CSBWG/IRCC14-07G

Report of the Crowdsourced Bathymetry Working Group

Submitted by:	Chair
Related documents:	IHO CSBWG11 report, IHO CSB Guidance Document (B-12) Edition 2.0.3, 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
Related Projects	GEBCO, Nippon Foundation-GEBCO Seabed 2030 Project

Chair:	Jennifer Jencks, USA
Vice-Chair:	Peter Wills, Canada
Secretary:	David Wyatt, IHO, Sam Harper, IHO
Member States:	Canada, China, Denmark, France, Germany, India, Italy, Lebanon, Mexico, Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, UK, Uruguay, USA
Expert Contributors:	CCOM-JHC, CIDCO, Da Gamma Maritime Ltd, Dongseo U, ECC AS, ESRI, FarSounder, FLIR Systems AB, Fugro, GMATEK, Inc., James Cook U, JAMSTEC, Navico/C-Map, ONE Data Tech Co., Olex, PYA, Seabed 2030, Sea-ID, SevenCs/ChartWorld, TeamSurv, Teledyne CARIS, World Maritime University, and World Ocean Council
See Annex A for full details	

1. Meetings Held During Reporting Period

The working group held its 11th meeting (virtually), from 14-16 September 2021. The meeting was led by the Chair and Vice-Chair and attended by over 65 participants. IHO Director Luigi Sinapi and Assistant Directors David Wyatt and Sam Harper (Secretary) represented the IHO Secretariat.

Several intersessional meetings were virtually held between December 2021 and February 2022.

The working group held its 12th meeting (virtual), from 7-10 March 2022, hosted by the IHO Secretariat in Monaco. The meeting was led by the Chair and Vice-Chair and attended by over 55 participants, see Annex A for a list of active working group members based on attendance at CSBWG12. IHO Director Luigi Sinapi and Assistant Director Sam Harper (Secretary) represented the IHO Secretariat.

2. Work Programme

CSBWG11

Due to the challenges (shorter meeting times, less discussion time, reduced active participation) that accompany a virtually-held meeting, the scope of CSBWG11 was vastly reduced and the main focus was to progress the effort of updating B-12: CSB Guidance on Crowdsourced Bathymetry. The meeting was split into two distinct components. The first was the B-12 Drafting Team review sessions, and associated plenary discussion sessions, and the rest of the agenda, all of which were heard during the second half plenary session. In order to provide a coherent record of the deliberations, the CSBWG11 report was split into two parts which reflect these distinct components.

B-12

The meeting commenced with an overview of why B-12 needed to be revised, highlighting the need to make it technology agnostic and more focused on the needs of the end user as principle drivers. SHOM provided an overview of the structure of the document and noted the intersessional work to propose and discuss corrections. He explained the plan for the morning component of the meeting over the three days would be to review the proposed changes to the various sections, agree consensus where possible and discuss remaining issues ahead of reporting back to plenary in the afternoon sessions to seek the endorsement of the full working group.

The morning component included review and discussion of each chapter of B-12 facilitated by the drafting team lead(s): Introduction, Data Contribution, Data Collection, Data & Metadata, Uncertainty/Data Quality and Additional Considerations. The afternoon components, again facilitated by the drafting team leads, included a brief summary of the morning session, review of the topics that achieved consensus, and then allowed for discussion that focused on issues where agreement had not been reached. The intent was for (1) the topics that reached consensus to be included in the next draft of B-12 and (2) the outstanding issues to be clarified. Chapter-focused intersessions would then be scheduled to progress these efforts before CSBWG12.

Current DCDB Work

USA provided an update on developments to the IHO Data Centre for Digital Bathymetry (DCDB), including a major overhaul of the CSB pipeline that was currently underway, taking into account the lessons learnt over the past few years to provide a better service, improved functionalities and an enhanced user experience. She highlighted the current Trusted Nodes providing CSB data to the DCDB (Rosepoint Navigation Systems Software MacGregor/Carnival, FarSounder, PGS) and noted that significant quantities of data had been received from James Cook University (JCU) but that the data release is awaiting AHO approval. She highlighted the geographic data filter that had been developed to comply with the responses received to the IHO CLs.

Current CSB Efforts

Summaries of on-going CBS efforts and projects were provided to the WG prior to the meeting and are available on the CSBWG11 web page. Projects discussed included: James Cook University/The Great Barrier Reef Project, SeaID, M2Ocean, Chartworld/SevenCs and GLOS.

Outreach to RHCs

The main purpose of this agenda item was to focus on how the CSBWG can improve the engagement to Regional Hydrographic Commissions (RHCs) and Hydrographic Offices. The IHO Sec gave a report on MS Data Gathering Policy activity and reported that no further MS had responded to the CL. It was suggested that at future meetings, the WG

should explore what other mechanisms can be used to encourage more positive action as issuing more CLs asking the same questions are unlikely to generate greater support.

Cmdr Christoff Theunissen (Seabed 2030/CSB Coordinator for SAIHC) presented a summary of lessons learned and introduced their trial and partnership with the Institute of Maritime Technology (IMT). In terms of lessons learnt so far, the following insights were provided:

- Low/tentative responses from commercial fishing and offshore mining industries are often driven by concerns over commercially sensitive information. Attempts to overcome this by continuing dialogue to show that data will be in safe custody, as well as developing a showcase model to help demonstrate the benefit;
- Lengthy decision making processes for participation approval makes it difficult to generate and maintain momentum;
- Limited off-the-shelf deployments. Most deployments are performing nearshore operations;
- SAIHC MS not committed to CSB yet;
- Actively engaging PCAs to facilitate collaboration.

Updates were then provided by Coordinators from the following RHCs: USCHC, ARHC, SWPHC, NSHC, MACHC, and MBSHC.

General Outreach

The Chair presented the sector specific 2-pager CSB summary guides that had been finalized during the intersessional period for the following sectors: Super yacht and leisure community, Survey, Geophysical and Submarine Cable industry, Fisheries, Cruise Line industry, Software/hardware industry, Hydrographic Offices, and the Academic/Scientific Research sector. Approval was received from the WG. These 2 pagers can be accessed here: *iho.int/en/communication-material*. Distribution of these flyers to the public is strongly encouraged.

Intersessional Period (Dec 2021 - Feb 2022):

Several B-12 section-specific meetings took place during the intersession. These meetings provided an opportunity for the Drafting Team Leads to review CSBWG11 suggestions/comments, note consensus, and further discuss and develop proposed solutions for the remaining areas of concern and disagreement. The Leads then incorporated updated suggestions/comments in a Track Changes and Clean Copy version for the WG to review prior to the CSBWG12 meeting.

CSBWG12

The focus of the virtual CSBWG12, which was hosted by the IHO Secretariat and attended by a few WG members including the Chair, was to further progress the work on finishing the new edition of B-12.

B-12

The goal over the 4 day meeting was to gather final consensus on B-12 where possible, identify which issues required further work, dedicate discussions and proposals on those issues, and aim to seek consensus. This was achieved. The CSBWG agreed to put B-12 to the WG for endorsement following final incorporation of the latest edits and suggestions.

Messaging & Outreach

Day 4 provided a small opportunity to discuss RHC Seabed 2030/CSB Coordinator and CSB Project updates.

Other Business

It was greatly acknowledged that the one year focus on B-12 has prevented the CSBWG from having substantial discussions on other topics - specifically on the details of the CSB-related work that is ongoing by many of the expert contributors on the WG. It was suggested that intersessional webinars could be organized, dedicated to these and other topics.

B-12 Guidance on Crowdsourced Bathymetry Endorsement

Following CSBWG12, decisions and edits were incorporated into B-12 and sent to the CSBWG for final review and endorsement. The WG was given two weeks to provide endorsement using silence procedure. **The CSBWG has endorsed B-12 IHO Guidance on Crowdsourced Bathymetry Edition 3.0.0.**

3. 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: Due to the enduring challenges associated with finalizing B-12 remotely, we propose this action be carried over to CSBWG13.

4. Problems Encountered

From an operational perspective, the principal challenge for the CSBWG has been the enforced remote working regime due to the ongoing COVID19 Pandemic. Producing a new edition of B-12 has been an extremely challenging endeavor to undertake via remote working and as a result, it has taken longer than expected and required a significant amount of intersessional work.

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 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. CSB data can play a role in completing the picture of the seabed by supporting the objectives of numerous international projects and initiatives, such as Seabed 2030, the UN Decade for Ocean Science for Sustainable Development and UN Sustainable Development Goal 14, and a plethora of scientific research, modelling, management and planning uses, which might include safety of navigation either directly onto charts or as a comparator to published data. Increased awareness and information as well as continued stakeholder engagement/involvement should all help to overcome these reservations.

There continues to be concern over the apparent lack of dedicated resources available within national HOs to process data available via the DCDB. While recognizing the resource limitations particularly in the current environment, it should be considered that the quantities of data likely to be generated and of interest to individual HOs will be relatively small. Any significant variance with published data highlighted during CSB collection should be reported directly to the relevant HO via Hydrographic Note, as is the current practice; the remaining CSB data is therefore unlikely to be of major interest to HOs, except in areas where data is sparse or non-existent.

5. Any Other Items of Note

A sincere appreciation to the CSBWG members, expert contributors and observers that dedicated a significant amount of their time to complete B-12.

The importance of liaison with other IHO bodies, as well as appropriate engagement with industry to progress the work items, continues to be a key enabler for the project. There is also a continued need to showcase various use cases of CSB data to MS to explain the benefits and utilization of 'free' data for national uses.

6. Justification and Impacts

N/A

7. Actions Required of IRCC

The IRCC is invited to:

a. Note the contents of this report;

b. Endorse **B-12 IHO Guidance on Crowdsourced Bathymetry Edition 3.0.0.**

c. 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.

d. 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.

e. Encourage Member States to release datasets or subsets into the public domain via the IHO DCDB;

f. 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;

g. Take what other action is deemed necessary.

Annexes:

A. List of active members based on attendance at last meeting

IHO Crowdsourced Bathymetry Working Group (CSBWG)
List of Active Members based on Attendance at CSBWG12 Meeting

Member State	Organization	Name	E-mail (correspondence)
Canada	Canadian Hydrographic Service (CHS)	Mathieu Rondeau	Mathieu.Rondeau@dfo-mpo.gc.ca
Canada	Canadian Hydrographic Service (CHS)	Peter Wills	Peter.Wills@dfo-mpo.gc.ca
China	China Maritime Safety Administration (China MSA)	Lingzhi WU	3511431@qq.com
China	China Maritime Safety Administration (China MSA)	Lilei Lv	316485475@qq.com
China	China Maritime Safety Administration (China MSA)	Chao Wang	30991092@qq.com
China	China Navy Hydrographic Office (CNHO)	Liang ZHICHENG	chnsetia@126.com
China	China Maritime Safety Administration (China MSA)	Dingshan BIAN	185541400@qq.com
China	China Navy Hydrographic Office (CNHO)	Shuaidong JIA	sky_jsd@163.com
China	China Maritime Safety Administration (China MSA)	Zhibin WANG	wangzhibin82@126.com

China	China Maritime Safety Administration (China MSA)	Chengsheng QIAN	281059733@qq.com
Denmark	Danish Geodata Agency (DGA)	Jens Peter Weiss Hartmann	jepha@gst.dk
Denmark	Danish Geodata Agency (DGA)	Belén Jiménez Barón	bejim@gst.dk
Denmark	Danish Geodata Agency (DGA)	Giuseppe Masetti	gimas@gst.dk
France	Service hydrographique et océanographique de la Marine (SHOM)	Thierry Schmitt	thierry.schmitt@shom.fr
Georgia	State Hydrographic Service of Georgia	Nino ZARANDIA	ninozarandia96@gmail.com
Germany	Bundesamt für Seeschifffahrt und Hydrographie (BSH)	Patrick Westfeld	patrick.westfeld@bsh.de
India	Indian National Hydrographic Office (INHO)	Kuldeep Singh	ia-inho@navy.gov.in
Lebanon	Lebanese Navy Hydrographic Service (LNHS)	Joud Sayah	lnhs.navy@army.gov.lb
Lebanon	Lebanese Navy Hydrographic Service (LNHS)	Afif GHAIIH	afifg@hotmail.com
Mexico	Mexican Navy Hydrographic Service	Cecilia Cortina Guzman	cecilia.cortina@gmail.com
New Zealand	National Institute of Water & Atmospheric Research Ltd (NIWA)	Stuart Caie	scaie@linz.govt.nz

Norway	Norwegian Mapping Authority Hydrographic Service/Chair DQWG	Edward Hands	Edward.Hands@kartverket.no
Norway	Norwegian Mapping Authority Hydrographic Service	Evert Flier	evert.flier@kartverket.no
South Africa	South African Navy Hydrographic Office (SANHO)	Cdr Christoff Theunissen	christheun@gmail.com; hydrosan@iafrica.com
Suriname	MARITIEME AUTORITEIT SURINAME (MAS)	Bernice MAHABIER	bmahabier@mas.sr
UK	United Kingdom Hydrographic Office (UKHO)	Andrew Talbot	Andrew.talbot@ukho.gov.uk; IBTE@UKHO.gov.uk
USA	NOAA National Centers for Environmental Information (NCEI)	Jennifer Jencks (Chair)	jennifer.jencks@noaa.gov
USA	National Oceanographic and Atmospheric Administration	Georgie Zelenak	georgianna.zelenak@noaa.gov
USA	National Oceanographic and Atmospheric Administration	Anthony Klemm	anthony.r.klemm@noaa.gov
USA	National Geospatial Agency (NGA)	Steve Keating	Steven.G.Keating@nga.mil
IHO	IHO Secretariat	Sam Harper (Secretary)	adso@iho.int
IHO	IHO Secretariat	Luigi Sinapi	luigi.sinapi@iho.int
Observer	NF-GEBCO Seabed 2030	Jennifer Cheveaux	admin@seabed2030.org

Observer	DockTech	Uri Yoselevich	uri@docktech.net
Observer	DockTech	Shaul Solomon	shauls@docktech.net
Observer	British Oceanographic Data Center	Helen Snaith	h.snaith@bodc.ac.uk
Observer	University of Alaska Fairbanks	Paul Duvoy	pxduvoy@alaska.edu
Observer	National Technical University of Athens (NTUA)	Stelios CONTARINIS	contarinis@central.ntua.gr
Expert Contributor	Centre for Coastal and Ocean Mapping - Joint Hydrographic Center, University of New Hampshire (CCOM-JHC/UNH)	Brian Calder	brc@ccom.unh.edu
Expert Contributor	Centre Interdisciplinaire de Développement en Cartographie des Océans (CIDCO)	Guillaume Morissette	guillaume.morissette@cidco.ca
Expert Contributor	Da Gama Maritime Limited	Steve Monk	steve@dgmaritime.com
Expert Contributor	Environmental Systems Research Institute (ESRI)	Meredith Payne	m.payne@esri.com
Expert Contributor	Environmental Systems Research Institute (ESRI)	Annie JI	yji@esri.com
Expert Contributor	Teledyne FLIR Systems AB	Anders Bergström	anders.bergstrom@flir.com

Expert Contributor	Fugro	David Millar	dmillar@fugro.com
Expert Contributor	GLOS	Linden Brinks	linden@glos.org
Expert Contributor	Ground Maritime Aerospace Technologies (GMATEK), Inc.	Glenn Wright	glenn@gmatek.com
Expert Contributor	H2i	Denis Haines	dhains@h2i.ca
Expert Contributor	James Cook University	Robin Beaman	robin.beaman@jcu.edu.au
Expert Contributor	M2Ocean	Julien Desrochers	julien.desrochers@m2ocean.com
Expert Contributor	National Institute of Water & Atmospheric Research (NIWA)	Jaya Roperez	Jaya.Roperez@niwa.co.nz
Expert Contributor	Orange Force Marine Ltd	Derek NILES	dniles@orangeforcemarine.com
Expert Contributor	Sea-ID	Kenneth Himschoot	Kenneth.himschoot@sea-id.org
Expert Contributor	SevenCs/Chartworld	Emma Wise	emma.wise@chartworld.com
Expert Contributor	sQuidd.io	Mauro CALVI	