

**Summary Report and Actions and Decisions from the remote 9<sup>th</sup> meeting  
of the Crowdsourced Bathymetry Working Group (CSBWG)**  
Submitted by IHO Secretariat

**SUMMARY**

Executive Summary: This document provides a summary of discussions and the details of actions and decisions agreed at the three remote sessions for the 9<sup>th</sup> meeting of the Crowdsourced Bathymetry Working Group (CSBWG).

Action to be taken: Paragraphs 2-7

Related documents: CSBWG8\_2019\_8.3\_EN\_Final\_Report; Daily download of each session Chat Log

**1. Introduction**

1.1 The 9<sup>th</sup> meeting of the Crowdsourced Bathymetry Working Group (CSBWG) was held 30 June - 2 July 2020 under the Chairmanship of Ms Jennifer Jencks (**JJ**) with 43 participants, see Annex A for list of participants.

1.2 All participants introduced themselves.

1.3 The Chair provided a presentation covering an introduction and the agenda, after which she outlined the objectives and goals for the meeting. The Chair then provided a brief background and update on the working group and initiative, and highlighted the progress achieved over the past 8 meetings. The agenda and report of CSBWG8 were approved without amendments.

1.4 It was agreed that all outstanding action items from CSBWG8 were included in the meeting agenda and would therefore be taken under the appropriate agenda items. It was also agreed that the download of each session Chat Log should be included as annexes to this summary report (**Action 1 – IHO**).

**2. Current DCDB Work and IHO Projects**

2.1 The Chair provided an update presentation on developments to the IHO Data Centre for Digital Bathymetry (DCDB), including improved CSB data upload and download capabilities. She highlighted the ongoing work with MacGregor/Carnival Cruise Lines to provide data from their voyage data recorder system. The Chair then described the implementation of a new geographic filter for incoming data to take into account coastal countries' positions on the collection of CSB in their areas of jurisdiction.

2.2 The engagement and data contributions of FarSounder and James Cook University were highlighted. The current data viewer was displayed and then the discovery and access developments were explained. Ongoing cloud pilot programmes were detailed and potential areas for funding and technical collaborations.

2.3 IHO CL 11/2019 and the outcomes were discussed in detail:

- a. It was asked whether embargoed data was stored in a non-public database for potential future use. The Chair confirmed that all data was stored for potential release if the relevant coastal state authorised it at some stage in the future;
- b. It was asked whether a Member State's 'No' response to IHO CL 11/2019 would be published. The Secretary explained that a positive list was appropriate under the current circumstances. The rationale behind publishing a positive list was provided by the Secretary. It was noted that the list might change when a critical mass of positive support had been reached, to highlight coastal states not supporting the provision of data into the public domain and to indicate they were in a minority; this figure had not been discussed or decided and would be assessed between the Secretariat and the Chair and Vice-Chair of CSBWG at some point in the future;
- c. The negative approach by some coastal states was questioned in relation to HOs becoming Maritime Geospatial Data Agency (MGDA) organizations and aligning with their stated mission and aim. It was noted that the CSBWG had been trying to highlight the connection/disconnection regarding various coastal state's support for the UN Decade for Ocean Science for Sustainable Development (UN Decade) and the UN Sustainable Development Goals (UN SDGs). It was noted that this situation was a result of the ambiguity around 'marine scientific research' within UNCLOS and the widely varying interpretations of what comes under this activity;
- d. A wide ranging and in-depth discussion, it was suggested by the Chair that HOs need to make renewed efforts to engage with their administrations to try and achieve some level of data provision (**Action 2 – All**);
- e. It was suggested that details of some of the reasons, positive and negative, should be made available to CSBWG to assist its efforts to increase engagement. It was noted that this information had been verbally provided by the Secretariat at CSBWG7 and CSBWG8. The Secretary agreed to investigate whether generalised details could be provided to the CSBWG in hard copy and discuss the potential format with the Chair (**Action 3 – IHO/Chair**);
- f. The Vice-Chair noted that for some countries, CSB is considered a survey even if it is not systematic and not mainly intended for charting purposes. As a consequence it is necessary to deal with national regulations. She also noted that even though ITA had provided a positive reply to CL 11/2019, they are not on the list because of the caveats indicated, which were considered as being restrictive. As a consequence those who want to conduct CSB activity are not aware of the procedure; and
- g. Andy Talbot (**AT**) (UKHO) asked, whether it was possible to publish some of the reasoning from the countries that provided a positive response, similar to a list of FQA of common concerns. It was felt this might help some of the negative coastal states to better understand the situation and work towards a positive position. See 2.3f above for action.

2.4 The Chair highlighted the ideas and suggestions made by Electronic Chart Centre (ECC) at CSBWG8, she noted the items which had been progressed through close engagement and discussion with ECC:

- a. It was agreed that the Chair should continue the discussions with ECC to progress the items highlighted by ECC at CSBWG8 (**Action 4 – Chair/ECC**);

2.5 The Chair and Sea-ID provided a brief on the database of polygons and how the information is maintained and updated as new information is received.

2.6 Brian Calder (**BC**) provided an update brief on a CSB data logger project undertaken by University of New Hampshire (UNH) students. :

- a. This presentation generated a number of questions and comments, including details of the quality control embedded into the data logger before the data is submitted to the DCDB and whether there were any plans to provide commercial support.

### 3. Current CSB Efforts

The Chair introduced the on-going CBS efforts and projects and highlighted that a number of valuable lessons had been learned by all projects. Project summaries were provided to the WG prior to the meeting and are available on the CSBWG9 web page:

- a. C-Map provided an explanation of its approach and position; he highlighted the areas in which it intended to focus, in particular areas where there are sparse data or data gaps. He noted that it was private individuals collecting the data not C-Map. It was suggested C-Map could provide a lower resolution subset of their dataset, at the same time they could advertise and highlight their company direct support for the IHO CSB initiative and the UN SDGs and UN Decade, both of which would be positive Corporate Social Responsibility (CSR) key performance indicators (KPIs). It was agreed that the Vice-Chair should continue her engagement with C-Map and that C-Map is encouraged to continue participation in the CSBWG (**Action 5 – Vice-Chair/C-Map**);
  - i. It was asked whether the C-Map data gathering crowd could be seen as coming under the UNCLOS marine scientific research definition and therefore whether a copy of the dataset would be available to the respective national HO.
- b. The Chair asked for an update from CIDCO on the progress with their HydroBox and the new HydroBlock. CIDCO provided details for their projects in northern Canada and the next stages to be undertaken. In particular CIDCO highlighted a number of lesson learned for future projects as well as project undertake by other organizations in other parts of the world;
- c. Matt Zimmerman (**MZ**), FarSounder, provided an update on its activities and developments. It was noted by Steve Monk (**SM**) that FarSounder activities and capabilities would be highlighted at the forthcoming Explorer Yacht Conference in Monaco in mid-November (**Action 6 – SM/MZ**). The engagement with the Cruise Liner operators was detailed and the plan to increase data gathering in the Antarctic region. It was requested that further development of the DCDB is needed to allow the inclusion of data other than single track lines, it was agreed that DCDB and FarSounder would discuss this further (**Action 7 – DCDB/MZ**);
- d. Yukari Kido (**YK**), JAMSTEC, provided a short brief on its activities, particularly in national and regional waters, she highlighted the collaboration with other regional and national organizations. It was confirmed that all bathymetric data collected during any particular cruise was shared with JODC and JHOD Japan Coast Guard as soon as possible on completion. It was agreed that JAMSTEC should commence a discussion with DCDB on how to make bathymetry data available for wider use (**Action 8 – DCDB/YK**); and
- e. TeamSurv provided a short summary of activities including the provision of data loggers to the Great Barrier Reef project.

### 4. Messaging and Coordination

4.1 The Chair introduced the topic, highlighting a number of questions which need to be addressed about how the CSBWG can improve the engagement and leverage of other organizations already active. The IHO provided a brief description of the relationship between the IHO, IOC, CSBWG, GEBCO and Seabed 2030 and the need for close harmonization and coordination to avoid duplication of effort. This type of clarification was appreciated by the WG and it was agreed to update the “tree diagram” shown by the Chair with the UN Ocean Decade Strategy

umbrella (**Action 9 – Chair/Vice-Chair**) and make it available to the WG for future use. David Millar (**DM**) and Evert Flier (**EF**) highlighted the UN Decade and the UN SDGs as being critical drivers towards obtaining a complete bathymetric picture of the oceans and corresponding knowledge.

4.2 The Chair introduced the “Outreach to Regional Hydrographic Commissions (RHCs)” agenda item, highlighting the identified actions from previous meetings and comments received at other meetings. She provided details of progress achieved on a number of the actions. Details of RHCs which had appointed Seabed 2030 Ambassadors were highlighted and the potential candidates for positions to be filled in other RHCs were suggested. It was noted that the proposed submission to IRCC contained a number of actions requested of IRCC to progress this and also to encourage greater engagement from all coastal states to make data available and progress the coverage in their areas/regions. The IHO noted that the new draft IHO Strategic Plan includes a KPI for RHCs to report annually on increased coverage within their region and thus individual coastal states within each region. The IHO also highlighted that it was a case of addressing individual state difficulties and obstacles to overcome any challenges contributing to the lack of progress. The Chair provided a background brief on the revised IHO CL and new IRCC letter to RHCs to obtain support for the provision of CSB data into the public domain, recognising that CSB is being collected, even if the data is not currently available. Jamie McMichael-Phillips (**JMcMP**) highlighted the recently published Seabed 2030 survey, for which he encouraged participation (**Action 10 – All**). It was highlighted the important need to develop automated processes to manage the data quantities being received by HOs:

- a. It was suggested that the CSB/Seabed 2030 Ambassadors should be members of the CSBWG and that IRCC should not only ask RHC Chairs to identify CSB/Seabed 2030 Ambassadors but also to encourage their participation in CSBWG meetings. The Chair will include this request in the IRCC submission, and explicitly ask it as an IRCC action (**Action 11 – Chair**);
- b. Jens Peter Hartmann (**JPH**) proposed that CSBWG develop discussion items for RHC meetings, in addition to giving the CSB presentation (**Action 12 – JPH/Chair**);
- c. Vice-Chair provided a short background brief on the proposed report submission to IRCC requesting the inclusion of CSB activity in RHCs meetings and National reports. It was agreed that the paper should be circulated to the CSBWG for input and comments prior to the final version being submitted. It was agreed that a short deadline should be set at 14 August for replies (**Action 13 – Vice-Chair/All**). The paper generated a number of comments regarding reporting to IRCC on the percentage coverage within RHCs and individual coastal states as an IHO KPI to support the UN Decade and the UN SDGs as approved by IHO Council and to be submitted to IHO Assembly 2 later in 2020; and
- d. The Vice-Chair suggested that the CSB/Seabed 2030 Ambassadors be provided with a list of tasks correlated with the future IHO Strategic Plan that will be approved during A-2 (November 2020); Their role should be active and not only informative. This proposed list will be discussed at CSBWG10.

4.3 David Millar (**DM**) provided a brief on the outcomes of the GEBCO Guiding Committee (GGC) intersessional meetings held in June. He highlighted the resultant CSB-related draft Actions and Decisions. He highlighted the importance of maintaining a clear distinction between standard CSB and systematic surveys. He noted that transit data generated by research and survey vessels with MBES needed to be considered and suggested that this issue needed to be addressed by the CSBWG. It was clear that a good deal of confusion remained over the distinctions between CSB data, transit data and systematic survey data and the terminology used in presentations and discussions; it was agreed that a short explanation should be drafted for wider discussion within the CSBWG (**Action 14 – Chair/Vice-Chair/All**) He noted that much of the discussion was focused on communications and the message provided as well as the methods employed, which needs to be coordinated with other IHO and IOC bodies and recognition of the relationships between the various bodies. He particularly noted the need to engage with communities and stakeholders not directly involved to ensure a wider

understanding of the need to obtain a complete picture of the seabed topography. He noted the details of the next GEBCO meetings in January 2021.

4.4 Jamie McMichael-Phillips (**JMcMP**), Director Seabed 2030 project, provided a brief overview of the Seabed 2030 project activities and the coordination efforts between the IHO and IOC bodies. He highlighted the Seabed 2030 structure and various elements involved in the project. He noted the recent release of the GEBCO 2020 grid which indicated coverage stands at 19% up from 6% in 2017. He highlighted that CSB activities were seen as a key initiative and for which funds were allocated from the Seabed 2030 annual budget. He provided details for the data logger initiative and to where they would be sent and the intended operating model once received, which would be based on leveraging national capability and resources. He noted that the intention was to progress towards local national procurement of additional loggers and for other organizations to provide resources and funding to expand the initiative. He noted that the Nippon Foundation (NF) were mainly focused on supporting the administration and structure of Seabed 2030:

- a. It was noted that the 2030 target had been set so that current rates of progress and activity were guaranteed to fail, the objective was aimed to generate an atmosphere of innovation and incentive to explore alternative methods and approaches to achieve the goal. CSB is one of the initiatives identified as having the potential increase the rate of coverage; however it was acknowledged that the attitudes and perceptions of many coastal states will need to alter radically for there to be the prospect of getting close to the target, as well providing the vital foundation data set to support the UN Decade and the UN SDGs;
- b. Details of the Data Logger trials undertaken by Brian Calder (**BC**) were requested, it was proposed that the presentation given at CSBWG8 could be uploaded to the CSBWG8 document page as part of the Presentation.zip (**Action 15 – BC/IHO**);
- c. Rogier Broekman (**RB**), Chair Data Quality Working Group (DQWG), recommended viewing the Data Validation ISO Principles presentation, available from the DQWG section of the IHO website (<https://iho.int/en/reference-documents>); and
- d. It was highlighted that caution needed to be exercised in the discussions on use of CSB data, which was focused to complete the global bathymetric picture and the GEBCO grid. Once available it would obviously have a plethora of other uses in maritime and marine related activities. However it should not be viewed as an activity primarily focused for inclusion in official navigational charts, although it was acknowledged that some CBS data, as an additional data source, is used by some HOs in their safety of navigation products, but this remained an individual HO assessment and decision. The important aspect was that all coastal states should support the gathering and open availability of CSB data in a format and resolution with which they are comfortable for the benefit of all.

4.5 Paul Holthus (**PH**) provided brief details on the activities and major initiatives of the World Ocean Council (WOC). He highlighted the importance of collaboration and coordination to raise the CSB initiative amongst the WOC membership. EF asked whether deeper capable SBES or cheaper MBES could be retrofitted to vessels to increase the global data gathering capability.

4.6 Rogier Broekman (**RB**), Chair DQWG, provided a short brief on the activities and developments related to DQ, in particular data uncertainty of CSB data and thus its potential inclusion on official charts. EF highlighted the need to address and remove the resistance in the use of CSB data by HOs, it should be approached as another data source to be assessed by the relevant user (HO) and provided to the mariner:

- a. It was noted that DQWG and UNH were working on a new display methodology so that, in the future, mariners would not need to understand CATZOC, as they would have an intuitive visual warning system. DQWG and UNH were invited to provide an update of developments at the next meeting (**Action 16 – RB/BC**);

- b. The importance of adequate metadata was highlighted and the need to educate potential data gatherers, it was felt that this should be part of the Outreach strategy (**Action 17 – C-Map/MZ/RB**);
- c. It was noted that a basic principle of DQ to evaluate accuracy is: compare to the value "known to be true", if no other data exist, CSB is the first and best; however if "old" MBE data exists, CSB can have a signal function that re-survey may be required;
- d. Peter Wills (**PW**) noted that the Canadian Hydrographic Service (CHS) has been using Pydro tools to compare data with the published ENC. It was suggested that additional information, experiences and lessons learned could be shared with CSBWG. PW was invited to provide this information, either intersessionally or as a presentation at the next meeting (**Action 18 – PW**); and
- e. Svein Skjaeveland (**SS**) (ECC) discussed if there was a methodology/concept created where CSB data could be compared to HOs official data, where the HOs could then be notified if there are discrepancies, especially where this may be of safety critical nature. ECC mentioned a possibility for comparing CSB against a HOs official ENC portfolio - something a RENC like PRIMAR could further investigate as possible additional "service" to support HOs work. Sea-ID replied that an API was requested during the last meeting and requested if ECC would be willing to provide such a mechanism with their data. BC replied that the WG might be interested in the work that he presented at CHC'20 in February, which does exactly this. BC was requested to provide his presentation with notes (**Action 19 – BC**). ECC stated they would like to explore the possibility with Sea-ID for creating such a service - figuring a scenario where the HOs could be notified/provided a report when CSB data of interest enters the DCDB. ECC will collaborate with Sea-ID and DCDB to investigate options for creating a structure where CSB surveys/data, upon entry into the DCDB, are compared against Hydrographic Offices official ENC portfolio" (**Action 20 – ECC/Sea-ID/DCDB**); and
- f. It was noted that an increasing number of small vessels, in particular fishing vessels, were being fitted with WASSP MBES, via which a significant amount of CSB data was being generated. It was therefore highlighted that coastal states were no longer in a position to attempt to control the activity and should be looking at the most appropriate ways to manage the resultant data to gain the maximum benefit for the maritime community and all related marine activities.

4.7 The Chair highlighted the wiki developed by Kenneth Himschoot (**KH**), Sea-ID, which should be considered the place to store presentations, papers, documents and images for general information and further use. It was highlighted that material generated representing the CSBWG should be placed in the IHO website, however all material created by individuals or under their organization in support of the CSB initiative is encouraged to be made available through the wiki. Contributors should understand they are responsible for the accuracy of the content and that once placed in the wiki would be available, in part or whole, for use by others with only an acknowledgement of the original source required. The login request link to the wiki was provided: <https://wiki.sea-id/login/request>. KH explained that he would email the WG a brief tutorial on how to edit and upload the wiki (**Action 21 – KH**). WG members are requested to upload relevant materials to the wiki (**Action 22 – All**).

## 5. CSB Guidance

5.1 The Chair provided a short brief on the DCDB website and recent developments, including the webpage clarifying how to contribute data and the recently developed GEBCO Data Contribution Form ([https://www.gebco.net/abouts\\_us/contributing\\_data/](https://www.gebco.net/abouts_us/contributing_data/)). WOC confirmed that they would direct potential contributors to this form or directly to the DCDB or the GGC for further information and guidance.

5.2 As no comments had been received regarding ‘pain points’ for contributors, the Chair invited interested parties to submit a discussion paper to the next meeting. MZ highlighted some of the challenges they have experienced, he agreed to develop a brief submission to the next meeting summarising their experiences (**Action 23 – MZ**).

5.3 The Chair highlighted the draft page one of the CSB Summary Guide, which would be circulated for comment and input (**Action 24 – Chair/All**). Page two is intended to highlight the various identified sectors and industries. The Chair noted that these individual sector perspectives needed to be developed and invited sector and industry representatives to coordinate the drafting of their respective page. WOC volunteered to undertake overall coordination using their access to a wide variety of industry sectors through their membership. It was noted that WOC would engage with individual CSBWG members for their sector perspective and input. JPH highlighted the need to address both the HOs use of data and the resistance to using CSB data. It was felt that this was better addressed through direct discussion and engagement. Anders Bergström (**AB**), FLIR Systems, indicated that, when available, they would include the relevant summary guide in their product delivery of depth sounder systems. It was agreed that harmonization and standardised proofing of the final version would need to be undertaken by the CSBWG to ensure consistency. It was also suggested that the guides could provide a template to be adopted for the generation of individual country or company perspectives. The following were identified to assist the drafting of their relevant sector page during the intercession (**Action 25 – Names listed below/Chair/Vice Chair**) (names in bold to coordinate):

- a. **Steve Monk**, Anders Bergström, Matt Zimmerman and Tim Thornton to coordinate the Superyacht and leisure community input;
- b. **David Millar** and Evert Flier to coordinate the Survey, Geophysical and Submarine Cable industry;
- c. **Evert Flier** to coordinate the Fisheries sector;
- d. **Matt Zimmerman** to coordinate the Cruise Liner industry;
- e. **Anders Bergström** to coordinate the Software/hardware industry;
- f. **Andy Talbot**, Jens Peter Hartmann, Pete Wills, Debbie Peterson, Zeljko Bradaric and Vice-Chair to coordinate the Hydrographic Offices sector;
- g. **Brian Calder**, Thierry Schmitt and Colin Devey to coordinate the Academic/Scientific Research sector;

Additional sectors were also identified as benefitting from a tailored CSB summary. However, no volunteers were identified to provide input:

- h. Navy/Coast Guard/Government vessels;
- i. Offshore supply/support; and
- j. Harbour/Workboat

5.4 It was agreed the Sea-ID drafted guidance on the Roles/Resources/Responsibilities of Trusted Nodes for inclusion in B-12 would be circulated for comments and input (**Action 26 – Chair**). It was agreed the IHO should investigate the status of the proposed annex to B-12 in relation to IHO Resolution 2/2007, as amended, and provide guidance at the next meeting (**Action 27 – IHO**).

5.5 Thierry Schmidt (TS) notified the WG that he was in the process of translating B-12 in French. The translation should be ready by the end of the summer. This French initiative was appreciated and it was noted that

translation material is highly valuable and most welcome. The Secretariat specified that the summary guide will have no official status as it will be viewed in the same way as an informational information leaflet.

5.6 Giuseppe Masetti (**GM**) and Mathieu Rondeau (**MR**) provided a presentation on aspects of a draft white paper addressing guidelines of Trusted CSB Use for HOs. It was noted that HOs need to be able to understand the data quality and therefore the limitations for CSB use. It was highlighted that good metadata was vital for HOs to have any confidence in using CSB. It was recognised that HOs need guidance on how best to process CSB, what tools are available to assist in the processing workload, how QC/QA can be achieved realistically, HOs have a clear understanding on CBS use limitations and the benefits of the provision CSB:

- a. It was agreed that further discussion was needed with the DQWG, which would require a formal request to investigate data quality parameters and indicators for use by HOs and provide further guidance and direction (**Action 28 – Chair/Vice-Chair**).

## 6. How do we Outreach?

The Chair introduced the Outreach topics, she displayed the revised ‘Mind Map’ developed over previous meetings. She noted that she wanted to generate concrete actions addressing the highlighted sectors before selecting and addressing additional communities. DM provided details on discussions with Submarine Cables companies, he noted that, although no data had been contributed as yet, the indications were positive and the companies were working through identified issues which need to be resolved. The Vice-Chair noted that the ICPC had a scheduled meeting in Madrid in 2021, and JMcMP highlighted that it is in the Seabed 2030 plan. It was agreed that it is a good occasion to present CSB activity and engage with this specific sector. The Chair/Vice-Chair will evaluate the opportunity to participate and to eventually present a work together with Seabed2030. DM provided some details on the Fugro motivation for and perceived benefits of participating in Seabed 2030 and CSB. SM highlighted a recent BBC Science article by Jonathan Amos (<https://www.bbc.co.uk/news/science-environment-53119686>), it was suggested that further engagement around CSB would be of benefit (**Action 29 – SM**):

- a. It was agreed CSBWG and Seabed 2030 should plan to participate at the ICPC 2021 meeting. The Chair and Director Seabed 2030 to liaise and coordinate (**Action 30 – Chair/JMcMP**);
- b. WOC volunteered to coordinate the commercial sector engagement and to lead a small sub-group to focus on individual sectors, it was suggested that interested individuals could join (**Action 31 – WOC**);
- c. TeamSurv (**TT**) volunteered to provide CSB Outreach related material for further use (**Action 32 – TT**);
- d. It was suggested that a list be compiled of specific reasons why participation helps with global sustainability. JMcMP provided a short update on the Seabed 2030 survey responses received, which were at an encouraging level. It was agreed that the information could be used in presentations and discussions. It was also agreed that Chair and Director Seabed 2030 should work to make the results available to the CSBWG (**Action 33 – Chair/JMcMP**); and
- e. AB recommended a fresh approach should be initiated in the style and manner of communications between commercial companies and HOs. The HO representatives present acknowledged that work remained to be done, it was proposed that further discussions between the various involved parties should continue to progress towards a more harmonised and balanced partnership.

## 7. Close

7.1 Any other business: The Chair recognized the contributions of Ray Sawyer to the CSBWG and wished him all the best in his upcoming retirement. The group extended their heartfelt congratulations as well.

- 7.2 The Secretary highlighted that the dates and location for the next meeting were in the IHO calendar and the CSBWG10 page would be generated in due course. The current invitation is from the Norwegian Hydrographic Service to host CSBWG10 in Stavanger, Norway, 12-16 April 2021. It is proposed to hold the postponed second stakeholders workshop/seminar during the same period. The formal invitation and logistic details would be provided towards the end of October (**Action 34 – IHO/EF**).
- 7.3 The Secretary noted that the draft summary report with actions and decisions would be passed to the chair and Vice-Chair for their initial comment and input on Friday 3 July (**Action 35 – Chair/Vice-Chair**); it was anticipated that the report would be circulated to all participants on 9 July with a deadline for input and comments being the 23 July (**Action 36 – All**). The final version with annexes would be published by the 31 July (**Action 37 – IHO**):
- 7.4 The Chair closed the meeting thanking all for their participation and enthusiastic engagement, particularly on the Chat Log. She acknowledged that a remote meeting did not have the same feel or sense of togetherness that a face-to-face meeting generated and that the always-important ‘in the margins’ discussions were unable to take place. However, she considered that a considerable amount of progress had been achieved on a number of key issues. The Chair and Vice Chair greatly look forward to seeing everybody in Norway in April in 2021.

Annexes:

- A. List of Participants.
- B. Consolidated List of Actions
- C. Session One Chat log.
- D. Session Two Chat Log.
- E. Session Three Chat Log.

**IHO Crowd-Sourced Bathymetry Working Group (CSBWG)  
List of Participants CSBWG9 Remote VTC Meeting**

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Expert Contributor	Farsounder INC.	Heath Henley Matthew Zimmerman	heath.henley@farsounder.com matthew.zimmerman@farsounder.com
Expert Contributor	ONE Data Technology Co., Ltd	Daewon Park	mr.daewonpark@gmail.com
Expert Contributor	TeamSurv	Tim Thornton	tim.thornton@teamsurv.com

## Apologies:

Patrick Westfeld – Bundesamt für Seeschifffahrt und Hydrographie (BSH)

Kentaro Kaneda – Hydrographic and Oceanographic Department, Japan Coast Guard (JHOD)

Haruka Ogawa – Hydrographic and Oceanographic Department, Japan Coast Guard (JHOD)

**LIST OF ACTIONS** – Updated 3 August 2020

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
CSBWG6					
	2.2	Presentations - DCDB	<del>CSBWG7</del> <del>CSBWG8</del> <del>CSBWG9</del> CSBWG10	Investigate how to handle S-102 format and gridded datasets for inclusion in the DCDB – <a href="#">on going, under investigation by new data manager, update at next meeting</a>	NOAA-NCEI
	2.3	Presentations - RosePoint	<del>CSBWG7</del> <del>CSBWG8</del> <del>CSBWG9</del> CSBWG10	Discuss with RosePoint on how to make the anonymous feature more obvious and to include ship type as well as offsets and heading data – <a href="#">on going, hindered by lack of focal point at NOAA OCS, update at next meeting</a>	NOAA-NCEI & OCS
	2.3	Presentations - RosePoint	<del>CSBWG7</del> <del>CSBWG8</del> <del>CSBWG9</del> CSBWG10	Investigate need for more regular meetings to move forward the inclusion of bathymetric data gathering within the VOS scheme – <a href="#">lack of NOAA NOS-VOS lead has stalled project, update on future at next meeting</a>	NOAA-OCS
CSBWG8					
2	2.6	CSB related projects	<del>CSBWG9</del> CSBWG10	Invite WASSP to attend meeting	NOR/My Gene Machine
7	4.2	B-12	IRCC12	Demonstrate e-publications format versions for endorsement and potential example for other IHO publications	Chair
8	5.1	CSB Use cases	<del>CSBWG9</del> CSBWG10	Provide examples and details of UKHO use cases for CSB	GBR
9	5.2	DQWG	<del>CSBWG9</del> CSBWG10	Draft guidance document for HOs on uses of CSB	Chair/Vice-Chair/NOR

20	6.1	Outreach Strategy	IRCC12	Encourage via IRCC regions not represented in CSBWG to participate	Chair
23	6.4	Outreach	On going	Generate graphics to show where data has been contributed and which states are in the positive list	IHO/Chair
24	6.4	Outreach	CSBWG9 CSBWG10	Generate a video highlighting successful use cases	IHO
CSBWG9 Remote					
1	1.4	Introduction	31 July	Include download of daily Chat Log as annex to final report	IHO
2	2.3d	Current DCDB Work and IHO Projects	On going	HOs to make renewed efforts to engage with administrations to try and achieve data provision	All
3	2.3e	Current DCDB Work and IHO Projects	CSBWG10	Investigate whether generalised details of CL 11/2019 could be provided in format agreed with Chair	IHO/Chair
4	2.4a	Current DCDB Work and IHO Projects	CSBWG10	Continue the discussions with ECC to progress the items highlighted at CSBWG8	Chair/ECC
5	3a	Current CSB Efforts	CSBWG10	Continue engagement with C-Map and that C-Map is encouraged to continue participation in the CSBWG	Vice-Chair/C-Map
6	3c	Current CSB Efforts	12 November	FarSounder activities and capabilities to be highlighted at the forthcoming Explorer Yacht Conference in Monaco	Da Gama Maritime/FarSounder
7	3c	Current CSB Efforts	CSBWG10	Discuss further development of DCDB to allow inclusion of data other than single track lines	DCDB/FarSounder
8	3d	Current CSB Efforts	CSBWG10	Discuss with DCDB on how to make JAMSTEC data holdings available for wider use	DCDB/JAMSTEC
9	4.1	Messaging and Coordination	CSBWG10	Update the "tree diagram" with the UN Ocean Decade Strategy umbrella	Chair/Vice-Chair
10	4.2	Messaging and Coordination	28 August	Participation in Seabed 2030 survey	All
11	4.2a	Messaging and Coordination	IRCC12	Include request in the IRCC submission for RHC Chairs to identify CSB/Seabed 2030 Ambassadors, also to encourage participation in CSBWG meetings	Chair
12	4.2b	Messaging and Coordination	CSBWG10	Develop discussion items for RHC meetings	DNK/Chair

13	4.2c	Messaging and Coordination	14 August	Provide input and comment to proposed report submission to IRCC requesting inclusion of CSB activity in RHCs meetings and National reports	Vice-Chair/All
14	4.3	Messaging and Coordination	CSBWG10	Draft short explanation for wider discussion on distinctions between CSB data, transit data and systematic survey data and the terminology used	Chair/Vice-Chair/All
15	4.4b	<del>Messaging and Coordination</del>	<del>31 July</del> Complete	<del>Data Logger trials presentation to be uploaded to CSBWG8 documents</del>	<del>CCOM-JHC/IHO</del>
16	4.6a	Messaging and Coordination	CSBWG10	Provide update on new display methodology for intuitive visual warning system	DQWG/CCOM-JHC
17	4.6b	Messaging and Coordination	CSBWG10	Educate potential data gathers on importance of adequate metadata	C-Map /FarSounder/DQWG
18	4.6d	Messaging and Coordination	CSBWG10	Provide information on Pydro tools to compare data with the published ENC	CAN
19	4.6e	<del>Messaging and Coordination</del>	<del>31 July</del> Complete	<del>Provide CHC'20 presentation for upload to meeting documents</del>	<del>CCOM-JHC</del>
20	4.6e	Messaging and Coordination	CSBWG10	Investigate options for creating structure for CSB data, upon entry into the DCDB, are compared against HO's official ENC portfolio	ECC/Sea-ID/DCDB
21	4.7	Messaging and Coordination	CSBWG10	Provide brief tutorial on how to edit and upload the wiki	Sea-ID
22	4.7	Messaging and Coordination	On going	Upload relevant materials to the wiki	All
23	5.2	CSB Guidance	CSBWG10	Develop brief submission to the next meeting summarising their experiences	FarSounder
24	5.3	CSB Guidance	31 July	Circulate draft page one of the CSB Summary Guide for comment and input	Chair/All
25	5.3	CSB Guidance	30 October	Assist drafting of relevant sector page intercessionally	Da Gama Maritime/Fugro/NOR/FarSounder /ECC/GBR/CCOM-JHC
26	5.4	CSB Guidance	28 August	Circulate draft guidance on Roles/Resources/Responsibilities of Trusted Nodes for input and comment	Chair
27	5.4	CSB Guidance	CSBWG10	Investigate status of B-12 with reference to IHO Resolution 2/2007, as amended, and provide guidance	IHO

28	5.6a	CSB Guidance	30 October	Request DQWG investigate data quality parameters and indicators for use by HOs and provide further guidance	Chair/Vice-Chair
29	6	How do we Outreach	CSBWG10	Investigate engagement with BBC	Da Gama Maritime
30	6a	How do we Outreach	CSBWG10	Investigate joint presentation at ICPC 2021 meeting in Madrid	Chair/Vice-Chair/Seabed 2030
31	6b	How do we Outreach	CSBWG10	Coordinate commercial sector engagement and lead small sub-group focus on individual sectors	WOC
32	6c	How do we Outreach	CSBWG10	Provide CSB Outreach related material	TeamSurv
33	6d	How do we Outreach	CSBWG10	Compile list of specific reasons why participation helps with global sustainability	Chair/Seabed 2030
34	7.2	CSBWG10	30 October	Circulate an initial letter of invitation	IHO/NOR
35	7.3	CSBWG9 Draft Report	3 July Complete	<del>Draft to be circulated for comment</del>	IHO
36	7.3	CSBWG9 Draft Report	23 July Complete	<del>All to provide comments on draft report</del>	All
37	7.3	CSBWG9 Final Report	31 July Complete	Publish final report	IHO

**Chat Log C:\Users\ADSO\Desktop\ChatLog 2020\_06\_30 17\_06.rtf**

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:03: David, let me know when we should start.

**Sea ID (to Everyone):** 14:13: can you share an update to the answers to CL11, Jennifer?

**Sea ID (to Everyone):** 14:16: I appreciate that the list is sensitive

**Matt Zimmerman - FarSounder (to Everyone):** 15:02: Q: is all the data

**Sea ID (to Everyone):** 15:16: it's just a positive table currently, I thought it would also include the negative answers, to 'name and shame'? (not my words)

**Giuseppe Masetti (DGA) (to Everyone):** 15:17: Will these slides be made available on the CSBWG9 web page?

**Croatia HO, Bradaric Z (to Everyone):** 15:17: The Geographic Filter (GF) is really nice innovation on the DCDB side in terms of compliance with the "positive list" but what is about "GF" on-board of "research vessels" which could warn up ship's master before starting measurement and collecting data and transferring to DCDB in area where it is not permitted?

**Sea ID (to Everyone):** 15:18: sure, but without the comments... just 'no, not allowed'. I appreciate the leaving out of comments, totally.

**Brian Calder (to Everyone):** 15:18: Could also do a "no" list without the comments as to why ...

**Sea ID (to Everyone):** 15:20: this is a change after the meeting... so.. ok, no choice from us, but 'what's the critical number'?

**Matt Zimmerman - FarSounder (to Everyone):** 15:20: It could be interesting to learn about the reasons (even anonymously) to see if there are ways that we could mitigate, at least some of the concerns, in order to win some more "yes".

**Sea ID (to Everyone):** 15:21: Agree, Matt.

**Brian Calder (to Everyone):** 15:21: @MattZ: I like that idea --- gets to a positive action we might execute against

**Steve Monk (to Everyone):** 15:22: How's GEBCO getting around this?

**Matt Zimmerman - FarSounder (to Everyone):** 15:23: @brian, thanks, I'm sure that there are some countries that have a clear "reason" why. But some might be purely "silly" bureaucratic limitations that we might be able to work around.

**Sea ID (to Everyone):** 15:23: GEBCO is mainly deep water, or at least focussed until now on deep water, right Jamie? So it wasn't an issue?

**Giuseppe Masetti (DGA) (to Everyone):** 15:24: A collection of success stories in modifying the political approach to CSB data would be handful to

leverage the message.

**Andy Talbot - UKHO (to Everyone):** 15:28: Could we publish some of the reasoning from the countries that say "yes". This might help some of the "no" countries better understand the situation and work towards a "yes". Like a FAQ list for common concerns.

**Sea ID (to Everyone):** 15:28: excellent idea, Andy

**Rogier Broekman (to Everyone):** 15:29: Please note maritime law making note of right of innocent passage. If countries allow right of innocent passage, can the collected depths be shared?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:29: Agree. I just captured your suggestion, Andy. Yours too Giuseppe.

**David Wyatt - IHO (to Everyone):** 15:32: The decision not to publish any of the comments, positive or negative, will not change and it would be considered a breach of confidentiality between MS and the SG.

**Andy Talbot - UKHO (to Everyone):** 15:33: agree. But could we distil these to generic statements with no mention of the source country?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:33: Agree with Andy. Could we summarize the comments into general information?

**Emma Wise (to Everyone):** 15:35: How do the HOs that are becoming MGDA organisations (or similar) deal with the issue of CSB then? Saying no would not align with the mission and aim of an MGDA - correct?

**Jamie McMP (to Everyone):** 15:39: re SEABED 2030 - CSB/data release restrictions do affect our activity. We are whole-ocean and not simply deep water - we need 100% of ocean mapped. Whilst we look at national HO's to assist us in the shallower zones, we are rolling out some CSB "field trials" to provide loggers to encourage data collection. National release rules still apply however and we need to work on these. Bearing mind we are only asking for one sounding in a 100mx100m grid (in shallow water) rather than high-res data.

**Sea ID (to Everyone):** 15:41: understood, thank you Jamie

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:42: @Emma - MGDA??

**Emma Wise (to Everyone):** 15:44: Maritime Geospatial Data Agency (or similar)

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:45: thank you and yes, you're right. We've been making that connection/disconnection regarding a countries support of the UN Decade but not supportive of CSB.

**David Millar - Fugro (to Everyone):** 15:46: The main issue here is the current ambiguity around "marine scientific research" within UNCLOS. Some nations consider CSB as MSR and some do not. So, to Evert's point,

our long term strategy should be to use the UN Decade of Ocean Science for Sustainable Development (which calls for a wholly mapped ocean) as means to clarify the definition and scope of MSR. At the moment, all UN member states support the UN Ocean Decade, but many do not support CSB, which creates a significant barrier in achieving the objectives of the UN Ocean Decade.

**Vice-Chair - Italy - Marta (to Everyone):** 15:48: thanks David (Fugro) agree with your vision

**Guillaume Morissette (to Everyone):** 15:50: What kind of quality control is embedded into the data logger before it's sent to DCDB?

**Giuseppe Masetti (DGA) (to Everyone):** 15:55: Any plan to provide commercial support for the UNH Data Logger?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:56: Any other questions out there?

**Croatia HO, Bradaric Z (to Everyone):** 16:05: David Millar - Fugro, Thanks for your valuable point about need to make diff between CSB and MSR. In Croatia the difference is clear. The regulations in force precisely define terms to be fulfilled if anyone wish to conduct bathymetric survey for the nav. charting purpose or for MSR purpose.

**Steve Monk (to Everyone):** 16:10: It's a shame there's so much discrepancy and variation between the understanding of what's being gathered, particularly in Croatia as the number of Superyachts currently converging on that coastline at the moment is probably the greatest number it's been in years and some of them I know want to contribute to the CSB

**Evert Flier (to Everyone):** 16:11: Dear Zeljko, CSB is neither Marine Scientific Research nor bathymetric survey for navigational charting purpose. It is logging of passage soundings while underway / innocent passage where data can contribute to general ocean knowledge.

**Andy Talbot - UKHO (to Everyone):** 16:14: vert - the actual gathering of CSB data is possibly outside of MSR definition but the fact that the data is subsequently data based and used for scientific reasons (e.g. GEBCO) that led some to define it as MSR.

**Evert Flier (to Everyone):** 16:16: Dear Andy, that is unfortunate. GEBCO is definitely not a scientific research activity but does provide a vital base layer of knowledge for science

**Rogier Broekman (to Everyone):** 16:20: quality question: the presentation of Navico shows 1 ft contour lines. Have these been tested against "values known to be true" i.e. official nautical charts? If no other prior information was available, that will answer the question.

**Giuseppe Masetti (DGA) (to Everyone):** 16:23: Who owns the collected CSB data? C-Map or the vessel?

**Steve Monk (to Everyone):** 16:23: As raised at CSBWG8, if C-Map openly contribute, will it encourage Garmin and Transas to do likewise with their databases?

**Croatia HO, Bradaric Z (to Everyone):** 16:24: Steve Monk - One of the main duties of ships/yachts master is to be informed about regulations in force across navigation route. If there is need for clarification there are many ways to reach it. The IHO "Positive List" is a good example how it is done on INT level.

**Croatia HO, Bradaric Z (to Everyone):** 16:38: Dear Evert, Yes, I completely agree with your remark but if you observe some commercial available PRIVATE charts you will see additional layers created from CSB data above original bathymetric data. From my point of view as former professional mariner it is completely confusing. Can you imagine situation with some less professional mariner leisure using that kind of mixed chart depth data?

**Emma Wise (to Everyone):** 16:40: On one hand Croatia I agree but on the other hand having more up to date data overlaid on a private or official chart is better than old data on that chart which hasn't been updated in years

**Steve Monk (to Everyone):** 16:41: For Bradaric - I hate to say this but they already do. I have been to countless vessels using official charts with poor data and on the screen next to that is the unofficial data from who knows where which they are almost convinced is right. All I try to get them to do is compare it against their current depth soundings for confidence

**MaryRose Sheldon NOAA (to Everyone):** 16:41: Right, and how are we going to prioritize discrepancies as to which ones we are sending out a reputable survey team to explore first

**Emma Wise (to Everyone):** 16:41: Also, as an ECDIS manufacturer, there is no mandatory standard that means an ECDIS has to be connected to an Echo Sounder so even if all ECS, ECDIS, ChartPlotters etc have a button to contribute data where allowed less than 5% of commercial vessels will do this

**Emma Wise (to Everyone):** 16:42: Steve Monk - I totally agree with your last comment

**Evert Flier (to Everyone):** 16:44: Dear Zeljko, as a professional mariner I would like to point out that once data quality of any bathymetric data is of CATZOC C (or even B) or less, it is the responsibility of the mariner (professional and amateur) to interpret the data in accordance with its

quality and act accordingly. Too many hydrographic offices are still sceptical of putting CSB data in their charts because they feel they cannot stand for the quality. All mariners need to make use of all available means to safely navigate. That means combining official charts with other sources of data if they provide data not available in the official nautical chart.

**Croatia HO, Bradaric Z (to Everyone):** 16:44: Dear Emma and Steve the main point regarding DQ is matter of responsibility for DQ.

**Emma Wise (to Everyone):** 16:46: I concur Evert. And we have lots of Mariners working this way

**Croatia HO, Bradaric Z (to Everyone):** 16:46: My last re to Emma and Steve can be applied to your last input.

**Rogier Broekman (to Everyone):** 16:47: Please be informed that the HSSC has requested its members to endorse S-67 Mariner's Guide to Accuracy of Depth information in ENCs. So far, there have only been positive responses. Soon the IHO will send out a CL to all IHO MS for endorsement of this standard. Might be a good read for the discussion.

**Steve Monk (to Everyone):** 16:53: If Covid has taught us one thing, owners of Superyachts who have the ability to go well away from anyone else, are going to tell their Captains to take them somewhere remote. If vessels go there, gather data and submit it on a hydrographic note, I seem to remember the HO has to act on it and I'd say, have a good reason to justify not releasing it.

**Croatia HO, Bradaric Z (to Everyone):** 16:54: To all in our chat ...For me there is no doubt that is better to have any data then nothing. But like ENC CATZOC it would be nice to have similar indication for CSB data intending to be included in official charts and of course who will be responsible in case of incident using CSB data incorporated in official charts.

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 16:56: my email is oreste.tommasi@navico.com

**Evert Flier (to Everyone):** 17:00: Zeljko, Whereas CATZOC A1 and A2 mean complete area survey, they do not guarantee complete object detection. Come to CATZOC C and D, the levels of vertical and horizontal inaccuracy are such that you have to navigate with extreme caution unless the depths are way deeper than for example 100m.

**Evert Flier (to Everyone):** 17:00: So responsibility sits pretty much with the mariner.

**Emma Wise (to Everyone):** 17:01: ChartWorld (7Cs sister Company) has a product CIO+ which overlays on top of official ENCs additional data. CSB could be used in a similar way

## Chat Log

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**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 13:59: Good morning, evening, night everyone! We'll get started in just a few minutes. We'll start off by having those that were here yesterday introduce themselves.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 13:59: that "weren't" here

**Paul Holthus (to Everyone):** 14:02: Hello from the World Ocean Council - the Global Blue Economy Business and Investment Organization

**Matt Zimmerman - FarSounder (to Everyone):** 14:02: Good morning everyone. My schedule changed last minute so I can join in at least the first

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:13: All - please feel free to add questions for the speakers here.

**Yukari Kido (to Everyone):** 14:30: Dear Peter, Thank you for your question. Yes, we do.

**Yukari Kido (to Everyone):** 14:31: As soon after our research cruise, we share all bathymetry data to JODC/JHOD\_Japan Coastal Guard.

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 14:34: Yes, clarifying the relationships between these projects/organization is really important.

**Rogier Broekman (to Everyone):** 14:37: No duplication is a Data Quality measure.

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 14:43: My understanding is not a negative answer. However, multiple caveats, which apparently have been interpreted as a "no". Will double check.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:56: SCOPE is the GEBCO Sub-Committee for Communications, Outreach and Public Engagement

**David Millar - Fugro (to Everyone):** 15:02: Sorry. I omitted Thierry Schmitt from list of folks who are participating in this meeting and who participated in the GEBCO Guiding Committee intercessional meetings. Sorry Thierry!!

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 15:08: No problem

**Steve Monk (to Everyone):** 15:11: Not wishing to be Mr Negative, but what happens if 2030 arrives and we don't have all the data or rather, we do have the data but many countries still won't allow its release?

**Giuseppe Masetti (DGA) (to Everyone):** 15:13: Which model/type of data loggers are going to be provided to Palau and South Africa?

**Evert Flier (to Everyone):** 15:14: The aim of Seabed 2030 is purposely set to an unachievable ambition level if we would all continue business as usual. It is therefore an incentive to think out of the box, to mobilize as

many as possible to contribute, to grow the network etc. etc.

**Brian Calder (to Everyone):** 15:14: @Giuseppe: a mix of TeamSurv NMEA0183s, and Yacht Devices NMEA2000.

**Matt Zimmerman - FarSounder (to Everyone):** 15:14: what is the order of magnitude of funding that GIBCO is spending on these two CSB efforts?

**Matt Zimmerman - FarSounder (to Everyone):** 15:14: \*GEBCO

**Matt Zimmerman - FarSounder (to Everyone):** 15:18: It would be interesting to look at KPI's such as cost/data or cost/Z"fill in"

**Brian Calder (to Everyone):** 15:20: @MattZ: I agree. The goal of the field trials is to investigate how we do this well, scalably, and transportably. The goal is to have a focussed data collection in a smaller region so that we get density of observation, which makes everything better. Getting some idea of how well that works is part of the process.

**Matt Zimmerman - FarSounder (to Everyone):** 15:20: @Brian cool!

**Steve Monk (to Everyone):** 15:21: @Evert - works for me. Love a challenge

**Giuseppe Masetti (DGA) (to Everyone):** 15:21: @Brian: Are the results of the data logger comparison in CSBWG8 presentations?

**Brian Calder (to Everyone):** 15:21: @Giuseppe: Should be, but I'm happy to send it to you if it isn't available. (**From David: Brian can you send me your presentation from CSBWG8, in which you reported on the tests, I will then add it to the Presentations.zip and upload it.**)

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:22: It should be, Giuseppe.

**Jamie Phillips (to Everyone):** 15:22: Based on current tech in deeper water (between 4xswath width at 10kts & 3.5swath at 7.5kts) between 70,000 and 127,000 mapping days at sea for a single platform (but the world has many)

Est cost \$3Bn to \$5Bn

So around the cost of 1 or 2 Mars missions

**Matt Zimmerman - FarSounder (to Everyone):** 15:25: @jamie, do you have any guesstimate of the amount of missing data (Z) in shallow waters (>100 meters)?

**Tim Thornton, TeamSurv (to Everyone):** 15:32: We find that shipping echo sounders go down to 1000-2000m depth. Small craft echo sounders are just 50-100m.

**Steve Monk (to Everyone):** 15:34: But what's the accuracy at those depths for standard fits? Does it almost become unusable even though something is better than nothing?

**Rogier Broekman (to Everyone):** 15:35: @Steve: "fitness for use", the

basic principle behind DQ.

**Jamie Phillips (to Everyone):** 15:35: Will get back to you on the shallow water "Z". About 6% of ocean shoaler than 200m. Most major shipping routes/ports covered by national HO's but a number of more remote areas are inadequately surveyed (or not at all in some cases). Ingestion of ENC data (shoal biased for safe nav) is something that is being addressed between IHO and GEBCO.

**Tim Thornton, TeamSurv (to Everyone):** 15:38: For small craft sounders it's about 1-2% of depth. Some of this is due to a fixed speed of sound value, so we improve on this with our monthly high res speed of sound data set. I don't have data on shipping sounders. But the other issue is the beam angle and vessel motion. Beam angle on small craft sounders is 6-10 degrees. Vessel motion (primarily roll) also introduces depth and position errors, though this is much minimised as the density of tracks increases, tending towards 0

**Croatia HO, Bradaric Z (to Everyone):** 15:47: Do anyone see the possible controversy between the concept "From the trusted crowd to the chart" (will be presented later) and the proposal to make and keep the distinction between CSB survey and systematic hydrographic survey (for production of the official chart)?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 15:48: Excellent question to be discussed during that section.

**Anders Bergström (to Everyone):** 15:49: But a similar approach is already done for older surveyed areas by some HO's

**Matt Zimmerman - FarSounder (to Everyone):** 15:51: visualization of "reliability" is an important part of this equation

**Matt Zimmerman - FarSounder (to Everyone):** 15:51: visualization at the end user (mariner) level

**David Wyatt - IHO (to Everyone):** 15:52: Can anybody provide a difference between 1950s/1970s passage sounding used on charts and modern CSB, except the name. I believe there is no difference, in fact modern CSB is of a much better quality and HO's are able to give the data a much more meaningful quality assessment.

**David Millar - Fugro (to Everyone):** 15:52: While these accuracies may not seem great, it may still provide a significant improvement over the existing data. Most of the world's ocean bathymetry has been derived from satellite altimetry, which can be in error by up to +/- 25% of depth (from studies of MH370 survey data). Users must be aware of and consider the accuracy, but CSB can provide a significant improvement over existing (not directly measured) data.

**Brian Calder (to Everyone):** 15:53: @DavidW: yes: passage soundings were likely done by someone with some training, and were probably corrected for sound speed to some extent, and possibly depth offsets. CSB is pretty much the Wild West in many cases. Is it significant? Unknown.

**Rogier Broekman (to Everyone):** 15:54: Please have a look at: [www.iho.int](http://www.iho.int) -> Services and Standards -> DQWG -> Reference Documents -> Data Validation ISO principles.

**NGA USA Debbie Peterson (to Everyone):** 15:54: I agree with David. At NGA, we have always used CSB. We just didn't call it that.

**Steve Monk (to Everyone):** 15:55: @Brian - If the calibration of the equipment is known, then surely at least the Wild West is a little less Wild?

**Anders Bergström (to Everyone):** 15:56: We talk little about the use of the data for navigation even if we clearly discuss the areas around it and the prerequisites in terms of eg CATZOC. Is it possible? I definitely believe so with some efforts.

**Rogier Broekman (to Everyone):** 15:56: Also useful -> Miscellaneous -> Explaining Feature Catalogues. And national methodologies: from survey to CATZOC values. (under reference documents).

**Pete Wills (Canada) (to Everyone):** 15:56: Thanks Rogier. This will help us in our validation processes. The key is assessing DQ as without it the data does not get loaded into our HO databases and thus does not get included for selection in our navigation products.

**Tim Thornton, TeamSurv (to Everyone):** 15:57: But older passage soundings may well have been done with older instruments that needed greater expertise to use, e.g. the old rotating dial depth sounders. Modern instruments need much less skill to operate, and their errors are much better understood. Also, speed of sound can be determined retrospectively, e.g. from oceanographic model outputs we used a high res monthly speed of sound atlas, but we could have done this using the date of the soundings

**Pete Wills (Canada) (to Everyone):** 15:58: SteveM's point on mariner understanding of our visualization of quality is an important one. A previous study indicated only 25% of mariners understand Catzoc in ENC's.

**Brian Calder (to Everyone):** 15:58: @Steve: yes, if it's known. That's uncommon, at least in what I've seen so far, unless there's someone behind the project working that metadata up. This is for "random user" CSB; for what we call TCB, calibration is automatic. But the systems are more expensive.

**Tim Thornton, TeamSurv (to Everyone):** 16:00: Another aspect is that discussions here are based on the traditional survey method of just treating

each track as an individual item. If they are combined and processed statistically, you can get much better quality data than just looking at single tracks.

**Brian Calder (to Everyone):** 16:02: @Tim: yes, absolutely. Depending on the depth, though, what's important in the uncertainty changes -- in shallows, the vertical offsets are much more important than the speed of sound, because the sound doesn't spend all that long in the water, for example. But @Debbie is also right: we've always used CSB, we just didn't acknowledge it. So long as we assess the uncertainty and keep that in our process, it shouldn't matter! Of course, that assumes that DQWG gets their way and there's a plan for display of that uncertainty/quality that people can use and understand.

**Rogier Broekman (to Everyone):** 16:02: DQWG and UNH are working on a new display methodology. Mariners don't need to understand CATZOC in the future if all goes well, We should have an intuitive visual warning system.

**Brian Calder (to Everyone):** 16:03: @Tim: Ack! I hate non-threaded messaging ... Re. statistical processing: yes, I agree, but only if you know and correct biases, or you assume that all of your errors are stochastic rather than deterministic. That might be hard to justify everywhere (but absolutely can be done some places).

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 16:05: A very fundamental aspect about CSB is the gathering of all metadata accompanying the surveys: this is an aspect that we need to improve with our contributors, educating them in the right way. For instance relative position of sonar to GPS, and transducer depth are two simple parameters that it is good to know. Someone is saying that if we request too much information, we bore our contributors and we lose them. I reply saying that: 1) if we communicate and engage properly, the effort to provide the metadata is much less than making the surveys; 2) without metadata, potentially good data become bad data, and need to be discarded.

**Croatia HO, Bradaric Z (to Everyone):** 16:06: My personal view (very similar with official one presented during IHC 2014) is that CSB bathy data collected nowadays can be useful only for the purpose to compare bathy data on official charts or for survey planning , not for including in charts even if indication of CATZOC exist.

**Brian Calder (to Everyone):** 16:06: @Oreste: absolutely! The question, though, is whether you get as much data if you ask for more effort from the participants? It's a balance between how much data and how good the data is.

**Tim Thornton, TeamSurv (to Everyone):** 16:09: @Brian yes of course errors are variable with depth, typical sea states for the body of water, vessel type etc. And similarly your comment on statistical processing. Both of those are simply a matter of doing the job properly, surely, and don't need specific comments?

**Rogier Broekman (to Everyone):** 16:09: One basic principle of DQ to evaluate accuracy as: compare to the value "known to be true". If no other data exist, CSB is the first and best. If "old" MBE data exists, CSB can have a signal function that re-survey should be done.

**Tim Thornton, TeamSurv (to Everyone):** 16:11: @Tommasi, I'd say don't discard the data, but know its potential inaccuracies and process it accordingly

**Brian Calder (to Everyone):** 16:11: @Tim: for those of us (like you and me) that have spent a lot of time thinking about processing, yes, it's just a matter of doing the job right. I don't think we're in the majority in this community, however ... I was trying to provide context.

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 16:12: @Brian: we have a program to pass from a "simple" voluntary contribution to a better engaging system, with scores, ranks (and rewards, maybe). But we must ask a minimum of "light professionalism". This can increase significantly the quality of the collected data.

**Matt Zimmerman - FarSounder (to Everyone):** 16:12: @Oreste, yes, quality of meta data is key. That is one strength of FarSounder's customer supplied data. We know the meta generally to a much high level than typical recreational echo sounders.

**Croatia HO, Bradaric Z (to Everyone):** 16:13: Rogier, agree only with second, CSB as a signal for resurvey.

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 16:14: @Tim: never discard data, but use only when suitable. For instance, if the time turns out to be inaccurate, and tide correction is impossible, that contribution is useless.

**Oreste Tommasi - C-MAP/Navico (to Everyone):** 16:14: @Matt: good for you!

**NGA USA Debbie Peterson (to Everyone):** 16:15: If I recall correctly, JCG was uncomfortable presenting CSB at EAHC.

**Tim Thornton, TeamSurv (to Everyone):** 16:15: Just to put the data quality issues into perspective, at the Shallow Survey conference in Plymouth a few years ago multibeam manufacturers surveyed a number of set areas, and published the results. Differences of a metre or more were not at all uncommon in depths of less than 10m. This is the same range we

found with poor quality CSB data (ie where we have a crowd, not just a single vessel track)

**Rogier Broekman (to Everyone):** 16:17: Interesting: makes a big difference if you survey with precise GNSS and a good ellipsoid-Chart Datum separation model of using a single remote tidal station.

**Tim Thornton, TeamSurv (to Everyone):** 16:18: Regarding metadata, we didn't have any problem getting it from our recreational loggers - if anything it was more of a problem with workboats and ships

**Matt Zimmerman - FarSounder (to Everyone):** 16:20: > " if anything it was more of a problem with workboats and ships" - good to know!

**Matt Zimmerman - FarSounder (to Everyone):** 16:20: gka

**Tim Thornton, TeamSurv (to Everyone):** 16:20: @Tommasi even in that example the data can still be useful if you have true crowd data - you use the good data to create a surface, and then use the data without time as a cross-check, applying a nominal tide height to raise that track to the surface level.

**Tim Thornton, TeamSurv (to Everyone):** 16:24: @Rogier - the biggest error we had was in tide models, especially in out of the way places. We finally used the OHU variable resolution gridded tide model, plus coastal tide stations, combining them in a similar way to that used in the UKHO's VORF

**Brian Calder (to Everyone):** 16:24: @Tim: 1m difference in 10m is very unusual for MBES survey, not typical. The differences there were mostly about biases and corrections, and would have caused any HO to request fixes before acceptance. I therefore, unfortunately, really don't think that's a very solid comparison.

**Matt Zimmerman - FarSounder (to Everyone):** 16:25: @tim "We finally used the OHU variable resolution gridded tide model, plus coastal tide stations, combining them in a similar way to that used in the UKHO's VORF" - That would make a really interesting white paper. I'm sure there are a lot of people here who would be interested in your findings

**Pete Wills (Canada) (to Everyone):** 16:26: The issue I have is when the singlebeam loses the bottom (bubbles). It can have great metadata and tides but how do I distinguish loss of bottom (near zero values) from a shoal?

**Rogier Broekman (to Everyone):** 16:26: NL recently published a ellipsoid - LAT separation model with an accuracy of 6.6 cm (1 sigma) over the southern North Sea, associated ellipsoid - geoid separation of 3cm (1 sigma). Combined with GNSS of 8cm (2 sigma), our vertical uncertainty is now really low (very accurate).

**Tim Thornton, TeamSurv (to Everyone):** 16:26: @Brian, I agree that it should be unusual, but presumably these companies were trying their best to show off their kit. And surely any HO would take the same critical approach to any data source whether CSB or multibeam

**Brian Calder (to Everyone):** 16:27: @Pete: what I'm trying here is time-series analysis. Bubble sweeps often cause recognisable differences that you can detect; it isn't perfect, however.

**Tim Thornton, TeamSurv (to Everyone):** 16:27: @Pete that's why you need a crowd! The chances of all tracks having aerated data at the same location are minimal.

**Brian Calder (to Everyone):** 16:28: @Tim: yes, but the manufacturers were trying to show off their sonars, not their total survey, so they generally didn't pay as much attention to the niceties of survey that we normally would (nor was that an expectation of the conference).

**Matt Zimmerman - FarSounder (to Everyone):** 16:28: @jennifer, that's why I was asking yesterday to understand what some of the negative responses were.

**Sea ID (to Everyone):** 16:29: The new letter is MUCH better, I would have preferred a question in there asking 'if so, at which endpoint would you like to be notified of gathered data'?

**Tim Thornton, TeamSurv (to Everyone):** 16:29: @Brian, not sure of that. When they did a comparison of all data sets it just used their data as absolute values, rather than trying to stack up the various surfaces with xyz offsets to minimise errors, and compare the shape of the surfaces

**Croatia HO, Bradaric Z (to Everyone):** 16:31: Being on this technical issues may I ask what is about the CTD measurements under CSB activities?

**Tim Thornton, TeamSurv (to Everyone):** 16:31: @Matt yes, if I get time between paying work. We also have the code as a tool for those who are interested

**Pete Wills (Canada) (to Everyone):** 16:33: Good points Jens.

**Brian Calder (to Everyone):** 16:40: @Bradaric: generally, there are no sound speed measurements done. Most programmes try to do some sort of modelling, or use an oceanographic database to do corrections.

**Svein Skjaeveland, Electronic Cart Centre (to Everyone):** 16:43: I think if there was a methodology/concept created where the CSB data could be compared to HOs official data then HOs could be notified if there are discrepancies, especially where this may be of safety critical nature. As an example I yesterday mentioned a possibility for comparing CSB against a HOs official ENC portfolio - something a RENC like PRIMAR could further

investigate.

**Croatia HO, Bradaric Z (to Everyone):** 16:44: @Brian: thanks for info.

**Sea ID (to Everyone):** 16:46: excellent technique, Evert. Excellent insight.

**David Millar - Fugro (to Everyone):** 16:47: Agreed. Very important issue and an appropriate / necessary approach.

**Sea ID (to Everyone):** 16:47: @Svein : we asked for such an API during the last meeting. Would you be willing to provide such a mechanism with your data?

**Brian Calder (to Everyone):** 16:47: @Svein: you might be interested in the work that I presented at CHC'20 in February, which does exactly this. There wasn't a required paper, but I'm happy to send you the presentation with notes.

**Steve Monk (to Everyone):** 16:48: Politics will never keep up with technology but anything which can be done to help is a step in the right direction

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 16:48: Agree, Steve

**Steve Monk (to Everyone):** 16:50: If necessary, use the environmentalists to explain to the governments what the cost of a clean-up operation costs. Didn't we mention getting 'Greta' involved at the last meeting...?

**Croatia HO, Bradaric Z (to Everyone):** 16:50: @Matt: Nice to hear regarding the CTD plans.

**Pete Wills (Canada) (to Everyone):** 16:51: @Evert Maybe we can leverage member states on-board with the International Open Data Charter.

**Svein Skjaeveland, Electronic Cart Centre (to Everyone):** 16:51: @Sea ID: We would like to explore the possibility for creating such a service - figuring a scenario where the HOs could be notified/provided a report when CSB data of interest enters the DCDB

**Evert Flier (to Everyone):** 16:51: I like that Pete!

**MaryRose Sheldon (to Everyone):** 16:52: @Svein: Would we want to be notified of discrepancies of only critical features like obstructions or dangerous shoals? Or would we be notified of all hydro discrepancies? And if so, what if the hydro discrepancy is that where a CSB "survey" would overlap a CATZOC A. Would we still want to overwrite that CATZOC A with CSB data, calling it "best available" or more recent?

**Sea ID (to Everyone):** 16:52: @svein just purely for the exercise, we'd be willing to spend the time on this. Let's talk offline and see what we can do by the next meeting

**Svein Skjaeveland, Electronic Cart Centre (to Everyone):** 16:52:

@Brian: Absolutely interested if you would share your presentation. Thank

you!

**MaryRose Sheldon (to Everyone):** 16:52: @Brian Calder: would you mind also sending me your presentation from CHC'20?

**Brian Calder (to Everyone):** 16:54: @Svein, @MaryRose: yes, no problem; DM me a preferred e-mail address.

**Pete Wills (Canada) (to Everyone):** 16:55: We have been using Pydro tools to compare data with the ENC.

**Giuseppe Masetti (DGA) (to Everyone):** 16:55: @Pete: I will touch on that tool (CA Tools) in my slides.

**Andy Talbot - UKHO (to Everyone):** 16:56: Hi Pete, I would be interested to learn more about your use of Pydro to compare data to ENCs.

**Rogier Broekman (to Everyone):** 16:56: @MaryRose, I believe that CSB is only a sample of a greater area. CSB is single beam data, CATZOC is a larger area with full coverage. CSB can signal depth inconsistencies, I would not use it for identification of isolated objects dangerous to navigation.

**Giuseppe Masetti (DGA) (to Everyone):** 16:57: @Andy: here you can read the original paper: <https://www.mdpi.com/2220-9964/7/10/392>

**Sea ID (to Everyone):** 17:02: excellent, Jens!

**Andy Talbot - UKHO (to Everyone):** 17:03: @Rogier. I'm not sure CSB is SBES only. Our definition does not rule out MBES. In this meeting we have mentioned MBES systems being fitted to non-survey vessels. Who knows how things might be in the future, MBES systems may be fitted to a large percentage of non-survey vessels. It's something we need to consider going forward.

**NGA USA Debbie Peterson (to Everyone):** 17:03: Pete, I would also be interested in the Pydro method. I am not familiar with it, and NGA would like to learn about it as we transition from DNC to ENC.

**Sea ID (to Everyone):** 17:03: Please can we do this together? Could we make this an action point?

**Svein Skjaeveland, Electronic Cart Centre (to Everyone):** 17:04:

@MaryRose: I think different set of criteria can be identified and used to provide the information interesting for the HO. It would be for the HO to decide whether the information provided will lead to ingestion of CSB data in their products or new surveys conducted.

**Tim Thornton, TeamSurv (to Everyone):** 17:04: @Andy have a look at commercial fishing vessels. Even surprisingly small ones are fitting WASSP MBES - we used them for some of our data off the Welsh coast

**Rogier Broekman (to Everyone):** 17:05: @Andy, agreed, but in general CATZOC area is far bigger than a single swath of MBE. You would be very

lucky to accidentally sail exactly over an underwater rock or wreck.

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**Matt Zimmerman - FarSounder (to Everyone):** 14:22: what is the transport method of sending data to these other collections? I mean, is it same format as we are doing as a trusted node?

**Matt Zimmerman - FarSounder (to Everyone):** 14:24: What about the idea of going the other way as well? i.e. trusted nodes already have a network interface to DCDB

**Anders Bergström (to Everyone):** 14:29: Great, love to see that taking form and participate.

**Steve Monk (to Everyone):** 14:29: I'm happy to draft the text for the Superyacht community

**Steve Monk (to Everyone):** 14:30: Oh, seems I'm already nominated :-)

**Matt Zimmerman - FarSounder (to Everyone):** 14:30: who do you have for the last bullet?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:31: @Matt - no one

**Rogier Broekman (to Everyone):** 14:33: Navy vessels can send their data to their national HO. Wonder if a warship wants to do that?

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 14:33: What about the academic sector ?

**Steve Monk (to Everyone):** 14:33: Include Coast Guards and coastal rescue authorities (eg. RNLI)

**Andy Talbot - UKHO (to Everyone):** 14:34: software & hardware sector?

**Pete Wills (Canada) (to Everyone):** 14:35: Government science vessels is a good point. They need to think about collecting bathymetry by default.

**Matt Zimmerman - FarSounder (to Everyone):** 14:37: A good differentiation between "super yachts" and "leisure" could be those vessels "with crew" vs "without crew"

**Anders Bergström (to Everyone):** 14:39: Also maybe add companies doing LIDAR surveys (eg Hexagon), Satellite surveys and ports, marinas that also do surveys that not always end up with HO or public.

**Tim Thornton, TeamSurv (to Everyone):** 14:40: @Matt some boats as small as 40' LOA have paid crew

**Matt Zimmerman - FarSounder (to Everyone):** 14:41: @tim yes, but there is a totally different mentality between crewed and uncrewed private vessels.

**Matt Zimmerman - FarSounder (to Everyone):** 14:41: @jennifer, I can assist with Cruise ships

**Tim Thornton, TeamSurv (to Everyone):** 14:42: @Olex were involved early on, and offered all of their data and data collection, but pulled out due

to the difference between commercial and committee ways and time scales of doing things!

**Brian Calder (to Everyone):** 14:42: @Matt: QPS have a (current experimental) SDK for their QPD files, which they might be willing to make available for people to use to get at the data. It wouldn't be hard to use it to extract useful data and reformat for DCDB ingest. I guess the question might be whether people that can afford Qimera need help in submitting their data, since they tend to be professional surveyors and doing it under contract for someone?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:42: Thank you, Matt!

**Anders Bergström (to Everyone):** 14:43: We will be happy to participate in leisure and yachting

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:43: Thank you, Anders.

**Matt Zimmerman - FarSounder (to Everyone):** 14:44: @steve, sure, we can help on yachting too

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:44: Thierry? Would you be up for leading the academic sector?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:44: Pete? Jens? HOs?

**Tim Thornton, TeamSurv (to Everyone):** 14:44: @I'd suggest moving submarine cables in to surveys, as in our experience you are talking to survey crews for this. Also, I'd suggest a specific lead on commercial fishing, as the routes to contact them and the "What's in it for me" is quite different from other sectors.

**Brian Calder (to Everyone):** 14:45: Jonathan Amos @BBC Science is the most likely point of contact for a story --- he's very active talking about the ocean, and always attends the AGU, for example.

**Pete Wills (Canada) (to Everyone):** 14:45: ASV/AUV (drones) survey companies would also be a potential contributor and would fit in Geophysical section.

**Steve Monk (to Everyone):** 14:45: As mentioned:

<<https://www.bbc.co.uk/news/science-environment-53119686>>

**NGA USA Debbie Peterson (to Everyone):** 14:45: I would be happy to work with Jens and Pete on HO aspect.

**Steve Monk (to Everyone):** 14:45: @Brian - that's exactly who did the article and I'm happy to engage with

**Andy Talbot - UKHO (to Everyone):** 14:46: I'm also happy to work with Pete and Jens on HO text.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:46: @Debbie. Thank you. I'll put you 3 down :)

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:46: And Andy!

**Tim Thornton, TeamSurv (to Everyone):** 14:46: @I'd be happy to help with the leisure sector

**Brian Calder (to Everyone):** 14:47: @Jenn: I'm happy to help with the academic sector.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:47: Thanks, Tim!

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 14:47: @Jen: A bit tricky, would be better to find somebody coming from the academic field.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:48: @Thierry. Brian has volunteered. Perhaps you can still provide perspective. I'm also thinking Colin Devey.

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 14:49: OK will have a look with Brian and Colin

**Anders Bergström (to Everyone):** 14:50: We will be happy to put the summary guide in our product delivery of depth sounder product

**Matt Zimmerman - FarSounder (to Everyone):** 14:51: yes, consistent editing is a GREAT idea

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:52: @Matt. 100% agree

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:52: Thank you, Anders

**David Millar - Fugro (to Everyone):** 14:52: I am happy to take on or help with Submarine Cable. It is a small sector, with only 4 or 5 companies involved. They are customers of Fugro and we are already talking to them and their industry association (ICPC) about CSB.

**Croatia HO, Bradaric Z (to Everyone):** 14:53: I can join the Peter HOs section as a volunteer

**Pete Wills (Canada) (to Everyone):** 14:54: Suggest the guides can be used as a template for specific countries/companies perspectives to make it easier to adopt.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:54: Thank you David and Bradaric!

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 14:54: Great suggestions, Pete

**Pete Wills (Canada) (to Everyone):** 14:57: @DavidW how are supporting documents considered wrt an official IHO document

**Thierry Schmitt, DOPS/STM/BATHY (to Everyone):** 14:58: For information, I'm in the processing of translating B-12 in French. The translation should be ready by the end of the summer. I see that translation of B-12 (and/or community guidance document) in other language should be valuable .

**David Wyatt - IHO (to Everyone):** 15:07: Translation of the material will be highly valuable and most welcome. The summary guide will have no official status as it will be viewed as an information leaflet, in the same manner that IHO PR leaflets covering 'benefits of hydrography' and 'why join the IHO'.

**Yukari Kido (to Everyone):** 15:08: related paper published as:

**Yukari Kido (to Everyone):** 15:08: Novaczek E, Devillers R, Edinger E (2019) Generating higher resolution regional seafloor maps from crowd-sourced bathymetry. PLoS ONE 14(6): e0216792.

<https://doi.org/10.1371/journal.pone.0216792>

**Croatia HO, Bradaric Z (to Everyone):** 15:12: What the CATZOC category wants to achieve in this CSB data project?

**Rogier Broekman (to Everyone):** 15:16: It cannot be better than CATZOC B. For A1 and A2 full area search undertaken is needed.

**Rogier Broekman (to Everyone):** 15:21: DQWG statement: Good data quality does not mean that the quality of the data has to be good, it means that the end user is well informed how good the data is.

**Rogier Broekman (to Everyone):** 15:22: Credibility is a combination of accuracy and legacy. For that reason in S-101 the attribute 'Temporal variation' has been included in the data model for CATZOC.

**Pete Wills (Canada) (to Everyone):** 15:24: comparatively validating new point data with other legacy point data is one of the biggest challenges for HO. Much of the world's data is point data.

**Evert Flier (to Everyone):** 15:25: Good points Rogier

**Rogier Broekman (to Everyone):** 15:25: We spent many hours over several years in the DQWG discussion this...

**Pete Wills (Canada) (to Everyone):** 15:29: We had some discussion of the chartable threshold. A past Canadian Dominion Hydrographer said "a shoal is a shoal is a shoal". We agreed the dotted line indicates this is variable.

**Steve Monk (to Everyone):** 15:32: If the CSB data isn't put on the 'official' charts but 'unofficial' providers such as Transas TX97, C-Map Pro+, Garmin, Navionics do put it on their charts, guess where the mariner will go for their information - even if they know it's not official.

**Steve Monk (to Everyone):** 15:33: I appreciate DQ varies within that CSB

**Evert Flier (to Everyone):** 15:33: Very true Steve.

**Anders Bergström (to Everyone):** 15:34: @Steve and many others. If you can't beat them join them

**Rogier Broekman (to Everyone):** 15:35: When you have a S-44 survey the accuracy is being lost in translation to the CATZOC value in the chart.

See the documents on national methodologies from survey to CATZOC.

**Tim Thornton, TeamSurv (to Everyone):** 15:36: @Steve that's why no small craft in the UK carry UKHO charts any more, and in countries where HO charts have to be carried they are just under the mattress of a bunk!

**Croatia HO, Bradaric Z (to Everyone):** 15:36: Evert I complete agree about importance of metadata info.

**Pete Wills (Canada) (to Everyone):** 15:37: There is also the notion that CSB has to co-exist with chart data. Perhaps S-100 needs an overlay layer of unofficial data.

**Steve Monk (to Everyone):** 15:38: @Tim - it's worse than that, I know of 110m yachts ignoring the official charts as they're so full of voids and saying 'no' to an owner on where they want to go is a career ending decision for Captains.

**Rogier Broekman (to Everyone):** 15:38: If you have a S-102 layer already existing, CSB as additional overlay seems like overkill. Using S-101 and S-102 at the same time is already a challenge.

**Steve Monk (to Everyone):** 15:40: @Jenn - happy

**Tim Thornton, TeamSurv (to Everyone):** 15:40: @Steve yes, I was on a brand new British warship a couple of years ago, and in the bridge they had a prominent Raymarine chartplotter to fill in the pieces that HO's haven't, even with the AMLs

**Croatia HO, Bradaric Z (to Everyone):** 15:40: Pete, agree, better as separate layer then mixed with official.

**Sea ID (to Everyone):** 15:40: <https://wiki.sea-id.org/login/request>

**Evert Flier (to Everyone):** 15:41: Thank you Tim and Steve. It is these experiences you share that should open the eyes of HO's and remain relevant for all mariners, not just those with ECDIS carriage requirement.

**Emma Wise (to Everyone):** 15:41: Separate S-100 - type layers are already happening in the commercial world. Mariners are using them for planning as opposed to actively navigating on them and the service is proving invaluable

**Matt Zimmerman - FarSounder (to Everyone):** 15:42: @ken, here's a nice summary of Markdown syntax:

<https://daringfireball.net/projects/markdown/syntax>

**Pete Wills (Canada) (to Everyone):** 15:42: Mariners prefer to use official products but they have to be updated quickly. If not they will use something unofficial.

**Sea ID (to Everyone):** 15:42: thanks matt, well aware of John Gruber's work :-)

**Yukari Kido (to Everyone):** 15:43: Thank you! great!

**Tim Thornton, TeamSurv (to Everyone):** 15:43: @Evert - just remember that we reckon there are 10 million seagoing vessels with depth sounders, all of whom could contribute to CSB. Those using ECDIS are just a tiny minority, though their depth sounders mean they can generally capture data for deeper waters

**Sea ID (to Everyone):** 15:44: Let the signups for the wiki come! :-)

**Croatia HO, Bradaric Z (to Everyone):** 15:45: Pete, agree, if consider need for a quickly updating to the depths dangerous for surface navigation.

**Tim Thornton, TeamSurv (to Everyone):** 15:45: @Pete, in my experience they want to use an electronic plotter/tablet/laptop/PC, generally with vector charts. At present HO data for these systems is either absent or raster - very few want to forego the revenue stream of high priced S-57/100 charts to a price that the small craft sector will use them

**Tim Thornton, TeamSurv (to Everyone):** 15:47: @Pete, @Bradaric, you may find it illuminating to wander round your local yacht marina one day and ask the sailors what they use and what they think of official products

**Croatia HO, Bradaric Z (to Everyone):** 15:56: @Tim, I don't think that yachts are only ships navigate worldwide, and marinas are only ports. But of course, I agree that they also should be adequately charted by official data.

**Pete Wills (Canada) (to Everyone):** 15:56: @ Tim. Agree with you. We find the small craft needs and large vessel needs difficult to manage and our two very distinct communities.

**David Wyatt - IHO (to Everyone):** 15:57: Please share everybody, it is on Facebook, LinkedIn and Twitter.

**Sea ID (to Everyone):** 16:00: a graphic's team at NOAA not using sharpies either!

**Tim Thornton, TeamSurv (to Everyone):** 16:00: @Bradaric, I agree with your last post. The point I'm making is the difference between your opinions of what small boat users use and want to use, and the reality

**Sea ID (to Everyone):** 16:00: excellent work!

**Tim Thornton, TeamSurv (to Everyone):** 16:01: @Pete yes, they are very different markets, and I don't think what I've seen of the structure of HOs suits them to the small craft sector either, so perhaps best left to the commercial sector?

**Anders Bergström (to Everyone):** 16:06:

<https://www.prnewswire.com/news-releases/global-submarine-optical-fiber-cables-markets-report-2019-with-profiles-of-100-key-companies-300901530.html>

**Croatia HO, Bradaric Z (to Everyone):** 16:12: @Tim, yes diff markets, but

in terms of the SOLAS conv. it shouldn't make the difference between safety of mariners on small (leisured/yachts) boats and big ships (SOLAS) in relation to the official/unofficial charts. Fortunately, it is up to the national regulator.

**Tim Thornton, TeamSurv (to Everyone):** 16:16: @Bradaric except the data requirements are very different - how many ships need detailed data of 1 - 2m depth on their charts, and how many small craft of depths over 5m, for example?

**Croatia HO, Bradaric Z (to Everyone):** 16:22: @Tim, Depends of navigation areas and intended and recognised nav routes. Having in mind those and other criteria the national charting authority make plans for systematic hydrographic (re)survey and chart productions and updating the existing official Charts.

**Rogier Broekman (to Everyone):** 16:28: Coastal States only have 50% of their water surveyed. Do they then assign CATZOC = U to their charts for the corresponding areas?

**Croatia HO, Bradaric Z (to Everyone):** 16:29: @Tim,..whether they are intended and tailored for use on boats or ships.

**Sea ID (to Everyone):** 16:29: correct, Tim.

**Pete Wills (Canada) (to Everyone):** 16:31: @Rogier U=unknown or unassessed?

**Croatia HO, Bradaric Z (to Everyone):** 16:31: unassessed

**Rogier Broekman (to Everyone):** 16:31: U = unassessed (should be avoided if possible)

**Pete Wills (Canada) (to Everyone):** 16:32: Yes. Unassessed is no longer supposed to be acceptable. Correct?

**Tim Thornton, TeamSurv (to Everyone):** 16:33: @Bradaric, the point is you don't have the data on your charts, and most countries have no plans to cover it in their survey and chart publishing schedules as their primary focus is commercial shipping and defence

**Matt Zimmerman - FarSounder (to Everyone):** 16:33: It would be great to compile a list of specific reasons why participation helps with global sustainability.

**Steve Monk (to Everyone):** 16:34: Ironically much of the water just a few miles to the east of Monaco and less than a mile offshore is 'U'. Who's going to tell the yacht owners to be careful there! Good job its deep water. We think.

**Tim Thornton, TeamSurv (to Everyone):** 16:35: @Matt yes for those who will benefit from "green" press releases, but is that relevant to most commercial concerns that don't have direct contact with consumers who

care about such things?

**Rogier Broekman (to Everyone):** 16:35: There is a guideline that unassessed should no longer be used. However CATZOC = D is almost the same, no guarantees (may exceed 500m, may exceed 2m +5% of depth). Deeper than 200m can be classified as Oceanic in S-101.

**Heath Henley (FarSounder) (to Everyone):** 16:38: Perhaps compile it as page in the Wiki?

**Croatia HO, Bradaric Z (to Everyone):** 16:39: @Tim, your point about CRO data is not worthy to comments. I can understand reason of your way of communication which is so far from mine.

**Pete Wills (Canada) (to Everyone):** 16:40: Don't we have this list already. Maybe we need a matrix mapping the list to communities?

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 16:40: @pete - where would that list be?

**Pete Wills (Canada) (to Everyone):** 16:41: I was thinking of Robert Ward listing off a bunch of factors.

**Matt Zimmerman - FarSounder (to Everyone):** 16:43: I don't think any of us here doubt there are sustainable values, but as part of our outreach could use those specific cases

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 16:44: Agree, Matt. I can work with Jamie to get those responses when the survey is complete.

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 16:48: @Matt. "white paper" is being using loosely here. We just need the points you're making captured so we can give to the WG ahead of our next meeting for preparation for discussion. That's all. Very informal.

**Matt Zimmerman - FarSounder (to Everyone):** 16:49: @jennifer, sure thing!

**Tim Thornton, TeamSurv (to Everyone):** 16:53: As an aside, Navionics started their CSB and open data projects to see if they could get enough data themselves so they could cut the costs of licencing data from the HOs

**MaryRose Sheldon (to Everyone):** 16:55: Thank you David!

**Steve Monk (to Everyone):** 16:55: Tom said you could use his picture instead of mine

**Jennifer Jencks (DCDB/NOAA) (to Everyone):** 16:56: ha!

**David Millar - Fugro (to Everyone):** 16:56: Marta - You did a great job moderating!!

**Raymond Sawyer USA Naval Oceanographic Office (to Everyone):** 16:57: It has been a pleasure working with this group. Good bye and good luck with CSB!

**David Millar - Fugro (to Everyone):** 16:59: I have to run to another

meeting. Thank you Jennifer, Marta and David on a great meeting. Very informative and productive!! Thank you and thank all participants.

**Anders Bergström (to Everyone):** 16:59: Maybe we can meet more often :-)

**Evert Flier (to Everyone):** 16:59: Great meeting, thanks everyone!