

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

1.1 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.

1.2 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.

1.3 Meeting Agenda and Previous Meeting report

The previous meeting report 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.

1.4 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.

2. Update on Current DCDB Work and IHO Projects

2.1 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** Giuseppe Masetti (**GM**) asked for clarification under which license the CSB data are made available on the DCDB as it appears that no license is mentioned during the download process from the portal. **Action 3 - Chair**

2.2 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 4 - All**

2.3 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 5 - Chair/Vice-Chair**

2.4 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.

3. Update on Current CSB-related Efforts

3.1 Project briefs

i. 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).

ii. 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.

iii. 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 Denmark 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.

iv. 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.

v. 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.

vi. 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.

vii. Canadian Hydrographic service (CHS)

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

viii. 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.

ix. 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.

3.2 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 CATZOC 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**

4. Messaging & Outreach

4.1 Outreach to IHO RHCs

4.1.1 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.

4.1.2 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**

4.1.3 Addressing the scepticism (Actions 3^f, 14^g) - 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. **EF** 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.

4.1.4 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**

4.2 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**

4.3 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.

4.3.1 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**

4.3.2 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.

4.3.3 Cruise Liner – **Zimmerman**

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

4.3.4 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.

4.3.5 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. **EF** 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.

4.3.6 Fisheries – **Flier**

EF 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.

4.3.7 Academic/Scientific Research - **Calder**

BC noted the importance of motivation and that collection and submission should 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**

5. **B-12: CSB Guidance Document**

5.1 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**

5.2 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), Anders 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**

6. **Close**

6.1 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.

6.2 Review of ToRs

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

6.3 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.

6.4 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**

6.5 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**

6.6 Outstanding issues

The Chair combined this with her closing remarks.

6.7 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:

- A. CSBWG10 – List of Participants.
- B. CSBWG10 – Agenda
- C. CSBWG10 – List of Documents

- D. CSBWG10 – ToRs and RoPs
- E. CSBWG10 – List of RHC meetings
- F. CSBWG10 – List of Actions
- G. CSBWG10 – Draft Agenda for CSBWG11
- H. CSBWG10 – ChatLog Day1
- I. CSBWG10 – ChatLog Day2
- J. CSBWG10 – ChatLog Day3

**IHO Crowd-Sourced Bathymetry Working Group (CSBWG)
List of Participants CSBWG10 Remote VTC Meeting**

Member State	Organization	Name	E-mail
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	Maritime Safety Administration (MSA)	Chao Wang	30991092@qq.com
China	Maritime Safety Administration (MSA)	Hang Luo	814235817@qq.com
China	Maritime Safety Administration (MSA)	Huaqiang Wang	115971013@qq.com
China	Maritime Safety Administration (MSA)	Jin Wu	13825086995@139.com
China	Maritime Safety Administration (MSA)	Lilei Lv	316485475@qq.com
China	Maritime Safety Administration (MSA)	Lingzhi Wu	3511431@qq.com
Colombia	Dirección General Marítima (DIMAR)	Dagoberto David Viteri	ddavid@dimar.mil.co
Croatia	Hrvatski Hidrografski Institut (HHI)	Zeljko Bradaric	zeljko.bradaric@hhi.hr
Croatia	Hrvatski Hidrografski Institut (HHI)	Vinka Kolić	vinka.kolic@hhi.hr
Denmark	Danish Geodata Agency (DGA)	Belén Jiménez Barón	bejim@gst.dk
Denmark (BSHC)	Danish Geodata Agency (DGA)	Jens Peter Hartmann	jepha@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
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
Italy (MBSHC)	Istituto Idrografico della Marina (IIM)	Marta Pratellesi (vice-Chair)	marta.pratellesi@marina.difesa.it
Mexico (MACHC)	Mexican Navy Hydrographic Service	Cecilia Cortina	cecilia.cortina@gmail.com
Netherlands	Netherlands Hydrographic Office/Chair DQWG (RNINHS)	Rogier Broekman	r.broekman.01@mindef.nl
New Zealand (SWPHC)	Land Information New Zealand (LINZ)	Stuart Caie	scaie@linz.govt.nz

Norway (NHC & ARHC)	Norwegian Mapping Authority Hydrographic Service (NMA)	Evert Flier	evert.flier@kartverket.no
Portugal (EAtHC)	Instituto Hidrografico (MHIH)	Leonor Veiga	Leonor.Veiga@hidrografico.pt
Portugal (EAtHC)	Instituto Hidrografico (MHIH)	João Paulo Delgado Vicente	delgado.vicente@marinha.pt dt.hi.chf@hidrografico.pt
South Africa (SAIHC)	South African Navy Hydrographic Office (SANHO)	Theo Stokes	theo.stokes@sanavy.co.za hydrosan@iafrica.com
South Africa (SAIHC)	South African Navy Hydrographic Office (SANHO)	Christoff Theunissen	hydrosan@iafrica.com christheun@gmail.com
UK	United Kingdom Hydrographic Office (UKHO)	Paul Marks	paul.marks@ukho.gov.uk
UK	United Kingdom Hydrographic Office (UKHO)	Andrew Talbot	andrew.talbot@ukho.gov.uk
Uruguay (SWAtHC)	Uruguayan Navy Hydrographic Office	Niki Eugenio Silvera	sohma_sub_jefe@armada.mil.uy
USA	National Oceanographic and Atmospheric Administration (NOAA) - National Centers for Environmental Information (NCEI)/Director IHO Data Centre for Digital Bathymetry (DCDB)	Jennifer Jencks (Chair)	Jennifer.Jencks@noaa.gov
USA (USCHC)	National Oceanographic and Atmospheric Administration (NOAA)	Andy Armstrong	andy.armstrong@noaa.gov
USA	National Oceanographic and Atmospheric Administration (NOAA)	MaryRose Sheldon	maryrose.sheldon@noaa.gov
USA	National Oceanographic and Atmospheric Administration (NOAA)	Georgianna Zelenak	georgianna.zelenak@noaa.gov
USA	National Geospatial Agency (NGA)	Steve Quan	Steven.Quan@nga.mil
USA	Naval Oceanographic Office (NAVOCEANO)	Letha DeMont	Letha.demont@navy.mil
IHO	IHO Secretariat	Luigi Sinapi	luigi.sinapi@iho.int
IHO	IHO Secretariat	David Wyatt (Secretary)	adso@iho.int
Observer	NF-GEBSCO Seabed 2030	Jennifer Cheveaux	admin@seabed2030.org
Observer	NF-GEBSCO Seabed 2030	Jamie McMichael-Phillips	director@seabed2030.org
Expert Contributor	Center 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@dgmartime.com

Expert Contributor	Dongseo University	Suhyun Park	subak@dongseo.ac.kr subak63@gmail.com
Expert Contributor	Electronic Chart Centre (ECC)	Svein Skjaeveland	svein.skjaeveland@ecc.no
Expert Contributor	Environmental Systems Research Institute, Inc. (ESRI)	Meredith Payne	m.payne@esri.com
Expert Contributor	Farsounder INC.	Matthew Zimmerman	matthew.zimmerman@farsounder.com
Expert Contributor	FLIR Systems AB	Andres Bergström	anders.bergstrom@flir.com
Expert Contributor	Fugro	David Millar	DMillar@fugro.com
Expert Contributor	Furuno UK	Luke Allen	lallen@furuno.co.uk
Expert Contributor	H2i	Denis Hains	dhains@h2i.ca
Expert Contributor	James Cook University	Rob Beaman	robin.beaman@jcu.edu.au
Expert Contributor	Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	Yukari Kido	ykido@jamstec.go.jp
Expert Contributor	NAVICO/C-Map	David D'Aquino	david.daquino@navico.com
Expert Contributor	NAVICO/C-Map	Oreste Tommasi	Oreste.tommasi@navico.com
Expert Contributor	ONE Data Technology Co., Ltd	Daewon Park	mr.daewonpark@gmail.com
Expert Contributor	Sea-ID	Kenneth Himschoot	kenneth@sea-id.org
Expert Contributor	SevenCs/ChatWorld	Emma Wise	emma.wise@chartworld.com

Apologies:

Glenn Wright - Ground Maritime Aerospace Technologies (GMATEK), Inc.

IHO Crowdsourced Bathymetry Working Group 10 Meeting

****Virtual Meeting****

30 March to 1 April 2021

AGENDA AND TIMETABLE

1. Instructions

Please join the CSBWG meeting from your computer, tablet or smartphone using the link provided in the covering email.

Country or Region	Start Time (Local Time)	GMT (+/-)
GMT	19:00	-
United Kingdom (BST)	20:00	+1
Europe (CEST)	21:00	+2
USA (EDT)	15:00	-4
USA (MDT)	13:00	-6
USA/Canada (PDT)	12:00	-7
Japan (JST) & S. Korea (KST)	04:00	+9
Australia (AEDT)	06:00	+11
New Zealand (NZDT)	08:00	+13

2. Read-ahead Materials

See CSBWG10 Document list for download of all documents (<https://iho.int/en/csbwg10-march-2021>).
For efficiency purposes, participants are invited to read beforehand:

Day 1:

- a. CSBWG9 Report (*CSBWG10-1.4-Meeting Report*)
- b. CSBWG9 Actions Chair Comments (*CSBWG10-1.4.1-Action List*)
- c. Data Quality documents (*CSBWG10-Day1 Folder*)

Day 2:

- d. Summary of Current Projects/Updates (*CSBWG10-Day2 Folder*)
 - Da Gama
 - FarSounder
 - Navico C-Map
 - CIDCO
 - JCU

- JAMSTEC
- CHS
- China MSA
- e. CSBWG Letter to IRCC (*CSBWG10-Day2 Folder*)
- f. Action 3: Responses to IHO Circular Letters on CSB (*CSBWG10-4.1.3*)
- g. Action 14 Draft: Guiding terminology for Data Gathering Activities (*CSBWG10-4.1.4*)
- h. Sector-specific 2-pagers (*CSBWG10-Day2 Folder*)
 - Super Yacht/Leisure Community
 - Survey, Geophysical and Submarine Cable Industry
 - Cruise Liner
 - Software/Hardware Industry
 - Hydrographic Offices
 - Research
 - Fisheries

Day 3:

- i. Proposed revisions to B-12 (*CSBWG10-5.2*)

3. Draft Agenda

Day 1: 30 March 2021

All times in Monaco

Day 1 Goal: Understanding where we are

21:00 – 22:00 – ***Welcome***

- 1.1 Welcome, Opening Remarks and Meeting Expectations - **Chair**
- 1.2 Introductions - **All**
- 1.3 Approval of agenda and CSBWG9 Report^a (Read ahead) - **IHO**
- 1.4 Review of Actions^b (Read ahead) - Details saved for Agenda items - **IHO, Chair**

22:00 – 23:00 – ***Update on Current DCDB Work and IHO Projects***

- 2.1 DCDB Pipeline (recent enhancements, data contributors, next steps) - **Chair**
- 2.2 Seabed 2030 Regional Projects - **McMichael-Phillips**

Health Break (10 minutes)

- 2.3 CHS: Canadian CSB Update - **Wills**
- 2.4 TCB & CSB Loggers - **Calder, Himschoot**

23:00 – 24:00 – ***Update on Current CSB-related Efforts***

- 3.2 ***Data Quality Working Group^c*** (Actions 16, 28; Read ahead) - **Chair DQWG**

00:00 – 00:15 – *Wrap-up*

Day 2: 31 March 2021

All times in Monaco

Day 2 Goal: Improving our messaging

21:00 – 22:30 – *Update on Current CSB-related Efforts*

3.1 Project Briefs^d - **Chair**

Each presenter given **5 min** to provide an overview of key points

Discussion and Q&A based on read ahead materials

Da Gama - **Monk**

FarSounder - **Zimmerman/Henley**

Navico C-Map - **Oreste**

CIDCO - **Morrisette**

JCU - **Beaman**

JAMSTEC - **Kido**

CHS (Act 18) - **Wills**

Fugro - **Millar**

China CSB - **China MSA**

Health Break (10 minutes)

22:40 – 00:00 – *Messaging & Outreach*

4.1 Outreach to IHO RHCs - **Chair**

4.1.1 Outcome of IRCC12 (Actions 11, 12, 13)^e - **Chair/Vice Chair**

4.1.2 Welcome CSB/Seabed 2030 RHC Coordinators

4.1.3 Addressing the skepticism (Actions 3^f, 14^g) - **Chair**

4.1.4 Next Steps

4.2 General outreach to Hydrographic Offices (Action 2) - **Chair**

4.3 Introduction to Sector-specific 2-pagers^h - **Chair**

00:00 – 00:30 – *Optional Happy Hour Beer, Coffee or Tea online*

Day 3: 01 April 2021

All times in Monaco

Day 3 Goal: Improving our Outreach Strategy

21:00 - 22:15 – *Sector-specific 2-pagers^h (Action 25) - Chair*

4.3.1 Super Yacht/Leisure Community - **Monk**

- 4.3.2 Survey, Geophysical and Submarine Cable Industry - **Millar**
- 4.3.3 Cruise Liner - **Zimmerman**
- 4.3.4 Software/Hardware Industry - **Bergström**
- 4.3.5 Hydrographic Offices - **Talbot**
- 4.3.6 Fisheries - **Flier**
- 4.3.7 Academic/Scientific Research - **Calder**

Health Break (15 minutes)

22:30 – 23:30 – **B-12: CSB Guidance Document**

- 5.1 Discussion on process of editing B-12 - **IHO**
- 5.2 Review of proposed revisions to B-12ⁱ - **Schmitt**

Guidance on Roles/Responsibilities of Trusted Nodes (CSBWG8 - Action 22) – **Sea-ID**

Guidance on provision of non-safety of navigation MBES datasets (transit and area) - **Chair**

Proposal to generate a Chinese translation version of B-12 - **China MSA**

23:30 – 00:00 – **Close**

- 6.1 Election of Chair and Vice-Chair - **IHO**
- 6.2 Review of ToRs - **IHO**
- 6.3 Any other business - **Chair**
- 6.4 Confirm date and venue of next meeting (CSBWG11) information - **IHO**
- 6.5 Review of List of Actions and Decisions for CSBWG10 and draft agenda for CSBWG11 - **IHO**
- 6.6 Discussion on outstanding issues and post-meeting expectations/focus - **Chair**

CSBWG10 - List of Documents

Document No	Document Title
CSBWG10-Document Template	Document Template (Word version)
CSBWG10-1.3-Agenda	CSBWG10 Draft Agenda v8.0
CSBWG10-1.4-Meeting Report	CSBWG9 Meeting Report
CSBWG10-1.4-IRCC12	Relevant outcomes of IRCC12
CSBWG10-1.4-Action List	List of Actions - CSBWG9 - updated 30 March 2021
CSBWG10-Day1	Read ahead documents
CSBWG10-Day2	Read ahead documents
CSBWG10-3.1	China CSB activities and proposal for International efforts
CSBWG10-4.1.2	Regional Hydrographic Commission meetings
CSBWG10-4.1.3	IHO CLs Generic Responses
CSBWG10-4.1.4	Data Gathering Terminology
CSBWG10-5.1	B-12 (<i>IHO Guidance on Crowdsourced Bathymetry</i>) Edition 2.0.3
CSBWG10-5.1.1	Resolution 2/2007, as amended, dated 07.10.2020
CSBWG10-5.2	Draft proposed amendments to B-12
CSBWG10-5.2.1	Draft proposed amendments to B12 - Trusted Node
CSBWG10-5.2.2	Proposal on the development of Chinese version of B-12
CSBWG10-6.2	ToRs and RoPs
CSBWG10-6.5	Proposed draft agenda for CSBWG11 v1.0
CSBWG10-Presentations	Presentations .zip
CSBWG10-Participants	CSBWG10 List of Participants - Final

CROWD-SOURCED BATHYMETRY WORKING GROUP (CSBWG)

Terms of Reference

Ref. 7th IRCC Meeting (Mexico City, June 2015)
10th IRCC Meeting (Goa, June 2018)

1. Preamble

The 5th Extraordinary International Hydrographic Conference (EIHC-5) considered Proposal 4 on Crowdsourced Bathymetry (CSB) and decided by Decision 8 to task the IRCC to establish a Working Group (WG) to prepare a new IHO publication on policy for trusted crowd-sourced bathymetry, taking into account EIHC-5 Proposal 4 and the comments made during the Conference. At the first session of the IHO Assembly and the first meeting of the IHO Council, it was agreed that the scope and tasks of the CSBWG should be considered by the IRCC with a view to expanding the role of the CSBWG beyond that of maintaining IHO publication B-12 - *IHO Guidelines for Crowdsourced Bathymetry* – to include consideration on the potential uses and portrayal of CSB, guidance on data quality and standards, and incentives to increase data contribution by mariners. The IRCC tasked the CSBWG to take into account the programmes already being progressed by other IHO bodies, such as the GEBCO Seabed 2030 and standards development by DQWG and HSPT, and to liaise with these bodies to ensure a harmonized approach and results.

2. Objectives

- a. Maintain the IHO publication B-12 – *IHO Guidelines on Crowdsourced Bathymetry* – 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.

3. Authority

- a. The WG is a subsidiary of the Inter Regional Coordination Committee (IRCC) and its work is subject to IRCC approval.

4. Composition and Chairmanship

- a. The WG shall comprise representatives of IHO Member States, invited Expert Contributors, including members of IHO-IOC Technical Sub Committee on Ocean mapping (TSCOM) and Observers from accredited NGOs and a representative of the IHO Secretariat.
- b. Member States, invited Expert Contributors and Observers may indicate their willingness to participate at any time. A membership list shall be maintained, posted on the IHO website and confirmed annually.

- c. Invited Expert Contributor membership is open to entities and organizations that can provide a relevant and constructive contribution to the work of the WG.
- d. The Chair and Vice Chair shall be a representative of a Member State. The election of the Chair and Vice-Chair should be decided at the first meeting following each ordinary session of the Assembly and, in such case, shall be determined by vote of the Member States present and voting.
- e. If a secretary is required it should normally be drawn from a member of the WG.
- f. If the Chair is unable to carry out the duties of the office, the Vice-Chair shall assume the Chair with the same powers and duties.
- g. Invited Expert Contributors shall seek approval [of membership / for attendance] from the Chair.
- h. Invited Expert Contributor membership may be withdrawn in the event that a majority of the MS represented in the WG agree that an Expert Contributor's continued participation is irrelevant or unconstructive to the work of the WG.
- i. All members shall inform the Chair in advance of their intention to attend meetings of the WG.
- j. In the event that a large number of Invited Expert Contributor members seek to attend a meeting, the Chair may restrict attendance by inviting the Invited Expert Contributors to act through one or more collective representatives.

5. Procedures

- a. The WG should work primarily by correspondence.
- b. The WG should meet at least annually, whenever possible in conjunction with another related conference or meeting. The WG meetings should not normally occur later than nine weeks before a meeting of the IRCC. The Chair or any appointed member, as considered necessary, with the agreement of the simple majority of all members of the WG, can call extraordinary meetings.
- c. The WG should seek advice and input from relevant HSSC WGs as required.
- d. Decisions should generally be made by consensus. If voting is required on issues or to endorse proposals presented to the WG, only IHO Member States may cast a vote. Votes at meetings shall be on the basis of one vote per MS represented at the meeting. Votes by correspondence shall be on the basis of one vote per MS represented in the WG. In all cases of voting, a majority shall be determined based on the number of Member States casting a vote.

Commission	2021		2022		2023	
	Location	Date	Location	Date	Location	Date
Arctic	Alaska, USA					
Baltic Sea	Stockholm, Sweden	21-23 Sep				
East Asia	Thailand	tbc Feb				
East Atlantic	Lisbon, Portugal	12-16 Apr	-	-		
Meso American and Caribbean						
Mediterranean and Black Sea	Ljubljana, Slovenia	1-3 Jun				
Nordic	Reykjavik, Iceland	tbc				
North Indian Ocean	Colombo, Sri Lanka	12-15 Jul				
North Sea	Reykjavik, Iceland	27-28 Apr	-	-		
ROPME Sea Area	tbc	tbc	-	-		
South Africa and Islands	Mauritius	tbc Jan				
South East Pacific	-	-	-	-	Tbc, Chile	tbc
South West Atlantic	Montevideo, Uruguay	13-14 Mar				
South West Pacific						
USA and Canada	USA	tbc Mar				
Antarctica	Monaco/Paris	tbc	-	-		

Meetings in italics have already taken place.

LIST OF ACTIONS – Updated 29 April 2021

No.	Agenda Item	Subject	Status/Date	Comments	Action
	-	IHO website	On going	Check IHO website for documents and information	All
	-	AOB	On going	Circulate presentations, articles and papers on CSB to ensure consistent harmonized message is provided at events to advertise CSB	All
	-	AOB	On going	Identify opportunities to highlight CSB and its uses	All
CSBWG9					
2	2.3	Current DCDB Work and IHO Projects	On going	Renewed efforts to engage with their administrations to try and achieve some level of data provision	All
4	2.4	Current DCDB Work and IHO Projects	CSBWG10	Continue the discussions with ECC to progress the items highlighted by ECC at CSBWG8	Chair
5	3.a	Current CSB Efforts	CSBWG10	Continue engagement with C-Map and that C-Map is encouraged to continue participation in the CSBWG	Vice-Chair
7	3.c	Current CSB Efforts	CSBWG10	Further development of the DCDB to allow the inclusion of data other than single track lines, DCDB and FarSounder to discuss this further	DCDB/MZ
8	3.d	Current CSB Efforts	CSBWG10	commence a discussion with DCDB on how to make bathymetry data available for wider use	DCDB/YK
9	4.1	Messaging and Coordination	CSBWG10	Update the “tree diagram” with the UN Ocean Decade Strategy umbrella	Chair
18	4.6.d	Messaging and Coordination	CSBWG10	Provide additional information on Pydro tools	PW
20	4.6.e	Messaging and Coordination	CSBWG10	Investigate options for creating a structure where CSB surveys/data, upon entry into the DCDB, are compared against Hydrographic Offices official ENC portfolio	ECC/Sea-ID/DCDB
21	4.7	Messaging and Coordination	CSBWG10	Email the WG a brief tutorial on how to edit and upload the wiki	KH
22	4.7	Messaging and Coordination	CSBWG10	Upload relevant materials to the wiki	All

23	5.1	CSB Guidance	CSBWG10	Provide details on some of the challenges experienced	MZ
33	6.d	How do we Outreach?	CSBWG10	Provide further details on results of Seabed 2030 survey	Chair/JMCMP
CSBWG10					
1	2.1	DCDB Developments	CSBWG11	Provide feedback to allow further development and to highlight areas that could be improved to enhance the user experience	All
2	2.1	DCDB Developments	CSBWG11	Highlight current Trusted Nodes and data types served and what to do if not covered by current list	Chair/MZ
3	2.1	DCDB Developments	CSBWG11	Provide details on license under which CSB is made available on DCDB	Chair
4	2.2	Seabed 2030 Regional Projects	CSBWG11	Complete and advertise the Seabed 2030 Community Survey	All
5	2.3	Canadian CSB Update	IRCC13	Raised generic CSB charting standards at IRCC13 and discussions should be progressed with the DQWG and the NCWG	Chair/Vice-Chair
6	3.2	Data Quality Working Group	CSBWG11	Continue engagement with DQWG and review guidelines developed by the DQWG and provide feedback and comment for further consideration	Chair/Vice-Chair
7	4.1.2	Welcome CSB/Seabed 2030 RHC Coordinators	CSBWG11	Develop generic presentation covering CSBWG activities and revise annually	Chair/JPH
8	4.1.4	Welcome CSB/Seabed 2030 RHC Coordinators	CSBWG11	Generate list of generic questions with 'staff' answers for use by Coordinators at RHC meetings	Chair/IHO
9	4.2	General outreach to Hydrographic Offices	On-going	Engage with their HOs and administrations	All
10	4.2	General outreach to Hydrographic Offices	CSBWG11	Submit short note on CSB to the IHR	Chair/Vice-Chair/DH
11	4.3.1	Introduction to sector-specific pages	28 May	Circulate suggested alternatives to 'Map the Gaps' for consideration by WG	Chair
12	4.3	Introduction to sector-specific pages	18 Jun	Complete final versions and make available via the CSBWG section of the IHO website	Chair/IHO/Sector Leads
13	5.1	B-12 Revision process	IRCC13	Make application to IRCC13 for it to propose to HSSC for B-12 to be removed from the list in resolution 2/2007, as amended	Chair

14	5.2	Review of proposed revisions to B-12 Edition 2.0.3	CSBWG11	Present mature amendments	TS/Chair
15	5.2	Review of proposed revisions to B-12 Edition 2.0.3	28 May	Volunteers to join Draft Group	All/Chair
16	5.2	Review of proposed revisions to B-12 Edition 2.0.3	CSBWG11	Commence translation of B-12 and report progress	China MSA
17	6.3	Any other business	CSBWG11	Generate vision statement for CSBWG	JPH
18	6.4	Next meeting	16 Jul	Preparations for next meeting and stakeholder event	Chair/IHO
19	-	CSBWG10 Draft Report	9 Apr Complete	Draft to be circulated for comment	IHO
20	-	CSBWG10 Draft Report	23 Apr Complete	All to provide comments on draft report	All
21	-	CSBWG10 Final Report	7 May Complete	Publish final report	IHO
22	-	Report to IRCC13	23 Apr Complete	Provide outline draft to Chair	IHO
23	-	Report to IRCC13	28 Apr Complete	Submit report to IRCC13	Chair

**11th MEETING OF THE IHO CROWDSOURCED BATHYMETRY WORKING GROUP
IHO-CSBWG11
IHO, Monaco 13 – 17 September 2021**

DRAFT AGENDA AND TIMETABLE

Time	DAY ONE OF CSBWG11 – Monday 13 September	Action
0900	1. Welcome .1 Welcome and opening remarks .2 Domestic and administrative arrangements .3 Introduction of participants, apologies and approval of agenda .4 Approval CSBWG10 Report and Review of Actions .5 Chair report to IRCC13 a. Outcomes and actions from IRCC13 b. Review of ToRs and RoPs	Chair/IHO Secretary Secretary Secretary Chair
1015	Group photograph	Secretary
1030	Coffee	
1100	2. Updates of Current CSB-related efforts .1 Introduction; .2 IHO DCDB development .3 Seabed 2030 .4 GMATEK .5 FarSounder .6 CIDCO .7 JCU	Chair Chair Director Wright Zimmerman Morrisette Beaman
1230	Lunch	
1400	2. Updates of Current Projects (cont.) .8 CHS .9 Furgo .10 JAMSTEC .11 xxx .12 xxx	Wills Millar Kido
1515	Coffee	
1545	3. Industry/Stakeholder Seminar Preparations, considerations and anticipated outcomes for industry/stakeholder engagement	Chair/All
1730	END OF DAY ONE	
1800	Reception (tbc) – IHO Terrace (partners welcome)	IHO
Time	DAY TWO OF CSBWG11 – Tuesday 14 September	Action
	Industry/Stakeholder Seminar	Chair/IHO
Time	DAY THREE OF CSBWG11 – Wednesday 15 September	Action
	Industry/Stakeholder Seminar	Chair/IHO

Time	DAY FOUR OF CSBWG11 – Thursday 16 September	Action
0830	4. Industry/Stakeholder Seminar Outcomes and follow-on activities/actions	Chair/All
0915	5. Data Quality Working Group Update on activities and progress on CSB data assessment	Chair DQWG
1000	Coffee	
1030	6. Member State Data Gathering Policy .1 Review of coastal state replies to IHO CL 21/2021 with respect to data provision policy for each coastal state? .2 Comments and feedback from RHC meetings	Chair Coordinators
1115	7. Review the CSB Guidance Document 2.0.3 (B-12) Consideration and approval of proposed amendments	Chair
1230	Lunch Break	
1400	8. Outreach Strategy .1 General outreach to national Hydrographic Offices .2 Sector-specific pages review: 8.2.1 Super Yacht/Leisure Community 8.2.2 Survey, Geophysical and Submarine Cable Industry 8.2.3 Cruise Liner 8.2.4 Software/Hardware Industry	Chair Monk Millar Zimmerman Bergström
1530	Coffee	
1600	8. Outreach Strategy (cont.) .2 Sector-specific pages review: 8.2.5 Hydrographic Offices 8.2.6 Fisheries 8.2.7 Academic/Scientific Research	Chair Talbot Flier Calder
1700	END OF DAY FOUR	
Time	DAY FIVE OF CSBWG11 – Friday 17 September	Action
0900	8. Outreach Strategy (cont.) .3 Next steps	Chair
1015	Coffee	
1045	9. Close .1 Any other business a. . .2 Date and venue of next meeting – CSBWG12 - and intercessional activities. .3 Review of Action List for CSBWG11 and draft agenda for CSBWG12. .4 Discussion on outstanding issues and post-meeting expectations 10. Closing remarks by Chair.	Chair Chair Secretary Chair
1200	END OF MEETING	Chair

Chat Log C:\Users\ADSO\Desktop\CSBWG10\ChatLog 2021_03_31
00_02.rtf

Kenneth Himschoot - Sea ID (to Everyone): 21:25: how very nice to see everyone - and meet new representatives! - this evening, but we cannot wait to spend endless hours on a plane again soon to meet in person next time, hopefully...

Kenneth Himschoot - Sea ID (to Everyone): 21:41: Jamie was at the first ever workgroup meeting in Kuala Lumpur, I believe

Kenneth Himschoot - Sea ID (to Everyone): 21:41: yes, very helpful

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:45: This is a great slide. May I suggest this be expanded to also link with other international organizations such as: WMO, IMO, IALA, ...? Many of them are "Citizen-centered data gathering".

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:48: Good point Evert!

Yukari Kido - JAMSTEC, JAPAN (to Everyone): 21:48: This is a really great slide to understand structure and relationship each other well.

MaryRose Sheldon NOAA (to Everyone): 21:48: Thanks David!

Kenneth Himschoot - Sea ID (to Everyone): 22:07: Where's France, Thierry?!

Thierry Schmitt (to Everyone): 22:08: I know... pushing hard to get the authorization...

Kenneth Himschoot - Sea ID (to Everyone): 22:08: No doubt you are. You've been a strong advocate. Looking forward to seeing France in green on that map!

Thierry Schmitt (to Everyone): 22:09: Monaco might be in green, but too small on the map :)

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:10: Excellent presentation Jennifer: Understanding that DIGITAL BATHYMETRY is and shall remain THE primary focus of data; is DCDB open and willing to eventually ingest additional Hydrospatial data such as: Backscatter; Reflectance and sub bottom data + Physical and biological Data within the water column?

Steve Monk - DG Maritime (to Everyone): 22:11: I don't think I'm colour blind Andy Talbot but shouldn't the UK be green?

Andy Talbot, UKHO (to Everyone): 22:11: Working on it

Andy Talbot, UKHO (to Everyone): 22:12: getting somewhere but just a bit more complicated than it should be.

Thierry Schmitt (to Everyone): 22:13: I understand that the letter will be

"permanently" open, is that right? (Allowing for any country to approve "at their own time").

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 22:14:

@Jennifer: Any plan/attempt to visualize the available DCDB CSB data by a "quality indicator"? (Any kind of quality that helps to navigate the data)

Mathieu Rondeau (Canada) (to Everyone): 22:14: I do not see the list of the CSB Trusted Nodes on the DCDB web site. It could be a good idea to provide it. If I would like to contribute to the DCDB with my data, I need to know to whom I have to deliver it (a Trusted Node in my region).

David Wyatt - IHO Secretariat (to Everyone): 22:14: Correct Thierry, we will accept a reply at any time.

Steve Monk - DG Maritime (to Everyone): 22:16: Don't the HO's who give a flat "no", understand that the companies producing 'unofficial' charts (Garmin, Navionics, C-Map etc) are still publishing their data in their plotters? Doesn't this make the HO's look out of date and losing credibility as mariners are out there using it and gathering it anyway?

Matt Zimmerman - FarSounder (to Everyone): 22:16: @Denis Hains, I think that is interesting too. We've been in discussion with some potential partners about using our systems for fisheries measurements. If any of these projects come to fruition, we may have the opportunity to crowdsource other valuable data. Perhaps one way to do this would be to have separate crowdsourced databases (from different organizations) that are coordinated so that a user could grab bathymetry from one database and other datatypes from another database from a single observer

Thierry Schmitt (to Everyone): 22:17: @David: Thanks for your precisions.

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:18: EXCELLENT THX Jennifer!

Thierry Schmitt (to Everyone): 22:19: @Mathieu: Good point to put forward a list of trusted nodes (by proximity or by type of data logger).

Kenneth Himschoot - Sea ID (to Everyone): 22:21: Some trusted nodes don't work on area, but on crowd/market. If yours truly would have spent more time preparing that section, we'd be further. WG11!

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:22: Was the Carnival Cruise Line Ship tested with a VDR equipped with a multibeam or singlebeam echosounder? Who provided the VDR?

Jennifer Jencks (Chair) (to Everyone): 22:24: @Denis - singlebeam. MacGregor.

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:25: Thx Jennifer!

Kenneth Himschoot - Sea ID (to Everyone): 22:25: second that, Matt.

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 22:25: On the Provider list in the IHO DCDB webpage, 4 CSB providers are listed. Are all of them Trusted Nodes? I ask because one of them is named "Unknown".

Anders Bergström (to Everyone): 22:28: If I might add to Steve's question. When can we anticipate that CSB data can be used to improve cartography and other nautical products bearing in mind that several companies already use crowdsourced data in their products?

Matt Zimmerman - FarSounder (to Everyone): 22:34: wow! I'm surprised so much of the coastal areas are still blank.

Steve Monk - DG Maritime (to Everyone): 22:35: needs updating for the Suez canal

David Wyatt - IHO Secretariat (to Everyone): 22:36: Bit wider now I believe!

Anders Bergström (to Everyone): 22:37: and deeper at its edges

Steve Monk - DG Maritime (to Everyone): 22:48: @Jamie - believe me I want Seabed 2030 to be successful for the gathering of the data. But working on the basis of 'hope for the best, plan for the worst', what's implications are there come 31 Dec 2030 if 100% hasn't been achieved?

Stuart Caie LINZ (to Everyone): 23:19: Thanks Pete, good presentation. NZ will use 3rd party data (ports, science cruises), but need metadata to be able to make an assessment of data quality and attribute CATZOC appropriately.

David Wyatt - IHO Secretariat (to Everyone): 23:20: I think Rogier will answer some of these points.

Daewon Park (ONE Data Tech) (to Everyone): 23:20: Thanks Pete for good presentation.

Andy Talbot, UKHO (to Everyone): 23:20: Pete, I see a lot of parallels with your presentation and with work we currently have going on at the UKHO.

Anders Bergström (to Everyone): 23:21: Great presentation, I wonder about your view if HO's do not adapt to this data, with so many new sources, technology and processing capacity we could soon have private companies solving HO roles.

Denis Hains, H2i-Ottawa, Canada (to Everyone): 23:23: You are right Evert, Citizen-Centered Science and Crowdsourced Bathymetry are often all what's available in many remote areas, where HOs has no or inadequate data...

Steve Monk - DG Maritime (to Everyone): 23:23: A shame we still have to trust the data provided 200 years ago by leadline, sextant and DR verses

modern plotters and sounders in areas where numerous vessels are going over and plotting the same points. Finance likely comes down to a big part of it when private companies have deeper pockets (and shareholders) than government organisations.

Steve Monk - DG Maritime (to Everyone): 23:23: Good work Pete - good luck

Denis Hains,H2i-Ottawa, Canada (to Everyone): 23:25: Bathymetric Data is not the monopoly of HOs. HOs have to be the Quality Custodian of Bathy Data...

Kenneth Himschoot - Sea ID (to Everyone): 23:31: It was a strategic choice then, agreed. And I believe in retrospect, it worked.

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 23:32: It worked indeed!

Colombia Dagoberto DAVID_VITERI (to Everyone): 23:32: That right Dear Director Sinnapi. The HO accept the CSB when this is good surveyed... the HO have the obligations of the safe navigation. The standards are necessary

Canada Pete Wills (to Everyone): 23:32: I agree with the IHO approach. This is a 'slow approach' issue for political/legal reasons.

David D'Aquino - C-MAP (to Everyone): 23:32: I wonder whether the issue of portrayal for CSB has ever been raised. Especially in combination with ENC into an ECDIS.

Anders Bergström (to Everyone): 23:45: A waterproof box would possibly add again the same cost as the board.

Kenneth Himschoot - Sea ID (to Everyone): 23:47: Correct. It adds up. But still extremely low-cost compared to what's out there, and that's always been the goal.

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:51: @Brian: What will the ideal/suggested business model be for the industrial partners for such an interesting open-source initiative? Which will be the expected sources of incomes for them? One-time fee? A recursive pay? Revenues from owning/reselling the data?

Daewon Park (ONE Data Tech) (to Everyone): 23:53: Thanks for your good presentation. If it could be worked as an edge device, it will be more useful.

Denis Hains,H2i-Ottawa, Canada (to Everyone): 23:54: @Brian: What has been the reactions and support of industry for your suggested approach so far?

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:54: Thank you for sharing your thoughts on industrialization!

Guillaume Morissette | CIDCO (to Everyone): 23:55: @Brian: How are cybersecurity issues addressed since the device uses critical networking infrastructures?

Steve Monk - DG Maritime (to Everyone): 23:59: I'll take some

Steve Monk - DG Maritime (to Everyone): 00:01: do we get a free boat too to trial it on?

Canada Pete Wills (to Everyone): 00:01: 50 Fahrenheit or Celsius?

Brian Calder (CCOM/JHC, UNH) (to Everyone): 00:02: @Pete: 50C, proper temperature!

Chat Log C:\Users\ADSO\Desktop\CSBWG10\ChatLog 2021_04_01 00_24.rtf

Kenneth Himschoot - Sea ID (to Everyone): 21:06: we're intimidated by the good job Marta has done, hence no candidates.

Steve Monk - DG Maritime (to Everyone): 21:06: I'll second Kenneth

David Millar - Fugro (to Everyone): 21:06: Congratulations Marta!!! But we will miss you here.

Matt Zimmerman - FarSounder (to Everyone): 21:06: Can you tell us about the responsibilities of the vice chair position?

MaryRose Sheldon NOAA (to Everyone): 21:06: Congrats Marta!!!

Kenneth Himschoot - Sea ID (to Everyone): 21:07: "restrained"

Oreste Tommasi - C-MAP/Navico (to Everyone): 21:07: Congratulations Marta, I wish you the best!

Denmark Jens Peter Weiss HARTMANN (to Everyone): 21:11: Do you also include OGC standards?

David Wyatt - IHO Secretariat (to Everyone): 21:22: It was a deliberate decision for S-44 standards not to match across to CATZOC values after discussion between DQWG, HSTP and HSSC.

Canada Pete Wills (to Everyone): 21:31: I think Rose Point applies tide (predicted).

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 21:35: @Rogier: You mentioned the relevance of meta quality for CSB, in particular confidence. What is the current DQWG suggestion on how to assign confidence level to CSB's error sources? If the definition is left generic/vague, how can CSB data from disparate sources/trusted nodes can be compared?

Andy Talbot, UKHO (to Everyone): 21:35: Hi Rogier, Doesn't Catzoc B refer to systematic surveys? I thought Catzoc C was more for opportunistic type data like CSB.

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:35: Thx Pete! Other CSB suppliers are also applying Tide and water level corrections and even Sound velocity using predictions and/or models when available... Similarly with horizontal positioning using PPP in post processing...

Anders Bergstrom (to Everyone): 21:36: excellent I think crowdsourced data can be used tomorrow if we want.

Canada Pete Wills (to Everyone): 21:36: What tide was actually applied is perhaps an issue for Quality assessment.

Cdr João Vicente (Portugal) (to Everyone): 21:37: Thank you DQWG, thank you Rogier, for the guidance in this area. I was very concerned about CSB, but with your presentation you have clearly illustrated where CSB can be used... not always can, sometimes can. Thank you.

David Wyatt - IHO Secretariat (to Everyone): 21:37: It was a policy decision for the data to be submitted without any tidal correction to avoid the chance of a double correction being applied or having no knowledge of the correction and its applicability.

David D'Aquino - C-MAP (to Everyone): 21:39: I would have a question for Rogier

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:41: In many (most) of remote areas where insufficient and incomplete hydrographic data coverage exist, many CSB Data sets would be better than existing data and qualify for CATZOC. Identifying and locating Hazards to navigation remain the most important element. Zones where to avoid navigation is as important to know as zones where to navigate...

Cdr João Vicente (Portugal) (to Everyone): 21:46: I have an important question? What is CSB, include bathy from research vessels and private companies or only from sources that do not

have knowledge about hydrography?

Anders Bergstrom (to Everyone): 21:47: Within RTCM SC129 (that I'm chairing since a few weeks) portrayal we will discussed also for CSB

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:47: Quality of the data is more important than knowing if it came from CSB or HO. Some CSB data is better than older HO data... the CATZOCing is important...

David Millar - Fugro (to Everyone): 21:47: Agreed Denis!!

David Wyatt - IHO Secretariat (to Everyone): 21:48: CSB is defined in B-12.

Anders Bergstrom (to Everyone): 21:48: agree Denis

Emma Wise, SevenCs/ChartWorld (to Everyone): 21:48: Can I add something from a commercial perspective?

David Millar - Fugro (to Everyone): 21:49: We need to update the definition of CSB in B-12, as it still includes MBES and this group has decided to not include MBES as CSB.

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 21:49: write down your question/comment please and we will try to come back to that!

Canada Pete Wills (to Everyone): 21:49: I will include a screenshot of an Arctic chart my unit was working on.

Jennifer Jencks (Chair) (to Everyone): 21:49: Thanks, Pete.

Matt Zimmerman - FarSounder (to Everyone): 21:50: @david millar, what is the reasoning for not including MBES data?

Brian Calder (CCOM/JHC, UNH) (to Everyone): 21:51: @Matt: too much like "real" survey, which makes many Member States nervous. Most regulate MBES survey to some degree.

Denis Hains,H2i-Ottawa, Canada (to Everyone): 21:51: The CSB data integrated into an HO data base becomes official data because. When CSB data is better than existing HO data it is serving the purpose of safer and efficient navigation...

David Millar - Fugro (to Everyone): 21:51: It is related to receptivity of CSB from a member state perspective

Jennifer Jencks (Chair) (to Everyone): 21:55: @DaveM and MattZ...we will discuss the inclusion/exclusion of MBES as CSB in B-12 tomorrow.

Cdr João Vicente (Portugal) (to Everyone): 21:56: then all surveys done for the purpose of studying the marine environment cannot be considered as CSB, regardless of who does them, HO, companies, research institutes, etc..

Kenneth Himschoot - Sea ID (to Everyone): 22:02: Steve: we'll make sure we actively reach out to you once we have units in stock.

Anders Bergstrom (to Everyone): 22:03: thanks Steve

David Millar - Fugro (to Everyone): 22:03: @SteveM - How large is the global super yacht fleet and how many super yachts are currently engaged in CSB? Thanks.

Steve Monk - DG Maritime (to Everyone): 22:04: Global fleet (i.e. those over 24m in length) equals 5,750 yachts. Those engaged in CSB probably 0.5%

Kenneth Himschoot - Sea ID (to Everyone): 22:06: that's an accurate estimate

David Millar - Fugro (to Everyone): 22:08: > Tremendous potential. Thanks @Steve and @Ken

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:09: @Matt - What is the level of effort (time and \$) required to make what is missing possible? Has FARSOUNDER metadata and data been made available to HCDB?

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:11: THX!

Mathieu Rondeau (Canada) (to Everyone): 22:11: Matt, I see data have been collected in Canada North. Are you willing to share with CHS in order to help us update our products there?

David Millar - Fugro (to Everyone): 22:15: Kenneth - Sounds great. Happy to discuss when ready and appropriate.

Anders Bergstrom (to Everyone): 22:20: have a legal question

Kenneth Himschoot - Sea ID (to Everyone): 22:23: would Sweden give a trusted node that is 'managing' a community a 'license'? It's impractical that every contributor would have to apply for an authorisation

Steve Monk - DG Maritime (to Everyone): 22:24: 'Surveys'! That's why private vessels will call it 'research' through SOLAS safe passage and innocent capture of data.

Kenneth Himschoot - Sea ID (to Everyone): 22:25: innocent safe passage, agreed, but _some member states_ don't see it that way. I'd like to know whether we could have our project get an authorisation and then open the door for any contributor using our system to gather data

Zeljko Bradaric, Croatia HO (to Everyone): 22:32: @Monk; under the SOLAS innocent measurement of data instead innocent capture of data

Jennifer Jencks (Chair) (to Everyone): 22:34: Please put your questions for Guillaume in the chat window.

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 22:34: I believe that the time slot for this dense and interesting presentation should have been longer.

Anders Bergstrom (to Everyone): 22:35: great approach

Denis Hains,H2i-Ottawa, Canada (to Everyone): 22:35: COMMENT - Technology cost to achieve CSB is very important and much needs to be done to lower the cost. However even when made free, technology must be simple and easy to use by the "Crowd", reliable and of quality to be used... Well said Guillaume the challenge of CSB remains more about culture, enabling it, and accepting it than a question of technology...

MaryRose Sheldon NOAA (to Everyone): 22:35: Thanks Guillaume!

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 22:36: I agree

Cdr João Vicente (Portugal) (to Everyone): 22:38: CSB is about people... hydrography is about hydrographers and their competences. Thank you.

Anders Bergstrom (to Everyone): 22:40: @Robin, will the data be used by AHO?

Zeljko Bradaric, Croatia HO (to Everyone): 22:43: @Vicente; Nicely said!

Kenneth Himschoot - Sea ID (to Everyone): 22:43: Can I ask for a virtual applause for Robin? This is great work.

Colombia Dagoberto DAVID_VITERI (to Everyone): 22:45: I agree... applauses

Kenneth Himschoot - Sea ID (to Everyone): 22:45: I'd like to talk offline later on how he managed the crowd. How much effort was required in keeping contributors motivated?

David Millar - Fugro (to Everyone): 22:46: @Robin - Great work!! Quick question ... Do these vessels consider existing coverage in an effort to try and capture new data?

Matt Zimmerman - FarSounder (to Everyone): 22:46: 🙌🙌

Stuart Caie LINZ (to Everyone): 22:46: Thanks Robin, great work. A couple of questions: How well does the CSB data compare to AHO surveys in the GBR? And is AusSeabed interested in the data?

Steve Monk - DG Maritime (to Everyone): 22:48: No-one doubts the competence of Hydrographers and haven't at any time. However what they need to understand is many mariners don't care what data they're looking at or where it came from. If they have unofficial charts showing lots of data and official charts showing no data, guess what they'll look at and use?

Insurance companies will get involved if it goes wrong but if the mariner is competent and risk assesses, why would they not use unofficial charts gathered through CSB. Can any Hydrographic Office really put their hand on their heart and say they're going to completely and professionally survey their coastal waters to a high CATZOC within our lifetime?

Kenneth Himschoot - Sea ID (to Everyone): 22:50: on a side note, what would be great is if the re-insurance companies got involved in the financing of the CSB effort. It's peanuts to them, with direct returns.

Robin Beaman JCU (to Everyone): 22:52: Yes, AusSeabed is interested in CSB data, but at this stage the focus on multibeam collation. I am quite involved with AusSeabed so am close to the action. I think once multibeam is sorted, that we will look closer at CSB data. However, my focus will be to try and get the CSB on the GBR data put onto DCDB, and released!

Robin Beaman JCU (to Everyone): 22:56: Yes, people do consider existing data coverage when going out. Some volunteer vessels are quite enthusiastic about mapping, and I usually give them guidance as to where we are interested in having them transit for new data. For example, there are drowned ancient river channels on the GBR, so we have tasked (asked) some vessels to survey along the channels - very helpful for science, as these sites are where upwelling occurs. We all gain.

David Millar - Fugro (to Everyone): 22:57: @Robin - Excellent. Very impressive. Well done.

Oreste Tommasi - C-MAP/Navico (to Everyone): 22:58: @Robin can you please share the link for the data that you released last week? Is this one

<https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/115066>

<<https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search>>?

Robin Beaman JCU (to Everyone): 22:59: I didn't mention but in this CSB on GBR project, we do full offset measurements to all sensors, apply tides and do calibration against Aust Navy surveys (IHO 1A/B usually). Comparisons are very good. I am getting generally <0.5 m vertical differences with AHO surveys on the shelf in depths <100 m.

Norway Evert FLIER (to Everyone): 23:01: Great project and great example for others Robin!

Jennifer Jencks (Chair) (to Everyone): 23:03: A reminder that Pete's document is available in the "Day 2 Read Ahead Materials"

Robin Beaman JCU (to Everyone): 23:07: 3D bathymetry model for the GBR and Coral Sea just released (which includes all CSB on GBR data):

<https://www.deepreef.org/bathymetry/65-3dgb-r-bathy.html>

Denis Hains, H2i-Ottawa, Canada (to Everyone): 23:11: Bravo to FUGRO for having pioneered and to maintain its CSB global commitment to advocate for CSB!!!

Norway Evert FLIER (to Everyone): 23:12: Echo Denis' words

Anders Bergstrom (to Everyone): 23:12: Fugro and David be proud

David Millar - Fugro (to Everyone): 23:14: Thanks Denis!

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:23: The proposal of having HOs as B-12 trusted nodes is also present in the whitepaper "Trusted Crowd-Sourced Bathymetry -From the Trusted Crowd to the Chart" presented by Canada and Denmark during CSBWG9:

<https://eng.gst.dk/media/2921056/trusted-crowd-sourced-bathymetry-from-the-trusted-crowd-to-the-chart20200621.pdf>

Anders Bergstrom (to Everyone): 23:31: Great work Marta, we know how passionate you are and sorry to see you leave.

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 23:33: Thanks Anders, thanks

you all for your appreciation.

Jennifer Jencks (Chair) (to Everyone): 23:34: <https://www.iho-machc.org/seabed2030.html>

Jennifer Jencks (Chair) (to Everyone): 23:34: A wonderful example of outreach for SB2030 and CSB.

Jennifer Jencks (Chair) (to Everyone): 23:34: Please see the Seabed 2030 tab at the top of the page.

Thierry Schmitt (to Everyone): 23:35: I fully agree for the need for RH coordinator. I also suggest that there should be a coordinator with some project/initiative (eg: the usual EMODnet Bathymetry, but there might be other).

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 23:44: Thanks Jens, all good points to be considered by HOs and coordinators. We saw this WG growing year by year!

Cdr João Vicente (Portugal) (to Everyone): 23:58: Portuguese SEABED 2030:
<https://www.hidrografico.pt/iprojeto/16>

Colombia Dagoberto DAVID_VITERI (to Everyone): 23:58: My compromise is consult our chair Peru about the representative for CSB. I think will be the same person who will work in the seabed2030 project. I am here only how IHO MS... I do not represent any HC

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 23:59: Thanks Dagoberto, this is noted. We will keep in touch about that.

Robin Beaman JCU (to Everyone): 00:01: Thank you Stuart - good points and questions.

Happy to chat offline/later about lessons from the CSB on GBR project:

<https://www.deepreef.org/projects/246-crowdsourcedbathy.html>. My email contact is robin.beaman@jcu.edu.au

Seabed 2030 Jamie MCMICHAEL-PHILLIPS (to Everyone): 00:04: Excellent news Christoff - many thanks

Stuart Caie LINZ (to Everyone): 00:06: Thanks Robin, I'll be in touch

Robin Beaman JCU (to Everyone): 00:10: We find showing people their CSB data collected (typically plotted as a 3D point cloud on bathy models) keeps that enthusiasm going.

Anders Bergstrom (to Everyone): 00:11: This is great work with the regional efforts and approach. Thanks Jennifer, Marta and also Jens for great comment.

Stuart Caie LINZ (to Everyone): 00:12: Regarding reporting to RHCs, the National Reports to the RHCs should now include CSB in the GEBCO Seabed 2030 section.

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Matt Zimmerman - FarSounder (to Everyone): 21:11: I concur with Evert's observation. That's why we called our efforts "Expedition Sourced Ocean Data Program" with our customers

Matt Zimmerman - FarSounder (to Everyone): 21:12:

<http://www.farsounder.com/technology/blog/expedition-sourced-ocean-data-program-surveying-seafloor>

Matt Zimmerman - FarSounder (to Everyone): 21:12:

<http://www.farsounder.com/technology/blog/expedition-sourced-data-collection-program-progress-update>

Seabed 2030 Jamie MCMICHAEL-PHILLIPS (to Everyone): 21:13: Seabed 2030 has already allocated \$240K to invest in CSB

Matt Zimmerman - FarSounder (to Everyone): 21:14: @David Millar and that expands even further with forward looking sonars

Matt Zimmerman - FarSounder (to Everyone): 21:16: Technically, our sonars have multiple beams and could be technically considered multibeam, but they are not at all what one colloquially calls "multibeam"

Jennifer Jencks (to Everyone): 21:17: 1. The additional sentence to be inserted at the end of paragraph 2.1.1:

“Vessels using multibeam for safety of navigation purposes and wishing to contribute their single track profiles should submit their data to the appropriate coastal state national Hydrographic Office under cover of a Hydrographic Note.”

Matt Zimmerman - FarSounder (to Everyone): 21:18: @david wyatt: Does "single track multibeam" refer to only a single beam from that sonar or a single "pass" of the sonar?

Anders Bergstrom (to Everyone): 21:18: Adapt to the needs to achieve highest possible goal. From my perspective the involvement and adaptation of the HO's are essential unless we are going to have a very different data supply. Meaning taking away many sources from national states. We need to work together to improve and HO's has also to contribute with their data like eg LINZ and NOAA.

Cdr João Vicente (Portugal) (to Everyone): 21:19: Is not a question of multibeam, singlebeam, fisheries, private companies or HO. It is a question of competence and that is clear in all national standards. If anybody, have competence, so..., it is hydrography.

Colombia Dagoberto DAVID_VITERI (to Everyone): 21:20: MBES is a system. Echosounder multibeam, MRU, SV, DGPS and software for survey, process and presentation of final products

Anders Bergstrom (to Everyone): 21:22: Many have competence now these days and believing HO's has monopoly on competence is very provocative statement.

Norway Evert FLIER (to Everyone): 21:22: Agree Anders

Denis Hains,H2i - Canada (to Everyone): 21:24: You're right Anders. There are many experts of multibeam outside HOs. Discriminating Single vs. Multi Beam is a BIG risk that some might bypass HOs, I don't think that is the objective, is it? In my mind, CSB is all encompassing of any type of data...

Colombia Dagoberto DAVID_VITERI (to Everyone): 21:26: In particular, my HO accept the data from CSB. This data is evaluated and classified for use in our national cartography

Cdr João Vicente (Portugal) (to Everyone): 21:26: Any person just need a CAT A or a CAT B

to have competence. This is not exclusive of HO.

Brian Calder (CCOM/JHC, UNH) (to Everyone): 21:26: We might also want to consider the case of recreational multi-beam systems (for example the Garmin Panoptix, although there are others). These are, technically, multibeams, but are not survey grade -- they are, however, sometimes used for systematic survey (e.g., by recreational fishermen to map their favourite hole). How would those be considered?

Emma Wise, SevenCs/ChartWorld (to Everyone): 21:26: Are HOs interested in incentivising commercial mariners in collecting and sharing CSB data to the likes of the DCDB and back to HOs themselves?

Matt Zimmerman - FarSounder (to Everyone): 21:27: Perhaps we can make a distinction between "survey grade" systems and training and non-survey grade

Denis Hains,H2i - Canada (to Everyone): 21:28: CSB should be as encompassing as possible with no restrictions except rules to respect the role of HOs.

Andy Talbot, UKHO (to Everyone): 21:29: I think it's great that we have these definitions now and this will help with explaining the differences. Just wondering if we should add "TCB" as that is an acronym that crops up in our documentation. Also, the "random unplanned" statement for CSB might be confusing, as most large vessels plan their voyage such as cruise ships, so this might be taken as excluding them from CSB. Suggest considering removing this.

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 21:29: @Dagoberto, hold your comment for B-12 topic... we will talk again about MBES... many thanks for that

DQWG Rogier BROEKMAN (to Everyone): 21:29: Multibeam data suggest "good quality" as the MBES pass will cover a certain portion of the seabed. Within that portion, there is most likely 100% coverage and features dangerous to navigation will be detected. But is the MBES data corrected to the sounding datum of the chart? This may give a false sense of confidence.

Anders Bergstrom (to Everyone): 21:30: Even to follow S-44 is not rocket science for highest accuracy but cooperation is still requirement between HO and data collector for making data is used in the benefit of all.

Matt Zimmerman - FarSounder (to Everyone): 21:30: @david millar: what is the incentive for MB users (like Fugro) to share their survey data? I was under the impression that the data they collect is the product for their customer/customer's mission. Is that not considered proprietary information?

Colombia Dagoberto DAVID_VITERI (to Everyone): 21:31: For me, the MBES is good system but the single beam is better measuring the depth. Of course the covering area is less, but SBEM is very precise system.

Brian Calder (CCOM/JHC, UNH) (to Everyone): 21:32: @AndyT: I'd be happy to see it; there are a couple of different initialisms around that idea, however, so it might be a little premature to do this right now.

Matt Zimmerman - FarSounder (to Everyone): 21:32: @andy Talbot: that's an interesting idea. Maybe by creating a "spectrum" of xCD categories, we might be able to gain some more traction for at least a fraction of those spectrums.

Guillaume Morissette | CIDCO (to Everyone): 21:32: From a scientific and software/hardware manufacturer point of view, single-beam systems are just multibeam systems with number of beams = 1. This model allows us to streamline data processing for arbitrary systems. Furthermore, having multibeam data allows for tight point-cloud registration, which is an extremely powerful tool for quality assessment

Anders Bergstrom (to Everyone): 21:32: Maybe define how various data from B-12

measurements can be quality tagged to comply to S44 levels?

Stuart Caie LINZ (to Everyone): 21:33: @Evert, agree and SWPHC has an action item for members to respond to the CL. As a CSB Coordinator it would be useful to know which Coastal States have responded 'No' and then we can start engagements to understand rationale

Denis Hains,H2i - Canada (to Everyone): 21:33: Excellent ideas Evert. Is the info about which countries have supported? Is this list publically available?

Matt Zimmerman - FarSounder (to Everyone): 21:33: @Guillaume "single-beam systems are just multibeam systems with number of beams = 1" I love it!

Jennifer Jencks (Chair) (to Everyone): 21:33:

https://iho.int/uploads/user/Inter-Regional%20Coordination/CSBWG/MISC/B-12_2020_EN_Acceptance_of_CSB_Data_in_NWJ_v3.0.pdf

Jennifer Jencks (Chair) (to Everyone): 21:34: Current positive responses

Brian Calder (CCOM/JHC, UNH) (to Everyone): 21:34: @MattZ: I agree. I've talked about reputation spectra before in this venue (paper in IHR shortly, hopefully). I guess this might make a structuring concept? But it seems clear that a lot of the distinction between different types of collection might be just intent --- someone with a good navigation echo sounder and some care might make very good data!

Cdr João Vicente (Portugal) (to Everyone): 21:36: Yes, it is clear. If a survey have a technical responsible with competence to sign a report and produce metadata IAW the survey specifications.., so, we are talking about hydrography. The systems, multibeam or singlebeam do not matters. Just the competence of those people that are responsible for the surveys.

David Wyatt - IHO Secretariat (to Everyone): 21:36: @Stuart Caie, if they are not on the list in the CSBWG webpage then assume they are no or have not answered.

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 21:36: @AndyT: I am also interested on clarifying terms. For instance, clarifying the differences between CSB, TCSB and TCB.

Canada Pete Wills (to Everyone): 21:39: I think the discussion boils down to the distinction between bathymetry and hydrography. This is not the crowd source hydrography working group. Multibeam is only good quality if you do what Colombia was suggesting: sound velocity, calibration, IMU, validation, CUBE etc. Multibeam can be a lot of noise as well especially in outer beams. Multibeam can also include a lot of other potential products/information such as seabed classification and water column data that can have resource implications.

Matt Zimmerman - FarSounder (to Everyone): 21:40: single-beam systems are just multibeam systems with number of beams = 1

Denis Hains,H2i - Canada (to Everyone): 21:40: Right on Pete! This is Hydrospatial...

David Millar - Fugro (to Everyone): 21:40: This is a great and important point @Pete

Matt Zimmerman - FarSounder (to Everyone): 21:40: @Pete Wills: That is a great distinction.

David Millar - Fugro (to Everyone): 21:41: At Fugro, our business is survey. Our MBES logging in transit is not survey. No sound velocity, no slowing of vessel to maximize data quality, etc. Just collecting data as moving from A to B ...

Steve Monk - DG Maritime (to Everyone): 21:42: CSB is not 'surveying'. It's not the competence of the individual, it's the quality and quantity of the data coming from the source. It's going to end up in unofficial charts anyway. We're just offering it to HO's to consider filling in the gaps.

Jennifer Jencks (Chair) (to Everyone): 21:42: @steve - exactly

Steve Monk - DG Maritime (to Everyone): 21:43: David's just said it in more words, but completely right.

Canada Pete Wills (to Everyone): 21:43: Appalling... a new quality class? Love it David Wyatt!! Good points.

Anders Bergstrom (to Everyone): 21:43: Right on Steve. Let's work together.

Stuart Caie LINZ (to Everyone): 21:44: This has a direct link to the IHO Strategic Plan Goal 2 - 'increasing the use of hydrographic data for the benefit of society'. One of the targets of Goal 2 is the number of HO's reporting success applying the UN Shared Guiding Principles for geospatial information

Stuart Caie LINZ (to Everyone): 21:45:

<http://ggim.un.org/meetings/GGIM-committee/documents/GGIM5/statement%20of%20shared%20guiding%20principles%20flyer.pdf>

Andy Armstrong USA NOAA, USCHC (to Everyone): 21:50: @DenisH--great idea for IHR Note!

Anders Bergstrom (to Everyone): 21:57: Yes a teaser

Canada Pete Wills (to Everyone): 21:58: My oceanographer colleagues also seem to prefer Citizen Science.

Brian Calder (CCOM/JHC, UNH) (to Everyone): 21:58: The wider world (on land) tends to "Volunteer Geographic Information", from what I've seen.

Meredith Payne - Esri (to Everyone): 21:58: I also like the "Citizen-sourced" and "citizen science" terms.

Seabed 2030 Jamie MCMICHAEL-PHILLIPS (to Everyone): 21:59: One other observation is the reference in each flyer "to help Map the Gaps". I know that "Map the Gaps" was a very apposite term previously coined by GEBCO and should "do exactly what it says on the tin". Those of us in the know appreciate the meaning of the phrase but for the uninitiated who come to this afresh, the first couple of hits of a Google search of "Map the Gaps" point towards mapthegaps.org. So there is a risk of unwittingly and incorrectly associating CSB activity with assistance to a Section 501 non-profit organisation "consisting of marine mapping professionals, students, industry partners and alumni from the Nippon Foundation/GEBCO Training Program in ocean bathymetry from the University of New Hampshire Center for Coastal Ocean Mapping"

.....

Kenneth Himschoot - Sea ID (to Everyone): 22:00: If the price is low enough, the price won't reach the owner. Just 'can we please?'

Denis Hains,H2i - Canada (to Everyone): 22:01: "Map the Gaps" is very powerful! Words are very important, HOWEVER they need to be changed, adapted and adjusted for the targeted audiences, context & timing... :-)

Matt Zimmerman - FarSounder (to Everyone): 22:05: Good points about "Map the Gaps". Maybe we can come up with another catch phrase.

Jennifer Jencks (Chair) (to Everyone): 22:05: Open to suggestions! Let's throw some out there!

Matt Zimmerman - FarSounder (to Everyone): 22:05: One poor suggestion is "Fill in the Blue"

Denis Hains,H2i - Canada (to Everyone): 22:06: CSB, Citizen Science, Map the Gaps and many others should continue to be used and adapted... We have to be agile to adapt and adjust while "adding" to the vocabulary... Context & Timing is everything!

David Millar - Fugro (to Everyone): 22:06: Agree with @Evert and @Jamie regarding the use

of "Map the Gaps". As much as I love the expression and as much as I appreciate the "Map the Gaps" organization, for the purposes of these flyers and these communications, I think it will add confusion.

Matt Zimmerman - FarSounder (to Everyone): 22:06: Once we settle on a catch phrase, maybe we can get a domain name for that phrase and have a simple landing page with public outreach details.

IHO Sarah Jones Couture (to Everyone): 22:07: I must admit I don't find "Map the Gaps" to be very clear, without an explanation behind. Gaps is used in many other situations. "Mind the gaps" in the London tube, "gender pay gaps"... People who know, know what it refers to.

Canada Pete Wills (to Everyone): 22:08: I think there is some obligation to report hazards in the Arctic.

Kenneth Himschoot - Sea ID (to Everyone): 22:08: map the whitespace

Letha DeMont - USA NAVO (to Everyone): 22:08: map the unknown depths

Stuart Caie LINZ (to Everyone): 22:08: @David Wyatt, agree. Any information received by an HO needs to be assessed and any uncertainty needs to be followed up. Ultimately it is down to the HO to publish the information on official products

DQWG Rogier BROEKMAN (to Everyone): 22:08: map the seabed?

Steve Monk - DG Maritime (to Everyone): 22:09: Fill the Gap

MaryRose Sheldon NOAA (to Everyone): 22:10: See the Whole Sea

Anders Bergstrom (to Everyone): 22:11: maybe the HOs has a liability to make the users report as well and not to make them into criminals that hardly ever will face any legal process for not reporting maybe due to complicated and diverse ways of doing so from country to country

IHO Sarah Jones Couture (to Everyone): 22:11: I was discussing CSB at the Monaco Yacht Club with some owners, and actually one of the terms which attracted their attention was "digital philanthropy".

Denis Hains,H2i - Canada (to Everyone): 22:11: The image of a Puzzle showing the water with many missing pieces is also quite good ... Pieces of the puzzles could be with yachts, Cruise ships, Commercial ships, Remote vehicles, Satellite-Derived Bathy...

MaryRose Sheldon NOAA (to Everyone): 22:12: Philanthro-Sea ;)

Steve Monk - DG Maritime (to Everyone): 22:12: @Sarah - like that term, especially if it comes from an owner as it's words they'll understand.

Letha DeMont - USA NAVO (to Everyone): 22:13: Map the Blue

IHO Sarah Jones Couture (to Everyone): 22:15: Do we need to keep the word map? If we are moving to a more data centric approach... Especially as a map can be seen as static. "Data" is broader, seems to have bigger implications in people's minds

Stuart Caie LINZ (to Everyone): 22:15: reveal the unknown

Stuart Caie LINZ (to Everyone): 22:16: map what lies beneath

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 22:16: agree with Sarah... Let's "Map the blue".... the users know that they need "maps" anyway

Debbie Peterson NGA USA (to Everyone): 22:16: Chart the sea

Anders Bergstrom (to Everyone): 22:16: map the unknown

Denis Hains,H2i - Canada (to Everyone): 22:17: I think Map is important. Everybody knows map nowadays due to "GoogleMap"... I like "Map the Blue" in the context of "Blue Planet" and "BlueEconomy" the UN Decade of Ocean Science and The Nippon Foundation-GEBCO Seabed 2030...

MaryRose Sheldon NOAA (to Everyone): 22:17: Solve the Mystery of the Sea/Blue

Anders Bergstrom (to Everyone): 22:17: help to gap the unknown

MaryRose Sheldon NOAA (to Everyone): 22:17: Piece Together the Blue Puzzle

Stuart Caie LINZ (to Everyone): 22:19: @David Millar, agree with connecting it to Seabed 2030 and the Decade of Ocean

Denis Hains,H2i - Canada (to Everyone): 22:21: What about adding the Logos of "The Nippon Foundation-GEBCO, Seabed 2030" and "IOC"? I understand it might slow down approval process but demonstrate collaboration...

Robin Beaman JCU (to Everyone): 22:22: Reveal the deep

Chao Wang(China MSA) (to Everyone): 22:22: Map the uncharted

Steve Monk - DG Maritime (to Everyone): 22:23: Long winded "Digital Oceanographic Philanthropy" or shorter "Close the gaps" or "Seal the gaps"

IHO Sarah Jones Couture (to Everyone): 22:25: Revealing the secrets of the abysses. Revealing the secrets of the deep blue

Denis Hains,H2i - Canada (to Everyone): 22:26: The words: "Discovery", "Mystery", "Unknown", "Blue" and "Map" are all powerfull...

Norway Evert FLIER (to Everyone): 22:28: Share knowledge (recognizing the professionals we aim to reach that they are knowledgeable) encouraging fishermen / others to help map our planet

Matt Zimmerman - FarSounder (to Everyone): 22:29: "Digital Oceanographic Contributions"

Steve Monk - DG Maritime (to Everyone): 22:29: "Chart your contribution" (pun intended)

Debbie Peterson NGA USA (to Everyone): 22:30: I like the verbs share, contribute, donate, etc. that imply philanthropy

Matt Zimmerman - FarSounder (to Everyone): 22:30: @steve monk: I like that!

Robin Beaman JCU (to Everyone): 22:32: Reveal the deep - share your data

Cdr João Vicente (Portugal) (to Everyone): 22:32: For those who did not understand what I said about competence, I will explain the difference between official bathymetry and CSB, in my point of view: in official bathymetry, regardless of who does it (HO, research institutes, private companies, etc) we have a final product, validated data associated with metadata and a technical report signed by someone who is competent to do it. In the CSB we have, as a rule, raw, unprocessed and unvalidated data that needs to be processed by someone with the competence to do so in order to become official bathymetry. So fill the gaps... yes!!! But with official bathymetry and not with data without quality control or without a report/metadata properly done by someone with competence that a given dataset meets certain specifications, whatever they may be.

I prefer the words "Chart the gaps" as CHART conveys something more responsible than FILL.

Debbie Peterson NGA USA (to Everyone): 22:36: Agree that "chart" is more scientific and professional

Norway Evert FLIER (to Everyone): 22:37: Share knowledge / explore our planet

Canada Pete Wills (to Everyone): 22:38: Be a blue crowdsource influencer and help us fill the ocean with science.

Anders Bergstrom (to Everyone): 22:39: Chart is a word that is good but maybe more difficult to follow from a none maternal English speaking with less knowledge of the language

Canada Pete Wills (to Everyone): 22:39: I spend lots of time distinguishing a chart from a map in outreach activities.

Anders Bergstrom (to Everyone): 22:40: just for fun CATZOG the gaps 😊

Debbie Peterson NGA USA (to Everyone): 22:40: I like Pete's idea of combining science and

philanthropy

IHO Sarah Jones Couture (to Everyone): 22:40: I like Catzog the gaps. lol

Brian Calder (CCOM/JHC, UNH) (to Everyone): 22:40: Or "Plumb the Depths" (except that puns don't translate well)

Canada Pete Wills (to Everyone): 22:40: Make Earth like Mars...never mind...

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 22:40: @Pete (Canada), can you also support with the images/material you used for your presentation! I think you used good images and examples

Canada Pete Wills (to Everyone): 22:41: Sure Marta.

Denis Hains,H2i - Canada (to Everyone): 22:41: "Map Blue Gaps". Chart is more associated to official Hydrographic Products. I think Map is more preferable and generic in the CSB context...

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 22:41: tks... Let's Chart the gap!

Canada Pete Wills (to Everyone): 22:43: @Marta I asked M2Ocean for permission to use their Arctic work.

Emma Wise, SevenCs/ChartWorld (to Everyone): 22:43: the examples are really strong (this is ken)

Emma Wise, SevenCs/ChartWorld (to Everyone): 22:43: showing more examples over time would convince more HO's

Robin Beaman JCU (to Everyone): 22:43: Very helpful Andy, knowing the perspective from HOs. Some peer pressure may help move some folks/HOs along.

Denis Hains,H2i - Canada (to Everyone): 22:44: Yep adding Goal 2 of IHO SP is important!

Stuart Caie LINZ (to Everyone): 22:46: And Goal 3

Andy Armstrong USA NOAA, USCHC (to Everyone): 22:48: SB2030/CSB coordinators can take the flyer to the RHCs

IHO Sarah Jones Couture (to Everyone): 22:49: Helping Increase knowledge of the deep blue

Andy Armstrong USA NOAA, USCHC (to Everyone): 22:56: Isn't the Olex data already going to SB2030?

Robin Beaman JCU (to Everyone): 22:56: The commercial fishers who use our loggers tend to do so for social licence and demonstrating they are part of sustainable industry by contributing to CSB.

Anders Bergstrom (to Everyone): 22:56: To get fishing industry involved maybe Olex is the best solution, secondly to include in licenses for fishing a requirement to feed data back.

Jennifer Jencks (to Everyone): 22:56: @AndyA...yes to the coordinators..yes to Olex going to SB2030

Norway Evert FLIER (to Everyone): 22:57: Olex data coverage:

https://www.olex.no/depthcharts/download_olex.html

Denis Hains,H2i - Canada (to Everyone): 23:03: What about "Remote Operated Vehicles" and "Satellite-Derived Bathymetry" requirements? Should they be included?

Denis Hains,H2i - Canada (to Everyone): 23:04: Absolutely for SDB for Ocean Frontier Mapping...

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:04: As Thierry noted, the section "Data Ownership" is a bit misleading. The same comments apply to several of these 2-page docs.

Canada Pete Wills (to Everyone): 23:04: We should also consider bath-topo lidar.

Stuart Caie LINZ (to Everyone): 23:04: Marine science research vessels will need to obtain permission from nations to collect data in EEZ and Territorial Waters. An opportunity for

nations to require MSR vessels + institutes to provide collected data to the nation. NZ formalised this a few years ago

<https://www.linz.govt.nz/sea/marine-geospatial-information/marine-scientific-research>. Data will be made discoverable and available on request - and provided to the DCDB by the HO

Stuart Caie LINZ (to Everyone): 23:06: transit data is also provided

Robin Beaman JCU (to Everyone): 23:07: Similar to Australia - expectation is that MSR vessels contribute multibeam/singlebeam data to Geoscience Australia. Key is to make it easy for them to do this - provide contacts before arrival and some liaison during transit.

Cdr João Vicente (Portugal) (to Everyone): 23:07: Why not find a way to mandate international registration of all hydrographic surveys on the ocean as a prerequisite before any further requests to the countries in whose waters such surveys occurs. Maybe it will be possible to bring to the United Nations a resolution whereby requests for scientific cruises would be registered (as well as country authorizations) in a database. At least we would all know who acquired bathymetric information and where. I leave the idea to you and maybe you can propose something to the GEBCO committee, for instance

Colombia Dagoberto DAVID_VITERI (to Everyone): 23:08: @stuart Error 404 with the link.. can you check, please?

Stuart Caie LINZ (to Everyone): 23:10: URL without the full stop at the end!

Stuart Caie LINZ (to Everyone): 23:10:

<https://www.linz.govt.nz/sea/marine-geospatial-information/marine-scientific-research>

Anders Bergstrom (to Everyone): 23:12: What about if data collection was made internationally accepted for all reasons on individual level for passage (as already required by IMO) and other reasons and t

Anders Bergstrom (to Everyone): 23:13: when provided to the database made available upon the discretion of the national state. Would be a great step forward.

Anders Bergstrom (to Everyone): 23:22: I hope we can make trusted nodes definitions and description part of a separate document

Matt Zimmerman - FarSounder (to Everyone): 23:24: As a compromise between MB and SB at this stage, maybe we could consider wording that say something like "depth measurements made from navigation equipment". This would imply coverage for all the recreational equipment that Brian mentioned an hour ago.

Matt Zimmerman - FarSounder (to Everyone): 23:25: It would still be great (I think) to get support from HO's for MB in general, but this could be a potential place to start.

Denis Hains,H2i - Canada (to Everyone): 23:27: I suggest that "ALL" Bathy Data should be included (Singlebeam, Multibeam, LiDAR, SDB,...)

Matt Zimmerman - FarSounder (to Everyone): 23:29: @Denis, I agree, but if that is going to cause a particular HO to prohibit collection of data in their waters, maybe it would be better to have a subset of all possible bathy data rather than no possible bathy data for that area.

DQWG Rogier BROEKMAN (to Everyone): 23:29: Please have a look at day1 read ahead materials. DQWG is working on a mechanism to portray the uncertainty of data and also how to present the worst case scenario to the mariner (see the mindmap).

Cdr João Vicente (Portugal) (to Everyone): 23:29: I have a question: does seamap 2030 have minimum requirements for the bathymetric data it incorporates? Is there a specification associated with the S-44? Perhaps this is the big problem?

Denis Hains,H2i - Canada (to Everyone): 23:30: The role of the HOs will be to analyse, assess, determine Quality (CATZOC) and integrate the relevant data, especially new detected hazards to

navigation...

Matt Zimmerman - FarSounder (to Everyone): 23:31: @David Wyatt are you able to comment on the survey responses from HO's that did not support the effort if they would be more amenable if there was a limitation to "navigation sensors"?

Matt Zimmerman - FarSounder (to Everyone): 23:32: I think we all agree that including MB data and getting allowances from HO's the ideal case, but if MB is a limiter for acceptance, perhaps that should drive decision for this document revision?

Stuart Caie LINZ (to Everyone): 23:32: Does LiDAR fit with the description of CSB as per doc CSBWG10/4/1/4 "Random unplanned gathering of depth"?

Canada Pete Wills (to Everyone): 23:34: General comment: maybe related to scientific research sector, do we need some drone/autonomous vessel/ROV content?

Denis Hains,H2i - Canada (to Everyone): 23:36: I'd say yes Pete.

Anders Bergstrom (to Everyone): 23:36: Maybe we need to understand how much "private" lidar data collection that's done today to include it?

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:37: @Jennifer: is the license approach (CC BY 4.0 +CC BY 3.0 IGO) described in "5. Additional Considerations" actually implemented for CSB data downloaded from IHO DCDB? I did not find references to the applied license when I downloaded a few CSB datasets from IHO DCDB site.

Anders Bergstrom (to Everyone): 23:38: Well done Thierry, be glad to help

Giuseppe Masetti (Danish Geodata Agency) (to Everyone): 23:38: Great presentation Thierry!

David Millar - Fugro (to Everyone): 23:39: Fugro is involved in LIDAR collection. From our experience, CSB does not translate to LIDAR. The reason is that transits to project sites from airports and back often occur at efficient transit altitudes, which does not match collection altitudes. That is to say data is collected at 1000m, but transits occur at 10,000m for example....

David Millar - Fugro (to Everyone): 23:40: Correction.... 1000 ft and 10000 ft

David Millar - Fugro (to Everyone): 23:40: I would be willing to participate in further development of B-12 revisions / updates.

Meredith Payne - Esri (to Everyone): 23:41: I'm very interested to continue the discussion on multiple bathymetric data generation techniques as applied to CSB (if non-member-state participation is allowed).

Steve Monk - DG Maritime (to Everyone): 23:41: Seconded

Canada Pete Wills (to Everyone): 23:41: Thanks Jennifer!

Norway Evert FLIER (to Everyone): 23:41: Thank you Jennifer!

Denis Hains,H2i - Canada (to Everyone): 23:41: BRAVO Jennifer!

MaryRose Sheldon NOAA (to Everyone): 23:41: Go Jenn!!

David Millar - Fugro (to Everyone): 23:41: Congrats Jenn!!!

Seabed 2030 Jamie MCMICHAEL-PHILLIPS (to Everyone): 23:41: Congrats Jenn

Robin Beaman JCU (to Everyone): 23:41: Congrats Jennifer - great working with you.

Letha DeMont - USA NAVO (to Everyone): 23:41: Congrats Jenn

Yukari Kido - JAMSTEC, JAPAN (to Everyone): 23:42: Bravo! Jennifer!

Daewon Park (ONE Data Tech) (to Everyone): 23:42: Congrats Jennifer

Denmark Jens Peter Weiss HARTMANN (to Everyone): 23:42: Congrats Jenn!!

Anders Bergstrom (to Everyone): 23:42: Great, thanks for your excellent work Jennifer

Canada Pete Wills (to Everyone): 23:42: Good idea David! Canada agrees

Debbie Peterson NGA USA (to Everyone): 23:42: Thank you, and congratulations to Jennifer!

Steve Monk - DG Maritime (to Everyone): 23:42: Agreed

Norway Evert FLIER (to Everyone): 23:42: Agreed
Andy Talbot, UKHO (to Everyone): 23:42: agreed
Andy Armstrong USA NOAA, USCHC (to Everyone): 23:43: agreed
Cdr João Vicente (Portugal) (to Everyone): 23:43: Portugal agreed
Denmark Jens Peter Weiss HARTMANN (to Everyone): 23:43: Denmark agreed
Colombia Dagoberto DAVID_VITERI (to Everyone): 23:43: Agreed
DQWG_Rogier BROEKMAN (to Everyone): 23:43: NL agreed.
Oreste Tommasi - C-MAP/Navico (to Everyone): 23:43: Thanks Jennifer to continue to lead this WG in an excellent way!
Yukari Kido - JAMSTEC, JAPAN (to Everyone): 23:43: agreed
Steve Monk - DG Maritime (to Everyone): 23:45: Thank you Rogier for your contributions - best of luck
Norway Evert FLIER (to Everyone): 23:45: Thank you Rogier!
Cdr João Vicente (Portugal) (to Everyone): 23:46: Thank you Rogier, you will be missed
Debbie Peterson NGA USA (to Everyone): 23:46: Thank you, Rogier, for your participation and for the presentation yesterday that will be valuable to HOs
Yukari Kido - JAMSTEC, JAPAN (to Everyone): 23:47: Thank you!
David Millar - Fugro (to Everyone): 23:47: Indeed. Thank you Rogier for educating me (and maybe others) on this working group about the work of DQWG.
Canada Pete Wills (to Everyone): 23:47: Thank you Rogier. Your analyses will be valuable.
Anders Bergstrom (to Everyone): 23:48: @ David, I know Lidar data is collected by both eg Teledyne and Hexagon (Leica) in many cases but maybe for mainly other purposes where bathymetric data could maybe be part of data.
Norway Evert FLIER (to Everyone): 23:48: Thank you Marta and good luck in your career. Expecting to see you back on the international arena.
Debbie Peterson NGA USA (to Everyone): 23:49: Good luck and congratulations to you, Marta! I enjoyed getting to know you in Monaco.
Thierry Schmitt (to Everyone): 23:51: Tnks Marta!
Denmark Jens Peter Weiss HARTMANN (to Everyone): 23:52: Congratulation to you Marta and good luck.
Yukari Kido - JAMSTEC, JAPAN (to Everyone): 23:52: Marta Congratulation!
DQWG_Rogier BROEKMAN (to Everyone): 23:52: Congratulations Marta, well done, I will miss you. Good luck with your future!
Daewon Park (ONE Data Tech) (to Everyone): 23:53: Thanks Marta and good luck.
David Millar - Fugro (to Everyone): 23:53: Congratulations Marta. Sounds like a wonderful opportunity. Well done. We will miss you.
Letha DeMont - USA NAVO (to Everyone): 23:53: Congratulations Marta!! Fair winds and following seas.
Steve Monk - DG Maritime (to Everyone): 23:53: Best of luck Marta - all downhill after this
Robin Beaman JCU (to Everyone): 23:53: Wonderful - good luck in your next career move.
Denis Hains,H2i - Canada (to Everyone): 23:53: THANK YOU Marta for your outstanding contribution to the IHO and the Hydrographic Community; CONGRATS and all the best to your new challenges!
Meredith Payne - Esri (to Everyone): 23:54: Best Wishes and Good Luck Marta! Don't be a stranger!
MaryRose Sheldon NOAA (to Everyone): 23:55: Thank you and Congrats Marta! You are the

most impressive woman!!

Vice Chair - Marta PRATELLESI - ITALY (to Everyone): 23:58: Thanks you all again! I feel so blessed. So many friends out there

Matt Zimmerman - FarSounder (to Everyone): 23:59: It would be great if future meetings could still offer a virtual attendance. That might enable additional attendance from those that can't make it in person.

Yukari Kido - JAMSTEC, JAPAN (to Everyone): 00:00: Thank you all! Wonderful community!

Denis Hains,H2i - Canada (to Everyone): 00:00: THANK YOU ALL! It was a pleasure to join the team as new Expert Contributor member to the WG. :-)

Norway Evert FLIER (to Everyone): 00:00: Great job Jennifer, Marta and David!

Anders Bergstrom (to Everyone): 00:01: Agree with Evert

Colombia Dagoberto DAVID_VITERI (to Everyone): 00:01: Congratulations for Martha and Jennifer and David. very nice leaders.

Andy Talbot, UKHO (to Everyone): 00:02: Thanks Jennifer, Marta, David. As always an excellent meeting. Really interesting and very well run.

Denis Hains,H2i - Canada (to Everyone): 00:02: Yes please, try to have the next meeting connectable via Video Conference as well...

Robin Beaman JCU (to Everyone): 00:02: Thank you Jennifer, David and Marta, and everyone else at CSBWG10 - great meeting. Very inspired.

Stuart Caie LINZ (to Everyone): 00:02: Thanks for a great meeting and keeping us on task and to time.

David Millar - Fugro (to Everyone): 00:03: Thanks Jenn, Marta and David for a productive meeting.

Denis Hains,H2i - Canada (to Everyone): 00:03: IHO should continue to use virtual meetings from now on...

PRIMAR Svein SKJAEVELAND (to Everyone): 00:03: Thank you for an excellent and informative meeting, great job Jennifer, Martha and David!