actions were evaluated in order to clarify their status and to establish the way forward. At the end of the meeting, new actions were added to the list. The latest list of action items can be found in **Annex C** of this report.

3. Progress on IRCC Action Items

IRCC15/Action 1 - Review the ROP and TOR (Statutes) based on Decision 9b of the Assembly on gender-inclusive language.

Status: Complete.

IRCC15/Decision 28 - Approve MSDI WG Terms of Reference version 2.0.

Status: Complete. Available on [MSDIWG website](#).

IRCC15/Decision 29 - Endorse IHO C-17 version 3.0.

Status: Complete. Available on [IHO publications website](#)

IRCC15/Action 7 - Ask IHO Secretariat to issue a CL for the C-17 ed. 3.0 approval by the Member States.

Status: Complete. CL 21/2023

IRCC15/Decision 30 - To approve the application of ISO 9001- 7 Quality Management Principles from MSDI Perspective and for inclusion into IHO C-17 version 3.0, depending on the approval of the C-17 by the IHO Member States.

Status: Complete. Included in C-17 version 3.0.

IRCC15/Recommendation 11 - RHCs to appoint MSDI ambassadors and inform the MSDIWG with contact details.

Status: In progress. Current list available on [MSDIWG website](#) and Annex D of this report. RHCs without current MSDI representation are invited to provide contact information to the MSDIWG.

IRCC15/Decision 31 - To task MSDI to stick with the content of the Portal to the existent IHO GIS layers in accordance with the Proposal 1.2 to the 3rd IHO Assembly and if new layers are identified by the MSDIWG they should be brought to IRCC to be endorsed and approved by the Council.

Related to **C7/23**: *In accordance with Decision A3/8c, the Council noted that IRCC tasked the MSDIWG to not invest in another portal, but to focus on global thematic layers by means of the existing IHO GIS infrastructure (like those already available on the INTOGIS*

Related to **C7/44**: *Following on clarification on the objectives provided by the Secretary General, including updates from the last NIPWG-10 meeting on S-122 development, the Council agreed on the strategic need to promote the S100 Concept with a quick-win through S-122. The Council tasked the IHO Secretariat to establish liaison with relevant data providers of MPAs and tasked the IRCC through the MSDIWG to establish a pilot project for the High Sea and MPAs adopted by IMO, to demonstrate the benefits of S-122 for non-navigation purposes.*

Related to **IRCC14/Action 8**: *MSDIWG to investigate in liaison with the IHO Secretariat, having in consideration the possibilities, challenges and resources required, the establishment of a basis MSDI portal solution building on the already existing INTOGIS solution and other available data.*

Related to **IRCC14/Action 9**: *MSDIWG to investigate in liaison with the IHO Secretariat the different possibilities, challenges and resources need for step 2 of the MSDI Portal (an IHO marine data hub network) in order to have the information needed to take a decision about implementing step 2 and to present the recommendations at IRCC 15.*

Status: In progress. Action requested.

During MSDIWG15, ProtectedSeas provided a presentation on their work surrounding Marine Protected Areas. Meeting participants appreciated the information and discussed next steps for

the MSDIWG as it relates ProtectedSeas data, S-122 standard development, and the above Council and IRCC actions. The MSDIWG agreed to liaise with NIPWG to monitor and provide assistance to the S-122 pilot project led by the IHO Secretariat with support from ProtectedSeas. The focus will be on the High Seas and MPAs adopted by the IMO to demonstrate the benefits of S-100 for non-navigation purposes.

The MSDIWG is not the appropriate body in terms of knowledge and experience to create S-100 datasets; the S-122 standard has been developed by NIPWG. However, the MSDIWG will provide assistance in creating S-122 datasets to demonstrate their use for non-navigation purposes.

Therefore, MSDIWG recommends that the Council decision C7/44 reflect the work of the group to address the Council's instruction, changing from:

MSDIWG to establish a pilot project for the High Seas and MPAs adopted by IMO, to demonstrate the benefits of S-122 for non-navigation purposes

To

MSDIWG to monitor and provide assistance to the S-122 ProtectedSeas pilot project with specific focus on the High Seas and MPAs adopted by IMO, to demonstrate the benefits of S-122 for non-navigation purposes.

Furthermore, MSDIWG recommends establishing the IHO MSDI Portal utilizing the existing INTogIS infrastructure. During MSDIWG15, Esri provided a presentation on Esri data "hub" technology based on conversation during MSDIWG13 and 14 and the proposed two-step approach to the implementation of a portal. Esri will present additional data exchange technology options at MSDIWG16 based on the updated Council decisions to not invest in another portal.

IRCC14/Action 5: *MSDIWG to provide recommendations to IRCC 15 on how IHO MS can use the FAIR principles and establish a HO MSDI FAIR principles checklist.*

Status: In progress. At MSDIWG14, the WG noted various examples of existing applications of FAIR principles to data management practices and provision in MSDIs. OGC shared recent developments of FAIR+, otherwise known as FAIR-TLC, which includes three additional principles, also relevant in the marine domain: traceability, licensure, and connectedness. The MSDIWG14 agreed that the OGC should build on Norway's FAIR principles parameters to incorporate the FAIR+ principles into a FAIR(+) principles checklist. MSDIWG15 update: Norway provided the FAIR Principles guide earlier this year and the WG plans to translate it to English, share it on the MSDIWG Body of Knowledge website for MS reference, and collaborate with OGC to form a FAIR (+) Principles Checklist to submit to IRCC17.

4. Problems Encountered

As highlighted during the International Seminar preceding the meeting as well as in discussions over the course of MSDIWG15, partnerships and cooperation are vital aspects of a successful integrated geospatial information system, therefore communication and outreach with relation to MSDI remain a high priority.

As noted in section 5 below, some Regional MSDI Working Groups are suffering from a lack of resources and strategic direction and are therefore ceasing or considering operations. While the IHO MSDIWG has attempted to provide some written resources for Regional MSDI Working Groups, some rejuvenating action from the RHCs is important if this work is to continue.

5. Any Other Items of Note

IHO Publication C-17

After a significant drafting effort over the 2022 - 2023 period, the WG celebrated IHO publication C-17 version 3.0, *Spatial Data Infrastructures “The Marine Dimension” Guidance for Hydrographic Offices*, officially adopted in October 2023, and considered how to most efficiently provide updates to keep the information in the document current. The WG decided to set up a Document Management Team (DMT) under the leadership of the MSDIWG Vice-Chair who will manage the document’s contents in the IHO Github in harmony with the UN-IGIF-Hydro. It is important to keep the latest version of the document current and relevant to users and the WG believes Github will provide a good path to that end. The DMT and MSDIWG Secretariat will participate in Github training on 3 July 2024.

Regional MSDI Working Groups

At a time when national and regional SDIs/MSDIs and geospatial programs are being developed worldwide, along with the upcoming suite of S-100 products for navigation and beyond, coordinated access and management of geographic information through the RHC remains important. Besides Regional MSDI Ambassadors, the establishment of Regional MSDI Working Groups and the provision of annual RHC MSDI reports to the IHO MSDIWG meetings would facilitate the gathering of member states’ approaches and to enable a coordinated approach to marine and maritime geographic information. Existing Regional MSDI Working Groups have demonstrated the benefits of such coordination, especially with the sharing of resources for MSDI establishment and capability development.

During the Regional MSDI Working Group presentations at MSDIWG14 (2023), it became obvious that there were varying levels of activity and “health” in the Regional MSDI Working Groups. Some groups had strong participation and were quite energetic in completing tasks and other groups lacked resources and direction from the associated Regional Hydrographic Commission. As a result, MSDIWG14 produced a number of actions related to Regional MSDI Working Groups and how the MSDIWG might better engage and provide guidance to these groups when helpful.

Over the meeting period, the WG compiled a list of regional MSDI Ambassadors and Working Group Chairs to aid in communication and collaboration. See Annex D in this report for details. Five out of the fourteen Regional Hydrographic Commissions have yet to provide MSDI contact details.

Second, the WG created and conducted an “active vs. non-active” google survey for Ambassadors and Working Group Chairs to complete, simply to gage the level of activity in each Regional MSDI Working Group. The survey had five participants and varied answers for many of the questions. The survey results are available on the MSDIWG Body of Knowledge. During the MSDIWG annual meeting, Regional MSDI Working Groups are always invited to present on their activities and accomplishments over the past meeting period. MSDIWG15 heard from four Regional MSDI Working Groups whose presentations are available on the MSDIWG15 meeting website.

Of note, two of the established Regional MSDI Working Groups have either ceased operations officially or are considering ceasing operations in the near future. If the RHCs value the contributions of the Regional MSDI Working Groups, it is important that they set clear direction and allocate resources for this work.

In addition to the regional presentation, the South-West Pacific Regional MSDI Working Group provided a presentation on two extremely successful initiatives: the [Data Value Proposition: Why should we share data?](#) and helpful explanatory [IGIF strategic pathway videos](#). These are great examples of resources created by a Regional MSDI Working Group.

To wrap up this section of the meeting, the WG conducted an interactive session on collaboration in Regional MSDI Working Groups, facilitated by the member from Denmark. The interactive session consisted of participants breaking into smaller groups and discussing strategies that have worked well for enhancing group collaboration as well as challenges that have stunted group collaboration. All of the groups presented their findings and a resource, [Key Themes for Successful Collaboration in Regional MSDIWGs](#), was created to further aid and enable regional MSDI working groups. The WG took really well to this type of interactive session and found it very productive. Special appreciation is due to Denmark for facilitating the interactive session and consolidating the written resource.

OGC FMSDI

During the OGC Marine DWG session of the meeting, OGC discussed the progress and next phases of the ongoing OGC Federated MSDI Pilot. This project directly responds to the OGC-IHO MSDI Concept Development Study (2017) and seeks to initiate a full-scale Pilot to demonstrate a multi-country, federated MSDI. In partnership with various IHO members, so far the Pilot has produced numerous phases and associated deliverables that are available on the OGC website. The current phase is FMSDI 2024, and as in previous phases, aims to improve the interoperability of land and sea data by considering the challenges unique to coastal zones and data management jurisdiction issues many nations face.

Future of MSDI

During the MSDWIG15 meeting, the Vice-Chair provided a presentation regarding the Future of MSDI, addressing topics discussed in recent years and their relevance to MSDI. With the completion of a major update to IHO C-17 to include rapid advancements in technology and emerging trends, it is necessary to address the changing needs of the maritime community for geospatial data. Topics discussed included S-100 and MSDI, Marine Protected Areas and S-122 development, Digital Twins for Marine Spatial Data, collaboration and engagement with partners and stakeholders, emerging technological trends like AI and machine learning, and enhancing linkages with various aspects of the marine science community. After the presentation, the WG discussed these topics and used the interventions provided along with the Work Plan interactive session to propose tasks included in the 2024 – 2027 Proposed Work Plan.

MSDIWG Body of Knowledge (BoK)

Throughout the last few years, MSDIWG members have been active in completing relevant projects and providing resources valuable to the community and many of these have been posted to the [MSDIWG BoK website](#) for reference. Of note, two newly developed categories on the BoK include Regional MSDI Working Group Resources and OGC Web Resources.

Connected MSDI

The MSDIWG has had fruitful exchange of knowledge with expert contributors from industry, academia, regional hydrographic commissions, and non-governmental organizations (NGOs) for many years. Since 2019, the MSDIWG enhanced connections with experts from the UN-GGIM WG-MGI and OGC Marine DWG and have shared a vibrant ecosystem for collaboration and innovation. The MSDIWG recognizes the benefits of keeping connected to the bigger

picture and keeping abreast on what the industry and other stakeholders have to offer by gathering together and values the additional participation from members of these groups. WG initiatives like the update of IHO C-17 in coordination with the UN-IGIF-Hydro, establishment of the MSDIWG Work Plan 2024 – 2027 in alignment with the UN-IGIF strategic pathways, and case studies regarding geospatial data integration at the land-sea boundary undoubtedly benefit from this kind of coordination and the MSDIWG welcomes a joint meeting framework similar to MSDIWG15 going forward. However, it was noted that the UN-GGIM WG-MGI will not hold an in-person meeting in 2025. The MSDIWG will continue to liaise with the WG-MGI and OGC Marine DWG on matters of mutual interest.

6. Conclusions and Recommended Actions

The work of the MSDIWG is progressing well, and the development of a new Work Plan 2024-2027 in line with the UN-IGIF will create a fresh framework for the WG to embark on new tasks and ensure a uniformed approach to data management between land and sea, especially after the update of IHO C-17.

The MSDIWG has continued to benefit from the exchange of knowledge from diverse members and connections, especially in regards to Regional MSDI Working Groups. The MSDIWG15 meeting was the fifth time the three working groups – the IHO MSDIWG, the UN-GGIM WG-MGI, and the OGC Marine DWG – have come together for annual meetings. Collectively, with diverse participants from government, academia and industry, these joint meetings address the “why” marine spatial data matters, “what” we have and what is required, and “how” we can achieve them. The MSDIWG recognizes the need to continuously share and review good practices to help newly establishing MSDIs jumpstart their developments and close the gap, leaving no one behind. At the same time, for MSDIs to remain relevant to the broader water domain and geospatial ecosystem, we must also think ahead and innovate together with our stakeholders on trends and future trends such as Artificial Intelligence. The proposed Work Plan aims to address these topics.

7. Justification and Impacts

N/A

8. Action Required of IRCC

The IRCC is invited to:

- a) note the report
- b) continue to appoint RHC MSDI Ambassadors and inform the MSDIWG of contact details
- c) liaise with Regional MSDI Working Group Chairs and Ambassadors regarding the needs of the RHC in relation to MSDI
- d) approve the Proposed MSDIWG 2024 – 2027 Work Plan
- e) recommend that Council decision C7/44 reflect the work of the group to address the Council’s instruction, changing from:

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To

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MSDI Working Group

13 May 2024

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Proposed MSDIWG Work Plan 2024-2027

Themes	
A	UN-IGIF Strategic Pathway #1: Governance and Institutions <i>Establishes the leadership, governance model, institutional arrangements, and a clear value proposition to strengthen multi-disciplinary and multisectoral participation</i>
B	UN-IGIF Strategic Pathway #4: Data <i>Establishes a geospatial data framework and custodianship guidelines that ensure the availability, quality, and accessibility of geospatial data, including the establishment of standards and practices for data collection, storage, and dissemination</i>
C	UN-IGIF Strategic Pathway #5: Innovation <i>Leveraging current and emerging technologies to enhance geospatial information management, including cloud computing, big data analytics, and artificial intelligence</i>
D	UN-IGIF Strategic Pathway #6: Standards <i>Establishes and ensures the adoption and implementation of standards and compliance mechanisms for enabling data and technology interoperability and compatibility across different systems and organizations</i>
E	UN-IGIF Strategic Pathway #8: Capacity and Education <i>Developing the workforce and expertise needed to effectively manage and utilize geospatial information, through enduring capacity development and education programs</i>
F	UN-IGIF Strategic Pathway #9: Communication and Engagement <i>Promoting awareness, understanding, and support for geospatial information and its benefits across all sectors of society, including decision-makers, stakeholders, and the general public through user engagement and strategic communication</i>

Reference: United Nations Integrated Geospatial Information Framework (UN-IGIF): <https://ggim.un.org/UN-IGIF/>

No.	Work Item	Milestones	Start Date	End Date	Status P - Planned O - Ongoing C - Complete	Responsible/ Contact Person(s)	Remarks
A.1	Create a story map to demonstrate the value of MSDI	1. Esri to present to MSDWIG 2. MSDIWG to circulate	2024	2027	P	Esri	
B.1	Publish SWPHC data value proposition document	1. SWPHC MSDIWG to provide document 2. Publish on IHO MSDIWG website	2024	2024	P	SWPHC MSDIWG, Chair, IHO Secretariat	
C.1	Collaborate with innovation centers to explore potential use cases	1. Establish focus group 2. Identify partnership opportunities with innovation centers 3. Explore project ideas 4. Present to MSDIWG	2024	2027	P	OGC, Portugal, [additional members]	
C.2	Conduct exploratory study to identify and document existing and potential uses of AI in the maritime sector	1. Liaise with OGC GeoAI Working Group 2. Present to MSDIWG 3. MSDIWG to address findings via project or paper	2024	2027	P	Denmark, OGC, Portugal, [additional members]	
C.3	Promote the interface between land and sea	1. Establish focus group 2. Identify partnership opportunities 3. Explore project ideas 4. Present to MSDIWG	2024	2027	P	Singapore, Italy, SPC, UN-GGIM WG-MGI, OGC	
D.1	Simplify standards for novice users with various needs	1. Consult UN documentation and provide executive summary of marine section 2. Present to MSDIWG 3. Publish on MSDIWG website	2024	2026	P	OGC	
D.2	Map S-100 with ISO19115 and other relevant standards		2024	2027	P	UK, Singapore, S-100 WG, [additional members]	

E.1	Maintain IHO Publication C-17 in accordance with UN-IGIF-H	<ol style="list-style-type: none"> 1. Develop Document Management Team (DMT) 2. GitHub Training 3. Liaise with UN-GGIM WG-MGI regarding IGIF-H updates 4. Manage content 	2024	2027	P	DMT, Vice-Chair, IHO Secretariat	
F.1	Present and discuss national MSDI initiatives and achievements	<ol style="list-style-type: none"> 1. Member States to provide national reports and case studies at annual MSDI WG meetings 	2024	2027	O	All	
F.2	Collaborate with and enable Regional Hydrographic Commission (RHC) MSDI Working Groups	<ol style="list-style-type: none"> 1. Update RHC MSDI WG Chairs and MSDI Ambassadors 2. Create procedures for cooperation resource for BoK 3. Provide RHC MSDI updates at annual MSDI WG meetings 	2024	2027	O	Chair, Vice-Chair, RHC MSDI WG Chairs/ MSDI Ambassadors	RHC MSDI WG Chairs and MSDI Ambassadors list available on IHO MSDI WG website. Procedures for cooperation document available in draft form.
F.3	<p>Conduct 2024-2027 annual meetings of MSDI WG, arranged back-to-back with OGC Marine DWG and UN-GGIM WG-MGI meetings when applicable. Hold adjacent open forum/ international seminar when possible.</p> <p>2024 - Indonesia 2025 - Portugal 2026 - TBD 2027 - TBD</p>	<ol style="list-style-type: none"> 1. Date and venue defined 2. Logistics in place 3. Open forum/ international seminar program defined 	2024	2027	O	Chair, Vice-Chair, IHO Secretariat	

LIST OF ACTIONS FROM THE MSDIWG – JUNE 2024

Action N.	Action Items (agenda item)	Responsible	Deadline	Status
19/2018	Include "economic impacts" of MSDI with respect to hydrography in the MSDI BoK. MSDIWG Members to send relevant reports and case studies for BoK	All, IHO Secretariat	Ongoing	Members invited to send relevant reports and case studies to the IHO Secretariat or include in national reports
1/2022	Nominate contact points from Data Quality WG, NIPWG and S100WG to report back to MSDIWG on relevant MSDI matters	S100WG – OGC Marine DWG/IIC Technologies	MSDIWG16	Awaiting DQWG and NIPWG TBD
15/2022	OGC to repurpose Norway FAIR Principles Guide into a checklist	OGC Marine DWG; Norway	MSDIWG15	Awaiting delivery of guide IGIF Maturity Matrix as starting point as well as Norway checklist; OGC Marine DWG checklist TBD
18/2022	MSDIWG to investigate/ monitor the role of MSDI in Maritime Digital Twin, how to proceed and the possibility to establish a pilot project together with the IHO-Singapore Innovation and Technology Laboratory with Singapore as a pilot study area. Status Report to be provided at MSDIWG16.	OGC Marine DWG	MSDIWG16	OGC to report on FMSDI pilot, connecting land and sea
09/2023	Share FAIR Principles Guide when it becomes available	Norway		Awaiting
17/2023	OGC - FAIR+ presentation to be presented at MSDIWG16	OGC	MSDIWG16	
01/2024	MSDIWG Members are invited to update their membership information, including contact details, via the new IHO Portal once the system is operational.	All	Permanent	
02/2024	IHO Secretariat (Yong) to announce the procedure for updating the MSDIWG membership via the IHO Portal.	IHO Secretariat	June 2024	
03/2024	Chair/IHO Sec to identify improvement and/or requirements needed to support the IHO MSDI with the INToGIS system and report on the outcomes and a way forward of INToGIS for MSDI at the next MSDIWG meeting.	MSDIWG Chair/ IHO Sec.	MSDIWG16	

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04/2024	Portugal to provide a summary of the challenges and obstacles they faced during the development of their MSDI from a national perspective.	Portugal	MSDIWG16	
05/2024	Australia to share their land/ sea interface work with Earth observation data use case to put into the MSDI.	Australia	MSDIWG16	
06/2024	ROK to consider submitting a case study or best practice considering the template provided in the IHO Bok repository.	ROK	MSDIWG16	
07/2024	MSDIWG members are invited to provide updates on their national portal, including the URL, to IHO Secretariat at the earliest opportunity. IHO Secretariat to update map of National Geoportals on IHO website.	All	Ongoing	
08/2024	WG Chair and IHO Sec to consider organizing a best practice seminar as a joint event with UN-GGIM and OGC if applicable. This seminar is intended for national and/or regional representatives and is planned to be held as an online event.	MSDIWG Chair, UN-GGIM, IHO Secretariat, OGC	MSDIWG16	
10/2024	ProtectedSeas to report the progress of their project and/or activities regarding the MPA at the next MSDIWG meeting.	ProtectedSeas, MSDIWG Chair	MSDIWG16	
11/2024	MSDIWG Chair to request that Council decision C7/44 reflect the work of the group to address the Council's instruction, changing from: MSDIWG to establish a pilot project for the High Seas and MPAs adopted by IMO, to demonstrate the benefits of... To MSDIWG to monitor and provide assistance to the S-122 ProtectedSeas pilot project with specific focus on the High Seas and MPAs adopted by IMO, to demonstrate the benefits of...	MSDIWG Chair	IRCC16	In progress – noted in MSDWIG report to IRCC16
12/2024	Esri to submit a follow up presentation for the potential way to move forward with data exchange noting the Council decision to not create a new hub.	Esri	MSDIWG16	
13/2024	MSDIWG members requested to inform the IHO Secretariat (Yong) of their intention to join the Document Management Team (DMT) at the earliest opportunity.	All	ASAP	VC to lead team
14/2024	IHO Secretariat to arrange the GitHub training for the DMT how to manage C-17 in the Github.	IHO Secretariat	Before MSDIWG16	Yong already requested training from Ronald Tse (4/10/24)
15/2024	DMT to establish the IHO GitHub repository for C-17 and update its contents to reflect Edition 3.0.0 of C-17.	MSDIWG DMT	MSDIWG16	

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16/2024	MSDIWG members requested to monitor Singapore's progress on MSDI metadata implementation roadmap, and consider partnering, Singapore invited to share progress.	All, Singapore	MSDIWG16	
17/2024	Singapore to provide paper on basic MSDI data model and share with MSDIWG.	Singapore	MSDIWG16	
18/2024	MSDIWG Chair to circulate the draft MSDIWG work plan 2024 – 2027 to WG for approval	Chair	2 months after MSDIWG15	
19/2024	MSDIWG Chair to submit the draft MSDIWG work plan 2024 – 2027 to IRCC for approval.	Chair/ IHO Secretariat	IRCC16 – June 2025	
20/2024	Host MSDIWG16 in coordination with the OGC Marine DWG	IHO Secretariat MSDIWG Chair, OGC, Portugal	MSDIWG16	Planned
04/2017	Submit an updated paper to HSSC11 outlining further development and implementation of DGGs.	OGC Marine DWG	2025	Closed WG can monitor HSSC for paper
04/2018	MSDI case studies: provide 500- word (maximum) examples for MSDI BoK.	Malaysia, Indonesia, RoK, USA	March 2020	Closed
04/2019	To investigate the development of a "Guide on Standards for the Common People" to be made available in the BOK (6)	OGC Marine DWG	April 2019	Closed – refer to UN-GGIM Standards Guide ed 3
05/2019	To add the OGC "Guide on Standards for the Common People" in the BOK from Action MSDIWG10/04 (6)	IHO Secretariat	May 2019	Closed – refer to UN-GGIM Standards Guide ed 3
06/2019	To share MSDI use cases as they are developed by the EAHC/MSDIWG and report the status to the MSDIWG (7)	EAHC MSDIWG	MSDIWG11	Closed Members welcomed to share MSDI use-cases
10/2019	To investigate how to make the e-learning developed by Denmark in the EAHC TRDC e-learning platform hosted by ROK (10)	ROK, Denmark September	2019	Closed
14/2019	To develop an outreach strategy considering the target audience and the means to do it and report back to MSDIWG (11.1.1)	MSDIWG Chair/Vice-Chair	MSDIWG14	Closed MSDIWG can reference the CSBWG outreach materials.
19/2019	To submit a paper to HSSC on data integrity for MSDI with a precise description of the problem to be solved (11.2)	OGC Marine DWG	HSSC12	Closed

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23/2019	To prepare a paper to submit the template on maturity assessment produced under Agenda MSDIWG10/22 to IRCC (11.3.1)	MSDIWG Chair	IRCC11	Closed
24/2019	To investigate the possibilities for the development of an online living C-17 publication (12.1)	MSDIWG Chair, Vice Chair and IHO Secretariat	MSDIWG15	Closed
25/2019	To investigate the incorporation of the living C-17 to the IHO website infrastructure (12.1)	IHO Secretariat	MSDIWG15	Closed
26/2019	To consider the draft C-17 produced under Actions MSDIWG10/25 and to submit to IRCC12 (12.1)	MSDIWG11	MSDIWG12	Closed
01/2020	To draft a CL on MSDIWG11 outcomes (CDS, questionnaire, video)	IHO Secretariat	MSDIWG12	Closed
03/2020	To update the BoK with the list of marine themes.	IHO Secretariat	MSDIWG15	Closed List of MSDI themes in 2010 MSDI White Paper (BoK)
9/2020	To send questions from MSDI Maturity Assessment Survey out to MSDIWG MS for comment.	VC/MSDIWG	MSDIWG12.	Closed
10/2020	Investigate distribution options for MSDI Maturity Assessment Survey.	C & VC/MSDIWG	MSDIWG12.	Closed
11/2020	Possibly turn MSDI Maturity Assessment Survey in to IHO Online Form.	VC/MSDIWG, IHO Secretariat	MSDIWG12.	Closed
12/2020	Release MSDI Maturity Assessment to IHO and share with UN-GGIM WG-MGI.	C & VC/MSDIWG, IHO Secretariat	MSDIWG12	Closed
13/2020	Update to C-17 to be included in MSDIWG work plan and investigate a new format (e.g. Wiki). Include IGIF in update of C-17 (crosswalk)	C/MSDIWG, CoChair UN-GGIM WG-MGI	MSDIWG14	Closed
14/2020	Establish a drafting group for C-17.	C/MSDIWG	MSDIWG14	Closed
16/2020	Investigate possibilities for funding for enhancements to training material.	C/MSDIWG	MSDIWG12	Closed
17/2020	Create Spanish version and French versions for enhancements to training material.	IHO Secretariat	MSDIWG13	Closed All materials transferred to IHO e-learning center team
19/2020	To work on the landing page (i.e. home page) for training material.	MEX, IHO Secretariat	MSDIWG12.	Closed

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20/2020	How to investigate the possibility of train the trainee for MSDI training material.	C/MSDIWG IHO Secretariat	MSDIWG12	Closed
21/2020	Submit the MSDI use cases to the UN-GGIM/WGMGI.	IHO Secretariat	MSDIWG12	Closed
22/2020	Developing the MSDI use cases in a future revision of the IHO publication C-17	C-17 Drafting Group	MSDIWG14	Closed
23/2020	Template framework for MSDI use cases in MSDI BOK	NZL, VC/MSDIWG, IHO Secretariat	MSDIWG13	Closed
28/2020	Create use cases for MSDI-supportable UN SDGs identified by MSDIWG breakout group.	CAN, GBR, BRA	MSDIWG13	Closed Presentation on MSDI and SDGs provided at MSDIWG13
29/2020	Visualize/describe governance model in C-17, training material and body of knowledge.	C & VC/MSDIWG, IHO Secretariat	MSDIWG14	Closed Available in C-17 v3.0
30/2020	Update MSDIWG ToR with C-17 maintenance	C/MSDIWG & IHO Secretariat	MSDIWG13	Closed
31/2020	IHO Strategic Plan 2.1: Build a portal to support and promote regional and international cooperation in marine spatial infrastructures (MSDI).	C & VC/MSDIWG, IHO Secretariat	MSDIWG12	Closed Related actions 22 and 23/2022
32/2020	IHO Strategic Plan 2.3: Apply UN shared guiding principles for geospatial information management in order to ensure interoperability and extended use of hydrographic data in combination with other marine-related data.	C & VC/MSDIWG, IHO Secretariat	MSDIWG12	Closed Following WEND 100-Matrix
33/2020	Value proposition statement prepared for MSDI MS who have not yet engaged in the process (1 page)	OceanWise, OGC	MSDIWG13	Closed
1/2021	To investigate if status of national MSDI implementation in the national reports, could use the NZ matrix as a new starting point?	C/MSDIWG, NZL	MSDIWG13	Closed
2/2021	To circulate the Arctic SDI Governances documents to the MSDIWG MS	C/MSDIWG & C/ARMSDIWG	MAR 2021	Closed https://arctic-sdi.org/documents/strategic-documents/ and Body of knowledge.

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3/2021	C/MSDIWG should include Arctic SDI Governance document in MSDIWG report to IRCC			Closed
4/2021	To give a presentation of the FAIR principles at the next MSDIWG meeting	C/MSDIWG	MSDIWG12 (in person OCT)	Closed
5/2021	IHO Secretariat to circulate Draft Work Plan 2021 – 2024 to MS	IHO Secretariat	MAR 2021	Closed
6/2021	MSDIWG MS to comment and indicate their participation in the Draft Work plan	MSDIWG MS	APR 2021	Closed
7/2021	IHO Secretariat to circulate Draft updated Action list to MS	IHO Secretariat	MAR 2021	Closed
8/2021	MSDIWG MS to comment and indicate their participation in the Draft updated Action list	MSDIWG MS	APR 2021	Closed
9/2021	Circulate IGIF-H (when available) to MSDIWG MS for comment.	C/UN-GGIM WG-MGI &C/MSDIWG	Pending	Closed
1/2021	Make proposal/paper to IRCC linking MSDI and S100 implementation beyond Safety of Navigation. Circulate to MSDIWG MS for comment.	C/MSDIWG, IIC	IRCC13	Closed
12/2021	Send out draft UN-GGIM Standards Guide Ed. 3	SGP	MAY 2021	Closed
13/2021	MSDIWG MS invited to comment on draft UNGGIM Standards Guide Ed. 3	MSDIWG MS	MAY 2021	Closed
14/2021	Review MSDIWG action list for ideas to participate in the joint IHO-Singapore Innovation and Technology Lab. -e.g. development of automatic data harvesting prototype for marine spatial data (ref. Arctic SDI project)	C/MSDIWG, SGP	JUN 2021	Closed
15/2021	Investigate how MSDIWG can provide information to IHO e-Learning Project team	C/MSDIWG,	IIC JUN 2021	Closed
16/2021	Investigate funding to update IHO e-Learning Resources	C/MSDIWG	JUN 2021	Closed
2/2022	Compile list of relevant S-1xx products point of contacts		MSDIWG14	Closed The contact point to S-1XX (Jonathan P)
3/2022	MSDIWG to identify the S-1xx products that could be relevant for MSDI users		MSDIWG14	Closed MSDIWG14

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4/2022	SWPHC MSDI WG to update terms of reference on making data in line with the UN SDG goals and UN Shared Principles	SWPHC Chair/UK and MSDIWG	MSDIWG14	Closed – Available on SWPHC MSDIWG website
5/2022	MSDIWG and UNGGIM WG MGI to work together to identify common use-cases for bathymetry data residing in DCDB and Seabed 2030	MSDIWG and UN-GGI WG MGI	MSDIWG15	Closed MSDWIG14
6/2022	MSDIWG to identify use-cases of crowdsource bathymetry	MSDIWG	MSDIWG14	Closed MSDWIG14
7/2022	MSDIWG to test the MSDI Training Materials on the IHO e-learning portal (https://elearning.iho.int)	MSDIWG	MSDIWG14	Closed
8/2022	OGC to provide guideline or Recipe Book and showcase(s) for Hydrographic Offices to implement OGC APIs	OGC Marine DWG	MSDIWG14	Closed – Resources available...
9/2022	OGC API - Feature Link to be made available to Body of Knowledge	OGC Marine DWG	MSDIWG14	Closed – Resources available...
10/2022	OGC to provide presentation on OGC APIs for MSDIs at MSDIWG14	OGC Marine DWG	MSDIWG14	Closed
11/2022	OGC to share links to latest OGC APIs for dissemination to MSDIWG	OGC Marine DWG, IHO Secretariat	MSDIWG14	Closed – Included in 08/2022 deliverables
12/2022	OGC to provide draft guidance on how to follow the FAIR principles from HO perspective	OGC Marine DWG	MSDIWG14	Closed – Resources available...
13/2022	MSDIWG to follow-up on IRCC14's outcomes of the IRCC Workshop and suggest how MSDI could contribute to SPI 2.3.1	MSDIWG Vice-Chair	MSDIWG14	Closed
14/2022	MSDIWG to explore practical approach or best practices on principles for MSDIs	MSDIWG Vice-Chair	MSDIWG14	Closed Reference C-17
16/2022	MSDIWG to establish a C-17 Drafting Team	MSDIWG Vice-Chair USA (NGA) Italy	August. 2022	Closed
17/2022	C-17 Drafting Team to provide a first version at MSDIWG14	MSDIWG Vice-Chair USA Italy	MSDIWG14	Closed
19/2022	MSDIWG to provide feedback on WENDWG's WEND Product Matrix from MSDI perspective when deemed appropriate.	WENDWG Chair, IHO Secretariat	MSDIWG14	Closed
20/2022	UKHO to provide relevant S100 guideline from MSDI perspective that could be made available on BoK.	UKHO, MSDIWG Chair and Vice-Chair	MSDIWG14	Closed UKHO to provide it. (Vice-Chair)

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21/2022	OGC FMSDI S-122 Engineering Report to be made available to the MSDIWG when made public	MSDIWG Chair, OGC	April 2024	Closed Newer action added
22/2022	An expert group to explore MSDIWG's task related to Target 2.1 Build a portal to support and promote regional and international cooperation in marine spatial data infrastructures (MSDI). Step 1: Make data that is already available into INTOGIS and Step 2: establish a hub	MSDIWG Chair and Vice-Chair, ESRI	MSDIWG14	Closed Presentation provided by Esri at MSDIWG15
23/2022	Recommendation for Step 2: establish a hub, to be submitted at MSDIWG14	ESRI	MSDIWG15	Closed Presentation provided by Esri at MSDIWG15
24/2022	An online workshop to be convened to further discuss Step 2: establish a hub for Target 2.1 Build a portal to support and promote regional and international cooperation in marine spatial data infrastructures (MSDI).	MSDIWG Chair and Vice-Chair, ESRI	MSDIWG15	Closed Presentation provided by Esri at MSDIWG15
25/2022	Hosting the MSDIWG14 and coordination with the UN-GGIM Working Group on Marine Geospatial Information and OGC Marine DWG on back-to-back meetings.	IHO Secretariat MSDIWG Chair and Vice-Chair Italy	MSDIWG14	Closed
26/2022	Hosting the MSDIWG15 and coordination with the UN-GGIM Working Group on Marine Geospatial Information and OGC Marine DWG on back-to-back meetings.	IHO Secretariat MSDIWG Chair and Vice-Chair Indonesia	MSDIWG15	Closed
01/2023	Submit the amended Terms of Reference to IRCC15.	MSDIWG Chair	IRCC15	Closed
02/2023	WG to consider and discuss "MSDI Vision for the Future"	MSDIWG	MSDIWG15	Closed Presentation provided at MSDIWG15
03/2023	WG to continue to consider "What does S-100 mean for MSDI? What role can MSDI play in S-100?"	MSDIWG Chair and Vice-Chair, S-100 PoC	MSDIWG15	Closed Presentation provided at MSDIWG15
04/2023	WG to investigate with the IHO Secretariat the possibility to incorporate a function on INTOGIS for other communities to contact and contribute with marine-related spatial data	IHO Secretariat	MSDIWG15	Closed Similar action added at MSDIWG15
05/2023	Members invited to send or update the links to national SDI/ MSDI portals to the MSDIWG Secretary	MSDIWG	Ongoing	Closed Action refreshed

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06/2023	Provide Policy and Legal case study for C-17	Italy	June 2023	Closed Included in C-17 v 3.0
07/2023	Provide link to authoritative data paper and ensure alignment in C-17	C-17 Drafting Team	MSDIWG15	Closed Included in C-17 v 3.0
08/2023	Provide presentation about Marine Base Map land/sea data continuity solutions	RoK	MSDIWG15	Closed Presentation at MSDIWG15
10/2023	Share Data Value Proposition leaflet with MSDWIG	SWPHC MSDIWG, MSDIWG Chair. IHO Secretariat	MSDIWG15	Closed. Added to BoK Presentation at MSDIWG15
11/2023	Create a list of RHC MSDI WGs and MSDI ambassadors	IHO Secretariat	MSDIWG15	Closed Available on Basic WG Documents
12/2023	Develop “Best-Practices” or “Rules of Procedure” document for engaging regional MSDI Working Groups and detail operational successes; possibly reference IHO MSDIWG Case Study Template on MSDIWG BoK	MSDIWG Chair, MSDI Ambassadors - Australia, USA (NGA), Italy, Portugal, Denmark	Post- MSDIWG15	Closed Document posted to BoK
13/2023	Develop status (active/ non-active) survey for regional MSDI Working Groups to get a sense of the level of activity in each	MSDI Ambassadors - Australia, USA (NGA), Italy, Portugal, Denmark		Closed Sent to MSDI Ambassadors FEB 2024
14/2023	Assist S-100 Coordinators in RHCs in completing MSDI section of S-100 WEND100 IGIF Matrix	MSDI Ambassadors/ S-100 Contact Point	Ongoing	Closed
15/2023	Contact regional MSDIWG via RHCs to assess possible S-1xx product themes for use cases beyond navigational use		MSDIWG16	Closed
16/2023	Repurpose Norway FAIR Principles Guide when delivered for MSDIWG use	OGC, Norway		Closed Combined with Action 15/2022
18/2023	Submit 7 QMPs Table with coordination with C/IRCC	MSDIWG Chair		Closed IRCC15 Decision and Action C6/71

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19/2023	Identify potential Digital Twin requirements in the respective Regional Hydrographic Commissions	Regional MSDIWGs	3 months before MSDIWG15	Closed Not part of revised Work Plan
20/2023	Create questionnaire to HOs on Digital Twin data, service and/or infrastructure requirements			Closed Not part of revised Work Plan
21/2023	Report to IRCC15 on how MSDI and HOs can be part of Digital Twins in the future	C/ MSDIWG	IRCC15	Closed Provided in MSDIWG report and presentation to IRCC15
22/2023	Provide national marine science data standards to BoK when ready	Singapore		Closed Presentation at MSDIWG15
23/2023	Invite MS to provide case studies and comments to C-17 3.0 Draft	MSDIWG	March 2023	Closed
24/2023	WG to inform CBSC Intercessional about C-17 3.0 draft and submit to IRCC15	C/ VC MSDIWG	March/ April 2023	Closed
09/2024	<i>OGC to provide Federated MSDI Pilot publication to IHO Secretariat to be posted in MSDIWG BoK when available</i>	<i>OGC, IHO Secretariat</i>	<i>2 months after MSDIWG15</i>	<i>Closed Posted to BoK</i>

List of RHC MSDIWs and Ambassadors

Regional Hydrographic Commission	MSDI Ambassador/ Contact Point
Nordic HC	Christian Thellufsen (DNK) <i>chthe@gst.dk</i>
Mediterranean and Black Seas HC	CMDR Nunziante Langellotto <i>nunziante.langellotto@marina.difesa.it</i>
Arctic RHC	Christian Thellufsen (DNK) <i>chthe@gst.dk</i>
Baltic Sea/ North Sea HC	Christian Thellufsen (DNK) <i>chthe@gst.dk</i>
US/ Canada HC	TBD Interim: Caitlin Johnson (USA) <i>caitlin.s.johnson@nga.mil</i>
East Asia HC	
South-East Pacific RHC	
South-West Pacific HC	Helen Phillips (UK) <i>helen.phillips@UKHO.gov.uk</i>
Meso American and Caribbean Sea HC	Andy Dippolito <i>andrew.s.dippolito@nga.mil</i>
Eastern Atlantic HC	LCDR Telmo Dias (PRT) <i>dt.cdt.chf@hidrografico.pt</i>
Southern African and Islands HC	Tim Lewis (UK) <i>tim.lewis@UKHO.gov.uk</i>
North Indian Ocean HC	
ROPME Sea Area HC	
South West Atlantic HC	