

Report of the Crowdsourced Bathymetry Working Group

<i>Submitted by:</i>	Jennifer Jencks, CSBWG Chair
<i>Related documents:</i>	IHO CSBWG13 report, IHO CSB Guidance Document (B-12) Edition 3.0.0, IHO CL 21/2020 dated 3 June 2020, IRCC CL 1/2020 dated 15 June 2020, IRCC 12-08A.2: CSBWG paper on raising the awareness of CSB within RHCs and proposed actions within RHCs to support the IHO CSB initiative
<i>Related Projects</i>	GEBSCO, Nippon Foundation-GEBSCO Seabed 2030 Project

<i>Chair:</i>	Jennifer Jencks, USA
<i>Vice-Chair:</i>	Peter Wills, Canada
<i>Secretary:</i>	Sam Harper, IHO
<i>Member States:</i>	Canada, China, Denmark, France, Germany, India, Italy, Lebanon, Mexico, Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, UK, Uruguay, USA
<i>Expert Contributors:</i>	CCOM-JHC, CIDCO, CIRES, Da Gama Maritime Ltd, Dongseo U, Dock Tech, ECC AS, ESRI, FarSounder, FLIR Systems AB, Fugro, GMATEK, Inc., Great Lakes Observing System (GLOS), H2i, James Cook U, JAMSTEC, Navico/C-Map, ONE Data Tech Co., Olex, Orange Force Marine, PYA, Seabed 2030, Sea-ID, SevenCs/ChartWorld, Teledyne CARIS, World Maritime University, and World Ocean Council
<i>See Annex C for full details</i>	

1. Meetings Held During Reporting Period

The working group held its 13th meeting (hybrid), from 10-12 January 2023, hosted by the National Oceanic and Atmospheric Administration in Denver, Colorado, U.S.A. The meeting was led by the Chair and Vice-Chair and attended by ~50 participants (25 in person, ~30 virtual), see Annex B for a list of active working group members based on attendance at CSBWG13. IHO Assistant Director Sam Harper (Secretary) represented the IHO Secretariat.

1. Work Programme

Following the publication of B-12 Ed. 3.0.0 (which has been the major focus of the CSBWG for the last three years), CSBWG13 focused on a critical review of the groups operating mandate, as set out in the ToRs and RoPs. To achieve this, the CSBWG undertook a number of strategic planning sessions to take stock of the current status quo, review what has worked well and what has not, identify barriers to scaling CSB and build an evidence base to inform future decision making. In doing so, the CSBWG were able to explore potential solutions to overcome these barriers and identify ten high level priority work areas which were used as the basis to develop a new Work Plan (Annex B). In turn, this work plan was cross referenced with the WGs existing ToRs and an updated version (Annex A) is provided for IRCC15 approval.

New work items include:

- A. Maintain and update IHO CSB Guidance Document (B-12)
- B. Submit IHO CSB initiative as a UN Decade Action
- C. Gather, prioritize and respond to HO-specific issues/opportunities regarding national policy/regulations related to CSB
- D. Gather and prioritize HO-specific issues relating to CSB data, including but not limited to Nautical Cartography
- E. Support CSB/SB2030 Coordinators in their RHC engagement
- F. Discuss and propose potential software tool support for HOs
- G. Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.
- H. Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.
- I. Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)
- J. Develop a recognition & incentive strategy plan

The CSBWG continues to enjoy strong industry participation and this is reflected in the membership of the group. CSBWG13 received sixteen reports on a diverse range CSB related projects from a mixture of industry, academia, member states and civil society.

In late 2022, the IHO signed a cooperation agreement with the Yacht Club de Monaco to work together to promote CSB within the yachting industry. In March 2023, the implementation of this agreement was launched at a joint dinner conference hosted by the YCM. This will be the first of a series of events showcasing CSB within this community.

Since IRCC14, the number of positive MS respondents to CL21/2020 has risen to 34 with the addition France and Australia. Whilst momentum seems to be growing, there is still the need to consider how to work within the MSR constraints of UNLCLOS within waters under national jurisdiction.

2. Progress on IRCC Action Items

Action 4: CSBWG, IRCC Chair and IHO Secretariat to consider ways to streamline the updates of B12 after the next CSBWG meeting.

Update: As B12 3.0.0 was such a significant re-write, the expectation is that future changes will be possible by revisions or corrections rather than new editions. These updates will have a dedicated team and work item in the new work plan (Annex B).

3. Problems Encountered

Hybrid meetings remain challenging. While VTC does enable higher participation rates, hybrid meetings are challenging to host (at best) and expensive (at worst). Hybrid hosting requirements may also limit the ability for a meeting to be hosted by some Member States.

While industry and NGO participation in the CSBWG continue to grow, IHO Member State participation has not. At the same time, a considerable degree of confusion continues to exist between the opportunistic and random CSB data gathering activity and the UNCLOS regulated planned scientific data gathering and systematic hydrographic survey operations. It is also clear that many coastal states continue to misunderstand the objectives and focus of the CSB initiative, which is to collect data in poorly surveyed or unsurveyed areas. Participation by coastal States would provide an opportunity to learn, ask questions, and express concerns about CSB, allowing for the meeting attendees to share this information within their HOs.

4. Any Other Items of Note

The CSBWG intends to hold in-person (hybrid if able to) meetings every 8 months. The justification for the higher frequency is that CSB technology and participation are rapidly evolving. CSB data also plays a significant role in the GEBCO-NF Seabed 2030 Project that has a quickly approaching deadline of 2030.

5. Conclusions and Recommended Actions

As the latest edition of IHO CSB Guidance Document (B-12) Edition 3.0.0 has been successfully completed and endorsed, the CSBWG would like to refocus some of its efforts. These new and updated efforts are captured in our proposed new Terms of Reference and associated work plan. IRCC are requested to review and approve these ToR and Work Plan.

It is challenging to understand coastal State concerns regarding CSB if they do not participate in the CSBWG. IRCC are requested to encourage more participation so coastal States can learn about CSB activities and provide representation of their viewpoints.

6. Justification and Impacts

N/A

7. Actions Required of IRCC

The IRCC is invited to:

- A. Note the contents of this report;
- B. Approve new Terms of Reference (Annex A)
- C. Encourage more CSBWG participation by coastal States
- D. Acknowledge the CSBWG meeting regime of every 8 months
- E. Encourage all Member States to review IHO CL 21/2020 and, if possible, offer a positive response, even if qualified, to enable provision of CSB data into the public domain collected from ships within waters subject to their national jurisdiction.

- F. Encourage all coastal states to review IRCC CL 1/2020 and, if possible, offer a positive response, even if qualified, to enable provision of CSB data into the public domain collected from ships within waters subject to their national jurisdiction.
- G. Encourage Member States to release datasets or subsets into the public domain via the IHO DCDB;
- H. Encourage Member States to support the CSB initiative with positive actions, such as requiring all research vessels to collect bathymetric data for late uploading, when on passage or when it does not interfere with other research activities;
- I. Take what other action is deemed necessary.

Annexes:

- A. Original and proposed ToRs
- B. List of CSBWG Tasks
- C. List of active members based on attendance at last meeting

Annex A: Proposed and Current ToRs

Updated CSBWG ToRs to be presented to IRCC15 for approval:

- A. Maintain the IHO publication B-12 through periodic reviews and updates identified by Member States;
- B. Engage with HOs and IHO Member States on matters relating to CSB uses, including but not limited to Nautical Cartography;
- C. Monitor Member State and Regional Hydrographic Commission progress regarding development of best practices and CSB initiatives and incorporate into B-12 as appropriate;
- D. Investigate ways to foster and facilitate data providers (i.e.: Trusted Nodes), increase data contributions and identify incentives on how and why mariners should become involved;
- E. Investigate and promote greater end use of CSB data in and outside the hydrographic community;
- F. Provide guidance on data quality and standards for CSB in liaison with appropriate IHO Working Groups;
- G. Liaise with other relevant IHO and allied bodies involved with CSB data to improve coordination and promote its use and development;
- H. Liaise closely with the IHO Data Centre for Digital Bathymetry (DCDB) as it continues to develop technology to collect, display and distribute CSB data to the public;
- I. Encourage and support all aspects of the CSB data life cycle from acquisition through archival to discovery and distribution, emphasizing automation and efficiency whenever possible; and
- J. Encourage and expand scholarly discourse regarding the benefits of CSB to support U.N. Decade on Ocean Science and GEBCO objectives by encouraging contributions to scientific, legal, and policy literature.

Current ToRs:

- A. Maintain the IHO publication B-12 through periodic reviews and updates identified by Member States;
- B. Monitor Member State and Regional progress regarding development of best practices and CSB initiatives and incorporate into B-12 as appropriate;
- C. Investigate and [highlight / promote] ways to increase data contributions and incentives on how and why mariners should become involved.
- D. Define potential uses of CSB for Hydrographic offices (HOs) with examples and useful land equivalents;
- E. Provide guidance on data quality and standards for CSB in liaison with appropriate IHO Working Groups;
- F. Liaise with other relevant IHO subordinate bodies involved with CSB data to promote its use and development; and
- G. Liaise closely with the IHO Data Centre for Digital Bathymetry (DCDB) as it continues to develop technology to collect and distribute CSB to the public.

Annex B: CSBWG Tasks and Work Plan

A	Maintain and update IHO CSB Guidance Document (B-12)
B	Submit IHO CSB initiative as a UN Decade Action
C	Gather, prioritize and respond to HO-specific issues/opportunities regarding national policy/ regulations related to CSB
D	Gather and prioritize HO-specific issues relating to CSB data, including but not limited to Nautical Cartography
E	Support CSB/SB2030 Coordinators in their RHC engagement
F	Discuss and propose potential software tool support for HOs
G	Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.
H	Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.
I	Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)
J	Develop a recognition & incentive strategy plan

Work Item	Title	Priority <i>H-high M-medium L-low</i>	Next milestone	Start Date	End Date	Status <i>P-planned O-ongoing C-completed S-Superseded</i>	Contact Person(s)	Related Pubs / Standard	Remarks
A-1	Review B-12 Edition 3.0.0	M	Identify review cycle	2023	August 2023	P	CIDCO/G Morissette	B-12 Edition 3.0.0	
A-2	Capture suggested updates to B-12 Edition 3.0.0	M	Consolidate and share suggestions	2023	August 2023	P	CIDCO/G Morissette	B-12 Edition 3.0.0	Discussion topic at CSBWG15
B-1						O	E Flier		
C-1	Capture issues regarding national policy/regulations /culture affecting the endorsement of CSB	H	Consolidate and draft solutions to overcome them	2023	August 2023	P	Chair		
C-2	Draft proposed rationale to the issuing of a new brief circular letter (and questionnaire) to MS explaining the purpose of IHO CL 21/2020 and encouraging a positive response	H	Present to CSBWG and determine whether to issue to MS	2023	August 2023	P	Chair		
C-3	Request the policy framework(s) or guideline(s) adopted by coastal States who positively responded to IHO CL 21/2020 or IRCC CL 01/2020	H	Consolidate and develop guidance for other coastal States	2023	Dec 2023	P	Chair		
D-1	Produce guidance for use of CSB data for SOLAS nautical cartography and other product	M	Share with coastal States	2023	Dec 2023	P	V Chair		
D-2	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	M	Provide feedback to DCDB	2023	Ongoing	O	V Chair		

D-3	Engage with industry to ensure the required tools exist to efficiently use DCDB-hosted CSB data for navigational products.	M	Dependent on progress made on D-1 and D-2	2023	Ongoing	P	V Chair		
D-4	Engage with other IHO WGs to ensure suitable standards exist for describing CSB data and displaying CSB data on ECDIS.	M	Dependent on progress made on D-1 and D-2	2023	Ongoing	P	V Chair		
E-1	Revisit and update (if necessary) the original intent of the CSB/SB2030 Coordinator (Co) role.	H	Ensure each Co is aware of roles and responsibilities of the position	2023	August 2023	P	Chair		
E-2	Work with each Co to develop a regional strategy to aim to achieve the goals of the CSBWG and SB2030	M	In coordination with GEBCO and Seabed 2030, develop regional stories	2023	August 2023	O	Chair		
E-3	Raise awareness of CSB in IHO Capacity Building Subcommittee	M	Discuss potential future collaboration/coordination	2023	Ongoing	P	Chair		
F-1	Identify objectives of industry team	H		2023	August 2023	O	Teledyne/A Bergstrom		
F-2							Teledyne/A Bergstrom		
G-1	Capture known issues identified by current Trusted Nodes	M	Develop guidance for current and future Trusted Nodes	2023	August 2023	P	CIDCO/G Morissette		
H-1	Review, recommend, and document the data flow of standard processing stages for data capture		Present to CSBWG for discussion	2023	Dec 2023	P	CCOM/B Calder		

H-2	Review current metadata structure for CSB data for completeness, encoding methods, validation mechanisms, and support for end-user database mapping		Recommend modifications	2023	Dec 2023	P	CCOM/B Calder		
H-3	Consider potential extensions of the current GeoJSON		Recommend modifications	2023	Dec 2023	P	CCOM/B Calder		
H-4	Investigate possible extensions to the DCDB S3 data store and OGC services		Consolidate suggestions for future development at DCDB.	2023	Dec 2023	P	CCOM/B Calder		
H-5	Establish recommendations for one or more use cases of CSB, and associated guidelines for data products		Collaborate with other working groups preparing specialized products (e.g., for HO use)	2023	Dec 2023	P	CCOM/B Calder		
I-1	Develop draft outreach coordination plan			2023	Dec 2023	P	MtG/T Kearns		
J-1	Compile a list of potential types of recognition and potential incentives that would motivate individuals and/or organizations to participate in CSB		For each potential type, develop a short summary of action required to support its implementation	2023	August 2023	O	Fugro/D Millar		
J-2	Develop Recognition and Incentive Strategy Plan		Gather feedback at CSBWG14 and finalize	2023	Dec 2023	P	Fugro/D Millar		

Annex C
IHO Crowdsourced Bathymetry Working Group (CSBWG)
List of Active Members based on Attendance at CSBWG13 Meeting

Member State	Organization	Name	E-mail (correspondence)
Canada	Canadian Hydrographic Service (CHS)	Mathieu Rondeau	Mathieu.Rondeau@dfo-mpo.gc.ca
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