

IHO DATA CENTRE FOR DIGITAL BATHYMETRY REPORT

Submitted by Director IHO DCDB

SUMMARY

Executive Summary: This document provides details of the work of the IHO DCDB, an update on the ongoing development programme to enhance the interfaces and digital data management capabilities of the DCDB as well as a general update on the work being undertaken by the CSBWG and relevant activities of the AORA.

Action to be taken: See paragraph 5

Related documents: GGC34/2/5 – IHO DCDB Report

1. IHO DCDB Enhancements

The [IHO's Data Centre for Digital Bathymetry](#), which is hosted by NOAA, was established in 1990 to ensure that an international repository existed that would accept, manage, archive and share, freely and without restrictions, depth data contributed by hydrographic, oceanographic, and other vessels. The DCDB strongly encourages IHO Member States and other organizations to contribute their bathymetric data and metadata in a variety of standard formats and to work with DCDB data managers to determine the best way to get data to the repository.

CSB-related Enhancements:

In 2014, the IHO, at its Fifth Extraordinary International Hydrographic Conference, recognized that traditional survey vessels alone should not be relied upon to solve data deficiency issues and agreed there was a need to encourage and support all mariners in an effort to “map the gaps”. And so, the IHO initiated an international collaborative project to support and enable mariners and professionally manned vessels to collect crowdsourced bathymetry as part of their “passage sounding”

Over the last several years, the DCDB has worked to enhance its existing infrastructure to streamline the ingestion of CSB and to improve the viewing, discovery and download capabilities of the data. The initial pilot work was accomplished with the help of two collaborative partners: Rosepoint Navigation Systems and SeaID and was discussed in detail in last year's report (GGC34/2/5).

Over the last year, the main focus of the software developers was to harden the data ingest system to prepare for expansion beyond our initial data providers. Specifically, we:

- Developed a streamlined “new contributor” on boarding operating procedure.
- Added test HTTP endpoints to refine new data contributions before sending the new data to our production system
- Developed an ingest status monitoring capability

- Addressed a few data delivery bugs.
- Added the ability to query data by “date added to database”
- Currently finalizing the ability to download data in CSV format (in addition to GeoJSON)

Improved Map Viewer:

Once the contributed bathymetric data have been archived, it is made discoverable and accessible through the [DCDB web map viewer](#). Improvements to the viewer over the last year include the restructuring of the viewer layout to highlight the map services of other Member States and organizations.

Future Enhancements:

Over the next year, additional enhancements will likely include:

- The addition of more trusted data providers in the CSB project (eg: FarSounder Inc)
- Continue to refine and improve the data upload and download pipelines at the DCDB
- Begin testing point storage technology (ie: cloud) to better handle the large volumes of points that are expected to be received.

2. CSB Working Group Update

The Crowdsourced Bathymetry Working Group (CSBWG), chaired by the Director of the IHO DCDB, is tasked by the Inter-Regional Coordination Committee (IRCC) to develop a draft IHO publication on policy for trusted crowdsourced bathymetry (CSB). B-12 (IHO Guidance on Crowdsourced Bathymetry) will provide guidelines on the collection and assessment of CSB data for inclusion in the global bathymetric data set maintained by the IHO Data Centre for Digital Bathymetry (DCDB). The final draft of B-12 has been completed and made available via the IHO website.

CSBWG5:

The working group held its fifth meeting at the Secretariat of the International Hydrographic Organization, Monaco, on 5 and 6 December. In the absence of the Chair of the CSBWG, Ms Jennifer Jencks (USA, Director of the DCDB), the Vice-Chair, Mr Serge Gosselin (Canada), chaired the meeting which was attended by representatives from nine Member States (Canada, Denmark, France, Italy, Nigeria, Norway, Portugal, UK and USA), and observers and expert contributors from the Baltic and International Maritime Council (BIMCO) and Sea-ID. Secretary-General Dr Mathias Jonas, Director Mustafa Iptes and Assistant Director David Wyatt (Secretary) represented the IHO Secretariat.

The CSBWG received verbal reports from the chapter leads who had been tasked to coordinate the drafting of specific sections of the B-12 Guidelines. During the meeting the various draft chapters of the guidelines were developed further, taking into account the feedback received in response to IHO Circular Letter 49/2017. The final draft version of the B-12 Guidelines was made available on the IHO website prior to the presentation to the IRCC at its 10th meeting in Goa, India, in June 2018.

CSBWG6:

The working group held its sixth meeting at the National Oceanographic and Atmospheric Administration (NOAA) – National Centers for Environmental Information (NCEI), Boulder, Colorado, United States 19-21 January 2018. The Chair of the CSBWG, Ms Jennifer Jencks, chaired the meeting, which was attended by representatives from four Member States (Canada, Norway, UK and USA), and observers and expert contributors from the World

Ocean Council (WOC), the NF-GEBSCO Seabed 2030 Project, ONE Data Technology Co, Dongseo University and Farsounder INC. Assistant Director David Wyatt represented the IHO Secretariat. Denmark participated remotely, as did GMATEK, Sea-ID, ChartWorld/SevenCs, and TeamSurv.

The CSBWG briefly reviewed the final draft version of the B-12 Guidelines which was presented to the IRCC at its 10th meeting in Goa, India, in June 2018; this would be followed by consideration by the IHO Council at its 2nd meeting in October and submitted for adoption by the IHO Member States towards the end of 2018. The participants received presentations updating activities on a number of ongoing projects related to CSB.

The participants spent time considering the future tasks which had been approved by IRCC10 as a result of the adoption of the revisions to the ToRs of the CSBWG. In particular the discussions focused on Member States' data gathering policies and future outreach strategies, for which five headline topics (need, how, what, incentives and benefits) were identified to increase contributions and participation, these will be further developed at the next meeting.

IHO Council 2

The IHO Council 2, which met 9-11 October 2018, endorsed B-12 Edition 1.0.0 in accordance with Resolution 2/2007. Edition 1.0.0 will be published on the IHO website (will be placed in the list of Standards and Publications) but will not be forwarded to Member States for adoption. The B-12 Edition 1.0.0 will remain a development documentation, updated by the CSBWG as required, until such as the CSBWG consider it appropriate to publish Edition 2.0.0; in this way IHO Member States will not be asked to adopt the publication, whilst at the same time they will have no direct input to its maintenance so long as it remains Edition 1.x.x. A number of coastal states expressed concerns over the gathering of data within their waters of national jurisdiction, particularly the control of the data. There was a strong desire expressed that all data should pass through a trusted node and there was some desire for the data not to be placed in the IHO DCDB. All these issues remain to be resolved as the initiative gains wider acceptance and becomes more mature.

It was agreed that the IHO will publish a list of coastal states that support the activity within their waters. The IHO Secretariat will work with the CSBWG to investigate the best way to develop this list, noting that there are a number of IHO Resolutions and published guidance which will need to be taken into account when developing this future.

CSBWG7:

The seventh meeting of the CSBWG is scheduled for 12-14 February 2019 in Quebec City, Canada. Specific goals and outcomes for the meeting include:

- Increase data contribution and incentives on how and why to become involved;
- Identify potential uses of CSB by HOs and how it can be portrayed, with concrete and useful examples;
- Provide guidance on data quality and standards for CSB for potential future Bathymetric Information Overlay (BIO) to be displayed on an ECDIS or ECS;
- Maintain B-12 and propose amendments as appropriate; and
- Liaise with other IHO bodies involved with and potential uses of CSB data, such as GGC, MSDIWG, DQWG and HSPT.

3. AORA Activities

The Atlantic Seabed Mapping International Working Group (ASMIWG) is one of four working groups (Aquaculture, Ocean Literacy, Seabed Mapping, Ecosystem Approach to Ocean Health and Stressors) focused on implementing the Galway Statement on Atlantic Ocean Cooperation, signed by the European Union, Canada, and the United States in May 2013. The intent of the Galway Statement is to foster cooperation and increase knowledge of the Atlantic Ocean through improved coordination and collaboration in ocean observation efforts.

A subset of the working group was tasked with developing a prioritisation approach for Atlantic Ocean seabed mapping. The aim of the study was to develop a reproducible process for identifying and evaluating potential target areas within the North Atlantic that represent suitable sites for future bathymetric surveys, based on current available information and environmental designations. The sites were selected by applying a GIS-based suitability analysis that included specific sectoral pressures and environmental considerations within marine environment. Information on current mapping coverage were gathered to inform the selection process. The results reveal the suitability of sites within the North Atlantic based on the selected criteria and currently available geospatial information and designations. Three potential target sites should be seen as flexible suggestions for future mapping initiatives rather than a rigid, defined set of areas. This methodology can be further improved as Basin Scale standardisation and application of criteria such as environmental characterisation is adopted. Further, this work only included accessible and displayable information about multibeam data coverage and would certainly benefit from more easily available and discoverable data sets or at least from location information.

This work was published in The Journal of Ocean Technology winter (2018) issue, JOT: Mapping the Deep.

5th Meeting of the Galway Statement Implementation Committee:

The fifth Galway Statement Implementation Committee meeting was hosted by the Department of Fisheries and Oceans Canada, Ottawa, Ontario, 23 April 2018 and attended by the tri-partite co-chairs from the U.S., EU, and Canada. The ASMIWG chair provided a summary overview of the activities of the ASMIWG and deliverables to date, which included an update on the process for Selection of Pilot Areas for Seabed Mapping in the North Atlantic. In principle the co-chairs were highly supportive of the proposed pilot.

ASMIWG9 and Industry Workshop:

The working group held its ninth meeting at the Portuguese Institute for Sea and Atmosphere, Lisbon, Portugal on 29 May 2018. The ASMIWG also hosted a one-day workshop (30 May 2018) with support from AORA-CSA WP 10, and coordinated by Ifremer, Marine Institute and DFO. The purpose of the workshop, *Mapping the Atlantic Ocean: Multi-stakeholder partnerships for mobilizing action towards the collection and sharing of high resolution seabed mapping datasets*, was to bring together key representatives from the ASMIWG and the private sector to explore the potential for multi-stakeholder partnerships to advance the collection and sharing of high resolution seabed datasets for the conservation and sustainable use of the North Atlantic Ocean. This industry engagement built upon the shared seabed mapping vision of Fugro, committed to collection and provision of transit data where feasible to the ASMIWG & Seabed 2030 initiative. Workshop invitees included senior personnel from Atlantic commercial survey vessel operators; international cruise ship operators, and

representative associations of the telecommunication and seabed mineral exploration sectors; as well as Seabed 2030 representatives (18 participants from 8 countries).

Key Workshop Action

- ASMIWG & workshop attendees to evolve a “Joint AORA-Industry statement” stating benefits of seabed mapping to society, to minimize risk, for infrastructure development.

Seabed Mapping Pilot Project – At Present

Driven by logistics and opportunistic research vessel time we are currently working on two “Pilot Areas” within our Project:

1) Northeast Atlantic

- Closer to European Coast
- 2018 RV Celtic Explorer mission completed June 2018. Builds on previous ASMIWG Transect work. Working with Irish University to target tectonic ocean spreading (Charlie Gibbs Fracture Zone) and focus on a seamount first surveyed during the first AORA Transect

2) South Bermuda

- Closer to North American Coast
- 2018 Okeanos Explorer survey mission led by NOAA completed July 2018.
 - This can be considered the first dedicated government survey (non transect) in support of AORA/ASMIWG
- Onboard and remote participation from Canada and an EU student.
- Very interesting preliminary data – now available for analysis. Many features in a “featureless” seafloor landscape.

ASMIWG10:

The tenth meeting of the working group has not yet been scheduled.

4. **Miscellaneous**

Notable New Data Contributor to DCDB:

Ocean Infinity is currently working with the IHO DCDB to archive the data collected by a fleet of eight autonomous underwater vehicles (AUVs) during its recent Indian Ocean search for the missing Malaysia Airlines flight MH370.

IHO Requirements to Consider:

There is a need for GEBCO and Seabed 2030 to consider how the following IHO resolutions (ie: in place guidance) should be addressed and followed - some of which are long standing.

Publication S-4, Ed. 4.8.0

- Section **A-402.1** "...Any other IHO Member State receiving data which might give rise to a chart update should immediately pass it to the producer nation for action. IHO MS should also liaise with their national institutions to obtain relevant data in order to provide it to the appropriate INT Chart Producer Nation for action."

- Section **B-635.4** "...HOs which receive information relating to waters for which another HO has the primary responsibility, should forward a copy to that office by the quickest possible method..."

Publication M-3

- IHO Resolution 3/1929 as amended: Centralization of oceanic soundings
- IHO Resolution 3/1932 as amended: "...It is recommended that ships fitted with MBES or SBES be requested to collect bathymetric soundings and communicate the results of such soundings to the HO of their respective countries with all information required to enable their accuracy to be estimated...."
- IHO Resolution 1/2017: Improving the availability of bathymetric data world-wide

5. Actions

The GGC is requested to note the contents of this report and take action as deemed necessary.