

**9TH MEETING OF THE IHO-INTER REGIONAL COORDINATION COMMITTEE
IHO IRCC9**

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Update on Data Gathering and Management, Maximizing the use of Hydrographic Data

Submitted by:	IHO Secretariat
Executive Summary:	The document provides an update on progress towards improving access to hydrographic data, data gathering and management, maximizing the use of hydrographic data.
Related Documents:	MSDIWG Report, CSBWG Report, GEBCO Report.
Related Projects:	None

Introduction / Background

1. The IHO Secretariat introduced the document *IRCC7-11B* at the 7th IRRC meeting in Mexico on guidance on access to bathymetric data collected for commercial or scientific purposes and proposed a way forward to help the broad hydrographic community to access available data. In line with this paper, United Kingdom also submitted document *IRCC7-11E* on maximizing access to hydrographic information and highlighted the insufficient knowledge of the seabed, the wider uses of hydrographic data, the fact that less than 20% of data collected are made available to hydrographic services, the cost of bathymetric surveys and the increasing engagement of hydrographic services and stakeholders.
2. The IRCC established a Crowd-Sourced Bathymetry Working Group (CSBWG)). Details of the activities of CSBWG are contained in document IRCC9-07G, report of the CSBWG to IRCC9.
3. The IRCC agreed that the development of the GEBCO Data Store should be coordinated with the current upgrade of the IHO DCDB that is intended to improve support for CSB and ocean mapping data discovery. The IRCC also agreed mechanisms should be developed to promote the collection of bathymetric data from scientific and crowd-sourced cruises and to ensure that the data is made available to GEBCO, accompanied by appropriate metadata, through the IHO DCDB. Details of these activities are contained in document IRCC9-07I, report of the GEBCO Project to IRCC9.

Analysis/Discussion

4. The IHO is committed to the collection and management of global reference bathymetry data sets. It has established the IHO Data Centre for Digital Bathymetry (DCDB) and operates together with the Intergovernmental Oceanographic Commission of UNESCO, the GEBCO project, the General Bathymetric Chart of the Oceans. GEBCO's aim is to provide the most authoritative publicly-available bathymetry of the world's oceans. The GEBCO products include global gridded bathymetric data sets, a global set of digital bathymetric contours and a reference manual on how to build bathymetric grids. The continuing improvement of these products relies on close collaboration with regional ocean mapping programmes *such as EMODnet*.
5. Bathymetry, knowing the depth of the ocean, is important because every human activity conducted in, on or under the sea depends on knowing the depth and the shape of the seafloor. Safe navigation is the primary objective but shipping is far from being the only activity concerned. Port operations, fishing and aquaculture, the development of marine renewable energies, coastal zone management, the delineation of maritime boundaries, the mitigation of

marine disaster risks and the response to marine disasters, defence and security, understanding ocean circulation, they all rely on hydrography. In short, hydrography underpins the Blue Economy. There is no conservation and sustainable use of the oceans, seas and marine resources without hydrography.

6. Yet the current status of the knowledge of the depth of the sea is quite limited. No more than 15% of ocean depths have been directly measured. The ship tracks along which depth measurements are available may be hundreds of miles apart and this means that in many instances the shape of the seafloor is inferred, relying on educated guess and indirect measurement such as satellite altimetry. The situation in coastal waters is less dramatic but nothing to be proud of with about half of the world's coastal waters, from the 200 m contour line to the shore, remaining unsurveyed.

7. This situation where 75% of the surface of our planet are virtually unmapped, unobserved, and unexplored has led the IHO-IOC GEBCO Project to develop a new initiative, called "Seabed 2030" with the focused goal of compiling a high-resolution openly available global digital bathymetric model portraying the seabed at the highest resolution possible by the year 2030. This initiative should efficiently provide bathymetric information to end users and leave no features of the World Ocean floor larger than 100 m unmapped by 2030.

Three types of actions are required to improve of data gathering and maximizing:

8. The first one is to increase the rate of bathymetric data collection through holistic governmental survey and data gathering programmes. These programmes should identify priority areas, based on risk assessment methodologies. They should be governed by the principle "collect once, use many times" and would benefit of sharing/pooling the relevant resources, such as survey platforms.

9. The second type of actions deals with unlocking all existing bathymetric data, in particular data collected for scientific or commercial purposes. This would go a long way towards filling the gaps in our world ocean coverage. Current barriers (real or perceived) to sharing these data include concerns about national security, liability, loss of profit potential, technical challenges, lack of coordination, desire for anonymity, and a lack of understanding of the overall benefit to the well-being of our planet and the people on it.

10. The third lever is crowd sourced bathymetry. Crowd-sourcing to date has largely been regional and focused on the needs of specific communities. With most if not all commercial and scientific vessels equipped with reliable echo sounders and accurate satellite-based position fixing systems, the world's commercial and scientific fleet, as well as a growing number of "exploration yachts", represent a significant untapped source of bathymetric observations. While the observations may not meet the charting requirements for critical passages, such observations may serve as reconnaissance data or confirmation of existing charted data. In areas where otherwise little or no data exists, then crowd-sourced data must have some value.

11. In 2015, a dedicated Crowd Sourced Bathymetry Working Group was established by the IRCC (see IHO CL 42/2015) to develop guidelines on the collection and use of crowd-sourced bathymetry. Meanwhile, the web-based interface portal to the IHO Data Centre for Digital Bathymetry is being upgraded to offer an ingestion capability compatible with the crowd-sourced bathymetry concept. The main concept of crowd-sourced data is to transfer from the collector of data to the different categories of end-users via the IHO DCDB. The current model supports contribution of CSB data via a network of "trusted nodes", individuals or organizations that serve as liaisons between a like group of mariners and the data centre. The trusted node model ensures clarity of requirements and data consistency, while minimizing the effort on individual mariners to contribute data. In the future, the DCDB plans to expand its capability to support other models, including individual mariner contributions if appropriate.

12. The guidance developed by the Crowd-Sourced Bathymetry Working Group will be a good reference for all hydrographic community and other stakeholders. The IHO welcomes and encourages the contribution of expert

contributors from the industry, academia and all stakeholders to the development of its guidance and further provision of CSB data to the DCDB.

Additional Engagements on data gathering and maximizing:

13. In 2016 and 2017, the IHO and GEBCO representatives also actively attended and contribute the meetings of the Atlantic Seabed Mapping International Working Group (ASMIWG) which is another platform to gather data from the Atlantic Ocean.

14. IHO Director Gilles Bessero represented the IHO at the Sustainable Ocean Summit of the World Ocean Council (WOC) held its 4th meeting in Rotterdam, Netherlands from 30 November to 2 December. The SOS 2016 theme was "Ocean 2030: Sustainable Development Goals and the Ocean Business Community".

15. The Secretary-General represented the IHO at the sixth Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) took place at the UN Headquarters in New York, USA from 3 to 6 August 2016. The Committee reviewed the progress being made by its working group (WG) on global fundamental geospatial data themes. There was some discussion on the usefulness of a minimum list of fundamental geospatial data themes rather than data sets. The WG was invited to report its progress to the next session. The Committee reconfirmed its acknowledgment that open data, data sharing policies, and the use of volunteered geographic information are critical to advancing the use of geospatial information. These are all subjects currently under the purview of the Marine Spatial Data Infrastructure Working Group (MSDIWG) and the Crowd-Sourced Bathymetry Working Group of the IHO.

16. The UN-GGIM's Expert Group on the *Application of Geospatial Information related to Land Administration and Management*, provided its report and observations. President Ward drew the Committee's attention to the fact that the subjects under consideration of this expert group applied equally to the coastal areas, seas and oceans. He drew attention to the ongoing work in the IHO of assisting Member States to contribute to national and regional spatial data infrastructures and invited the Committee to consider whether the scope of study should be widened beyond the terrestrial domain to specifically include coastal waters, the seas and the oceans. As a result, the Committee: *... recognized the need to consider the marine environment – shorelines, coastal waters, seas and oceans – as a key component of the spatial data infrastructure that underpins the administration and management of land, marine spaces, and the national geospatial resources of many littoral Member States.*

This statement reinforces the role of the MSDIWG and the priority that is placed on MSDI in the IHO Work Programme.

17. The Secretary-General also represented the IHO at the United Nations (UN) Conference to Support the Implementation of Sustainable Development Goal (SDG) 14: *Conserve and sustainably use the oceans, seas and marine resources for sustainable development* (The Ocean Conference). The Ocean Conference took place in the General Assembly Hall at the UN Headquarters in New York, USA from 5 to 9 June 2017, coinciding with World Oceans Day, observed annually on 8 June. The overarching theme of the Ocean Conference was - *Our oceans, our future: partnering for the implementation of Sustainable Development Goal 14.*

18. Secretary-General made a statement on behalf of the IHO during the Conference. He pointed out that all the targets agreed under SDG14 depend upon a better knowledge of the depth and shape of the seafloor, not only in the deeper ocean but also in the world's coastal waters where 50% remains unsurveyed. The Secretary-General highlighted the IHO's continuing desire to improve the currently unsatisfactory situation and the need to support government hydrographic surveying programmes. He explained that in addition to national surveying programmes, the IHO is now re-invigorating the concept of crowd-sourcing or passage sounding - where all vessels use their standard navigation equipment to help measure and map the depth of the sea. At the same time, the IHO is investigating the use of other innovative technologies, including the use of autonomous roaming vehicles, and the determination of the depth in shallow water using satellite imagery, where conditions allow. The Secretary-General

specifically mentioned the IHO-IOC GEBCO (General Bathymetric Chart of the Oceans) programme as a way to support the aims of SDG14. He concluded by saying that Governments need to support their national hydrographic services; industry and academia must ensure that the depth data that they already hold is made available for the common good; and that the entire seafaring community should support the IHO in its global, crowd-sourced bathymetry programme.

19. During the UN Ocean Conference, Mr Yohei Sasakawa, on behalf of the Nippon Foundation, announced that the Nippon Foundation will increase its involvement in the IHO-IOC GEBCO programme and is planning to contribute US\$18.5M over ten years to support the specific goal of comprehensively mapping all of the seafloor by 2030. This will be known as Project Seabed 2030.

20. The following IHO Resolution was endorsed at the First Session of the IHO Assembly: *Improving the Availability of Bathymetric Data Worldwide* (see *Doc IRCC9-08A*). In accordance with this IHO Resolution:

Member States resolve that, in addition to fulfilling their international obligations to provide hydrographic information in support of safety of navigation, they should also consider implementing mechanisms that encourage the widest possible availability of all hydrographic and particularly bathymetric data, so as to support the sustainable development, management and governance of the marine environment. This may be achieved in several ways, including:

- a. active participation in and contribution to the marine element of national Spatial Data Infrastructures (MSDI);
- b. continued support for the IHO-IOC GEBCO project and the IHO Data Centre for Digital Bathymetry;
- c. encouraging the scientific and the commercial sector to identify and wherever possible make available for secondary use, data collected or being collected for a specific scientific or commercial purpose;
- d. supporting systems and infrastructures, such as MSDI and the IHO DCDB, that facilitate data discovery, thereby avoiding unnecessary duplication in bathymetric data collection;
- e. encouraging supplementary methods for collecting bathymetric data, including, but not limited to:
 - (1) Crowd-Sourced Bathymetry,
 - (2) Satellite Derived Bathymetry,
 - (3) The use of autonomous vehicles for the collection of environmental data including bathymetry.

Cooperation with other International Organizations and New Agreements

21. Several intergovernmental and international organizations were recognised as Observer organizations during the 2016 which are considered good partners to provide additional data to the IHO and in particular to the DCDB. These are:

The International Seabed Authority (see IHO CL35/2016),

The International Association of Independent Tanker Owners (INTERTANKO) (see IHO CL36/2016),

The Open Geospatial Consortium (see IHO CL53/2016)

The World Ocean Council (see IHO CL2016/56).

The Arctic Expedition Cruise Operators (see IHO CL60/2016),

The Mediterranean Science Commission (see IHO CL62/2016).

Conclusion

22. It is considered that global efforts to improve the collection, quality and availability of hydrographic data worldwide should be pursued by the IHO community as a constant objective. The IHO Secretariat, the relevant IRCC Subordinate Bodies and RHCs should continue engaging and encouraging all relevant stakeholders in order to receive more data and maximizing data.

23. It is deemed that coordination of data gathering, management and maximizing the use of hydrographic data should be one of the focus areas by the IRCC.

24. RHCs should continue encouraging the Member States to improve their capabilities for enhancing and achieving the MSDI.

Action Required of IRCC

25. The IRCC is invited to:
- a. note the contents of this document; and
 - b. take any other action appropriate.