**10th Crowd-Sourced Bathymetry Working Group (CSBWG8) Meeting**

30 March – 1 April 2021,

Virtual Meeting

*(Paragraph numbering is the same as the Agenda Item numbering and does not necessarily reflect the order in which matters were discussed. When more than one participant attended from a State, each is identified by their initials after the three letter country code.)*

1. **Opening**
2. Welcome

Chair welcomed all participants, particularly those who were up early or working late; she also noted a positive of COVID had been the ability for more people to engage with the CSBWG via the virtual meetings. She noted that while the awareness of Crowdsourced Bathymetry (CSB) was increasing, more still needed to be done to raise its profile and increase its acceptance. The Chair provided a short background and overview presentation, in which she described the progress achieved since the establishment of the CSBWG. She highlighted the efforts to increase engagement and participation via the two IHO Circular Letters published in 2019 and 2020, and also noted the engagement with non-IHO member coastal states via the Regional Hydrographic Commissions (RHCs). She displayed the tasks set by IRCC for the CSBWG and noted the progress achieved on the various tasks as well as areas that needed more focus and effort. She asked all to consider what sort of applications CSB could be applied other than safety of navigation and also ways to increase data contributions. The Chair requested participants to consider with which IHO bodies the CSBWG should engage.

Secretary provided a brief explanation on the relationships within the IHO structure as well as its relationship with GEBCO and the Nippon Foundation-Seabed 2030 Project, the Intergovernmental Oceanographic Commission of UNESCO (IOC) and the UN Decade of Ocean Science for Sustainable Development (UN Decade). He highlighted the two main elements of the UN Decade in which the IHO was making a significant contribution – completing the picture of the Ocean floor as a foundation dataset on which the following would be based and the Open Data policy agreed as one of the goals of the UN Decade. He noted that all UN Member States has supported, endorsed and approved the UN Decade and its goals, therefore there should be no reason for individual national HOs not to make data available in the public domain, at a suitable resolution, and to support the citizen science efforts to contribute to the overall goal.

1. Introductions

All participants introduced themselves and provided brief details on their background. Apologies were received from Glen Wright (GMATEK). The Chair noted the new faces was an indication of the health and growing interest in the initiative amongst IHO Member States and Industry partners, see Annex A for list of participants.

1. Meeting Agenda and Previous Meeting report

The agenda was approved with the minor amendment requested by Denmark. The agenda was adopted without amendment, see Annex B, and Annex C for a list of meeting documents.

1. Review of Actions

The Secretary noted that the outstanding items on the list of actions from CSBWG9 would be covered under other agenda items, it was agreed that there was no need to go through the list.

1. **Update on Current DCDB Work and IHO Projects**
2. DCDB Developments

The Chair provided an update on the developments of the IHO Data Centre for Digital Bathymetry (DCDB) data pipeline, the recent enhancements, and data contributors. She requested feedback to allow further development and to highlight areas that could be improved to enhance the user experience. **Action 1 – All** She highlighted the current Trusted Nodes providing CSB data to the DCDB, she noted that significant quantities of data had been received from James Cook University (JCU) but that the data remained embargoed as Australia had not indicated its positive support via CL response to allow the data to be placed in the public domain. She highlighted the geographic data filter that had been developed to comply with the responses received to the IHO CLs. She noted that a major overhaul of the CSB pipeline was underway, taking into account the lessons learnt over the past few years to provide a better service, improved functionalities and an enhanced user experience. Luigi Sinapi (**LS**) highlighted the significant progress that had been achieved in the short period since the establishment of the CSBWG and that, although there had been an increase in Member State participation, it still remained a small number compared to the overall number of IHO Member States. Evert Flier (**EF**) highlighted the importance of increased data sharing and the need for participants to challenge the positions of their organizations to look at ways to make datasets available at an acceptable resolution for that organization. It was suggested that a list of Trusted Nodes could be provided on the DCDB; the Chair indicated that it was under consideration, however until recently there had been too few to make it meaningful or they were focused on a limited participation population. Matt Zimmerman (**MZ**) suggested that it would be worth highlighting the current Trusted Nodes and which types of data contributors they served and where to go if a contributor did not fit in these types of data and how to provide their data. **Action 2 - Chair/MZ**

1. Seabed 2030 Regional Projects

Jamie McMichael-Phillips (**JMcMP**), the Director Nippon Foundation-Seabed 2030 Project, provided a short update on project activities. He provided brief background details on the projects and the connection with GEBCO. He noted the coverage in the most recent GEBCO 2020 Grid was 19%, an increase from 6% when the project started. It is anticipated that the increase could be up to 21% for the 2021 Grid. He highlighted the CSB field trials underway with Seabed 2030 provided data loggers in Palau and South Africa with Greenland in the process of being arranged. He noted that the project was searching for other areas, he encouraged that suitable candidates be proposed by CSBWG members and through RHCs. He requested CSBWG members complete and advertise the Seabed 2030 Community Survey (<https://mailchi.mp/f014da368728/add_sessions-4192121?e=203144bd75>). **Action 3 - All**

1. Canadian CSB Update

Peter Wills (**PW**) provided a presentation updating the Canadian Hydrographic Service (CHS) CSB activities. He noted that CHS was releasing validated data, however it was recognised there was a market for non-navigation (Nonna) data at 10 metre and 100 metre resolution in an open data platform. He highlighted a number of different ways and approaches to using CSB data to support local coastal communities for their charting uses to support their traditional activities and to support scientific programmes as well as coastal protection efforts. He highlighted the importance for HOs to be involved rather than not being part of the data chain and ignoring CSB. He described the CHS transformation process to improve the management for CSB data to make it available in a more timely fashion. **EF** highlighted that there was a double challenge of general outreach to increase data provision and internal HO outreach and education to improve the approach to CSB as a valuable data source with multiple uses. The Chair noted the importance of sharing the progress and activities being undertaken by CHS as an example for other HOs to follow. Oreste Tommasi (**OT**), NAVICO/C-Map, noted the benefit that commercial companies can gain from this approach as well as being able to contribute to these initiatives. **LS** noted that S-44 (IHO Standards for Hydrographic Surveys) Edition 6.0.0 provided the flexibility to allocate a qualitative standard to CSB data. The Secretary highlighted the reasons why the original approach had been cautious and had avoided articulating the potential use in nautical charts, he noted the way the initiative had evolved and that CSB was beginning to be accepted as a valid data type and was being used increasingly in charts with appropriate caveats. He suggested the next step was to develop a more formal international charting standard for CSB derived data, which would give national HOs the confidence to use CSB more widely within their legal protections. It was proposed that the topic should be raised at IRCC13 and discussions should be progressed with the DQWG and the Nautical Cartography Working Group (NCWG). **Action 4 - Chair/Vice-Chair**

1. TCB & CSB Loggers

Brian Calder (**BC**) provided a presentation covering An Open Hardware/Software Solution for Focused CSB Data Collection which aimed to answer “what’s the minimum cost for the minimum useful functionality for a data logger”. He highlighted the necessary principles to achieve the required scale to generate a true crowd. He described the overall concept of operation followed and the data flow, he provided details on the current hardware developed and its operation. He noted the production plan to get significant numbers of SeaID-produced low-cost loggers into the field to increase the data gathering activities. He described a number of potential business models for the public sector, which would most likely involve philanthropic support rather than a commercial approach. The presentation generated numerous questions and comments. It was noted that Seabed 2030 would lead on the selection of areas, however more volunteer candidates were required to expand the field trials. The Chair noted that the RHC Coordinators would be playing a role in gaining participation. Steve Monk (**SM**) expressed interest in obtaining a few data loggers for his community to test.

1. **Update on Current CSB-related Efforts**
2. Project briefs
3. Da Gama Maritime

Steve Monk (**SM**) provided brief details on activities within the super yacht community. His focus was on promotion of CSB, supply of data loggers, explorer yacht activities and the annual Explorer Yacht conference scheduled for November 2021, reduced usage over past year, more remote locations and concern on accuracy (HOs) verses availability and quality (unofficial).

1. FarSounder

Mat Zimmerman (**MZ**) provided a brief update on activities and growing contributions from forward looking sonars (FLS) fitted on a variety of vessels. He displayed some of the locations from where data has been collected and the quantity of data. He highlighted the contributions of SBES data to the DCDB and the desire to contribute the depth data obtained from the FLS, however the business model needs to be clarified to allow the necessary development to be undertaken. He highlighted the research and development (R&D) opportunities which could be pursued. The Chair noted that the data provided would be made available once the data pipeline improvements had been completed. The Chair also noted the FarSounder data collected in the coastal waters of countries who had yet to reply positively to the CLs, thus unfortunately disallowing the public availability of that data.

1. Navico/C-Map

Oreste Tommasi (**OT**) provided a short presentation on activities, including the number of contributors (approximately 25,000), the profile of the typical contributors, the data that is being prepared for submission to the DCDB in an area between Sweden and Finland and the metadata, which lacked many details but could be estimated from experience of typical vessels used by customers. He highlighted that the metadata was being reviewed to improve quality. He noted that there were considerable national legal issues which needed to be addressed and progressed.

1. Centre Interdisciplinaire de Développement en Cartographie des Océans (CIDCO)

Guillaume Morissette (**GM**) provided a short overview on the recent activities undertaken in northern Canada. He described the data loggers used and the methods of employment. He highlighted the collaboration with indigenous communities and the resultant charts generated. He highlighted the lessons learnt from the projects completed. He noted the need to increase the number of platforms deployed and gathering data.

1. James Cook University (JCU)

Rob Beaman (**RB**) provided a short update on the Great Barrier Reef CSB activities, he noted the various vessels involved, mainly fishing and dive boats. He noted the activity over the past year, despite the global environment. He described the data flow and the errors detected and resolved. He highlighted the future work to be undertaken. He questioned why it was necessary for AHO approval to make the data available when it was already approved scientific research data.

1. Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Yukari Kido (**YK**) provided a brief presentation on activities around Japan and recent developments. She highlighted the objective of the developments was to contribute to the Seabed 2030 project. She highlighted the recent improvements. It was asked whether non-research vessels were going to be included in the project to collect CSB data, it was noted that this was under discussion.

1. Canadian Hydrographic service (CHS)

**PW** provided a short presentation covering the Pydro application used by CHS. He described its use with CSB datasets.

1. Fugro

David Millar (**DM**) provided brief comments to update recent activities and the progress achieved in expanding the Fugro programme. He highlighted the number of vessels involved and the quantity of data submitted to the DCDB. He noted the number of other companies joining or preparing to join the effort, which indicated the growing awareness of the initiative and the perceived benefits to commercial organisations.

1. China MSA CSB

Lingzhi Wu (**LW**) provided details on the CSB data collection efforts in China and some proposals and recommendations for consideration by the CSBWG. He noted that more details would be provided at CSBWG11. **LS** suggested that the information provided in the China MSA paper could be used to develop a submission to IRCC13 for discussions to increase national HO engagement. **Action 5 - Chair/Vice-Chair**

1. Data Quality Working Group

Rogier Broekman (**RB**), Netherlands/Chair DQWG, provided an update on the activities of the DQWG relevant to the CSBWG, in particular focusing on guidelines and recommendations for HOs to allocate CATZOC values. He noted the relevant tasks in the DQWG ToRs, in particular the provision of guidance to HOs on DQ aspects. He highlighted the request for guidance submitted by CSBWG to the DQWG on the use of CSB by HOs, the initial actions taken were described and then he articulated the intended follow-on actions anticipated in collaboration with relevant other IHO subordinate bodies. He noted the flow from data capture to display on a nautical chart, which included assigning appropriate CATZOC values and the potential added value of CSB data. He noted that S-44 standards did not match across to CATZOV values, although this was deliberate. He highlighted the need for consistency between spatial data sets; he articulated the added value of CSB data and the criteria that needed to be met that HOs would need to confirm prior to use. He provided the assessments of CSB data into official nautical charts which needed to be investigated to provide a standard assessment for HOs to apply to have confidence in the data. The presentation generated numerous comments and questions. David D’Aquino (**DD’A**) suggested that methods to portray and display CSB data need to be developed to clarify to the user. It was agreed that continued engagement with DQWG was important and that the CSBWG, at its next meeting, should review the guidelines developed by the DQWG and provide feedback and comment for further consideration. **Action 6 - Chair/Vice-Chair**

1. **Messaging & Outreach**
2. Outreach to IHO RHCs
3. Outcome of IRCC12 (Actions 11, 12, 13)e - Chair/Vice Chair

Vice-Chair provide a short brief on the outcomes from IRCC12, she highlighted the submission by CSBWG to request the identification of Regional Coordinators and include CSB activities in national reports to RHC meetings and was pleased to state that the IRCC not only approved the request but was very positive of the CSBWGs actions.

1. Welcome CSB/Seabed 2030 RHC Coordinators - Chair/Vice Chair

The list of nominated Coordinators was displayed. The Coordinators introduced themselves and noted what they considered to be their role and main tasks, which included education and awareness of activities in other regions as well as promoting support within the region and encouraging national HOs to engage and address barriers.

Jens Peter Hartmann (**JPH**), Coordinator for BSHC, proposed that a CSBWG report be submitted to RHC meetings to allow the respective Member States to make their own preparations for the meeting. He also suggested that a generic presentation covering the activities of the CSBWG could be developed by the Chair and then adjusted by the relevant Coordinator to suit the RHC to which it was going to be delivered, in this manner it would facilitate discussions and communicate the message. **JPH** proposed that a revised version should be generated annual after each IRCC. **Action 7 - Chair/JPH**

1. Addressing the scepticism (Actions 3f, 14g) - Secretary

The Secretary provided brief comments on the replies received to the two IHO Circular Letters, which provided some details on reason for non-participation. He also noted the proposed terminology guidance generated by the IHO Secretariat, he highlighted that these were not revised definitions but clarifications to aid discussion and explanation at relevant meetings. He noted that these issues needed to be considered when discussing proposed amendments to B-12. **EV** noted that some sectors consider themselves as professional and find the use of the term ‘crowd’ as slightly offensive. **DM** raised concerns that the survey industry had difficulties with the current approach to MBES data; the Secretary highlighted the additional sentence that had been added to B-12 at the end of paragraph 2.1.1 as highlighted in Annex B to CL 06/2020. **JPH** noted that there was an urgent requirement to address the provision of MBES data that is acceptable to coastal states. **LS** highlighted the comments in the Introduction to B-12 and the challenge faced between the needs to collect data and national legislation. The Chair highlighted that it was recognised the issue of MBES needed to be addressed and how it is discussed within B-12 to provide clarity.

1. Next Steps

The Chair highlighted that the Coordinators and engagement with RHCs were a vital element in the next steps along with engaging with national HOs. The Vice-Chair proposed that a list of generic questions could be developed with ‘staff’ answers for use by Coordinators at RHC meetings to help provide consistency in the message transmitted. **Action 8 - Chair/IHO**

1. General outreach to Hydrographic Offices

The Chair noted that HOs were encouraged to engage with their national administrations to provide an answer to CL 21/2020. The Chair considered that all participants representing HOs at the meeting should consider it is their role to undertake this task. The Secretary suggested that HOs will evolve to data management and a data centric approach rather than the current focus on products for the limited number of SOLAS vessels, as commercial companies will surpass national HOs in their ability to adapt services to meet the changing needs of their customers. The Chair requested all to engage with their HOs and administrations. **Action 9 - All** Denis Hains (**DH**) proposed that a short note could be submitted to the IHR for provide clarity on the topic. **Action 10 - Chair/Vice-Chair/DH**

1. Introduction to sector-specific pages

The Chair provided a brief introduction on the background for the development of the two-page fliers. Sarah Jones-Couture (**SJC**), IHO Secretariat, provided some guidance on the language used and content to achieve the aim of the fliers.

1. Super Yacht/Leisure Community – Monk

**SM** provided a quick overview and some proposed amendments from initial circulation. He confirmed the need to achieve brevity in getting the message across and the key elements of the operation. This generated a number of comments. It was noted that the term ‘Map the Gaps’ had been taken by an organization and therefore a different term could be considered. The issue of legal liability was raised, however it was noted that submitters of Hydrographic Notes did not have any liability when submitting information to national HOs. **SJC** suggested ‘digital philanthropy’ could be used instead of ‘map the gaps’. Chair requested that the WG propose alternative terms to be used as our slogan and also in place of “crowdsourced” in the chat window. Chair will circulate suggestions to the WG for a vote. **Action 11 - Chair**

1. Survey, Geophysical and Submarine Cable Industry – Miller

**DM** introduced the flier, he noted that he had focused on SBES usage, the additional systems available onboard and the different options for logging and uploading the data, including remote options. He proposed that connections could be included to wider global programmes and initiatives, such the UN Decade and UN SDG 14. **DM** noted that the fliers re-enforced the message already being articulated. **SJC** cautioned over associating Oil and Gas with sustainable initiatives, however **DM** noted that many companies were re-branding to be more general, which was an advantage.

1. Cruise Liner – Zimmerman

**MZ** provided a brief overview, he highlighted the need to incentivise the Cruise Liners to gather and provide their data.

1. Software/Hardware Industry – Bergström

Anders Bergström (**AB**) noted that there was some general wording that went across all the sectors. He suggested that there was a need to harmonise the wording to re-enforce the overall brand and provide a simple coordinated message. **OT** supported the approach and comments.

1. Hydrographic Offices – Talbot

Andy Talbot (**AT**) provided brief comments, noting that the same format had been used, although the language and terminology could be more technical as it was targeted on a knowledgeable community. He noted that it had been highlighted that CSB was not a new concept and that HOs had been using the data under different names since their establishment. He noted that examples needed to be provided to display real use cases to re-enforce the message. He highlighted the need to achieve a joined up national approach and for national HOs to embrace the concept. The Vice-Chair proposed the IHO Strategic Plan goals two and three could be included. **EV** suggested that although there needed to be similarities, it was important to recognise the different sectors being addressed. The Vice-Chair proposed that a mature version could be shared at IRCC13 but not as an action requested.

1. Fisheries – Flier

**EV** noted the estimated number of fishing vessels was over 4 million and over 23,000 SOLAS registered fishing vessels. He noted about 40% of vessels had Olex systems on board and therefore it appeared logical to engage with this sector. He noted that the use of crowdsourced and Trusted Node should not be used and alternative terms should be found. It proposed some form of recognition symbol could be developed for presentation to contributing vessels.

1. Academic/Scientific Research - Calder

**BC** noted the importance of motivation and that it would not require too much additional effort. It generated a number of comments.

The Chair requested the fliers were progressed towards final version as soon as possible, noting that advice could be obtained from the IHO Secretariat, if required. It was proposed by the Vice-Chair that the final versions could be approved by correspondence and that once approved, and checked by the PRO at the IHO Secretariat, they should be used. It was also proposed that the final versions should be made available via the CSBWG section of the IHO website. **Action 12 - Chair/IHO/Sector Leads**

1. **B-12: CSB Guidance Document**
2. B-12 Revision process

The Secretary noted that B-12 currently came under appendix 2 of IHO resolution 2/2007, as amended, which was inconsistent with it being a guidance document and not an IHO standard. He proposed that application should be made to IRCC13 for it to propose to HSSC for B-12 to be removed from the list in resolution 2/2007, as amended. **Action 13 - Chair**

1. Review of proposed revisions to B-12 Edition 2.0.3

Thierry Schmitt (**TS**) provided brief details on proposed amendments identified during the French translation process. He noted the target audience and main structure of B-12. He noted the reasons why the document should be improved, including correction of typos, update outdated information, improvement of figures, clarity of target audience and more detail of some concepts. During the intercession, he requested suggested amendments from the WG and received some input. He noted that he had tried to classify the amendments into major and minor improvements. He noted the potential impacts of including MBES but suggested that this needed to be given adequate time at the next WG to discuss. He highlighted the suggested approach to be taken to present mature amendments to CSBWG11 and agreed to lead the effort with support from the Chair. **Action 14 - TS/ Chair** The Chair indicated that she would circulate an email asking for volunteers, as well as those who indicated in the Chatlog, to join the drafting group to develop a mature set of amendments for presentation at CSBWG11 for further discussion with the objective of submission to IRCC14 in 2022. The Drafting Group, under the leadership of Thierry Schmitt (France), will consist of the following volunteers: Stuart Caie (New Zealand), Andres Bergström (FLIR Systems), David Millar (Fugro), Meredith Payne (ESRI); additional volunteers were requested and names should be given to the Chair. **Action 15 - All/Chair**

The Chair highlighted the offer by China MSA to generate a Chinese version, which was welcomed and supported by the participants. **Action 16 - China MSA**

1. **Close**
2. Election of Chair and Vice-Chair

The current Chair, Jennifer Jencks, was re-elected unanimously. There were no volunteers for the Vice-Chair position, the current Vice-Chair agreed to continue to support the Chair for a short period after the meeting to allow individuals to approach their organizations and to hold a vote by correspondence.

1. Review of ToRs

It was agreed that no revision or amendment of the ToRs were required at this time.

1. Any other business

**RB** noted that this was his final meeting as Chair DQWG and that he had informed his WG. He noted that he would be passing over the items in progress and those that needed support from the DQWG going forward. His significant contribution to the work of the CSBWG was recognised and that his enthusiastic input would be greatly missed.

**JPH** proposed that the CSBWG could develop a vision to be included in presentations, similar to the Seabed 2030 vision, taking into account the IHO vision and strategic goals as well as the connection and contribution to wider global initiatives. **Action 17 - JPH**

The Chair provided a summary of the outstanding contribution made by the Vice-Chair since taking on the role. She highlighted a number key moments during the period and thanked her for her support.

1. Next meeting

The IHO Secretariat offered to host the next meeting in Monaco, during the week commencing 13 September. It was suggested that a second industry/stakeholder event could be considered, the Chair supported the idea. It was proposed to include science, government and other stakeholders. It was agreed that 14 – 15 September were the best dates for the stakeholder event. **Action 18 - Chair/IHO**

1. Review of list of actions

The Secretary indicated that he would generate a draft list of actions, which would be circulated with the draft meeting report for comment. The Chair requested that participants identify which actions they could progress and indicate as such in the draft list of actions. **Action 19 - All** All Action Items are marked in this report and are collated together at Annex F. An updated list of the Action Items will be maintained on the CSBWG11 webpage and all those who have actions to complete should keep the Chair and the Secretary informed of any progress. **Action 20 - All**

1. Outstanding issues

The Chair combined this with her closing remarks.

1. Closing

The Chair again thanked the departing vice-Chair. She also thanked all participants for their outstanding contributions and engagement across the three sessions. She highlighted the challenges of achieving successful outcomes through the virtual format and hoped that the next meeting would be a physical one in Monaco, although there would inevitably be a remote participation element as well. She encouraged all to maintain the momentum and engagement and asked that further efforts be made to increase the number of coastal states indicating positive support for the provision of data into the public domain, and she look forward to seeing the impact the new Coordinators will have in the RHCs.

The following Annexes are attached:

1. CSBWG10 – List of Participants.
2. CSBWG10 – Agenda
3. CSBWG10 – List of Documents
4. CSBWG10 – ToRs and RoPs
5. CSBWG10 – List of RHC meetings
6. CSBWG10 – List of Actions
7. CSBWG10 – Draft Agenda for CSBWG11
8. CSBWG10 – ChatLog Day1
9. CSBWG10 – ChatLog Day2
10. CSBWG10 – ChatLog Day3