

13th Meeting of the IHO Crowd Sourced Bathymetry Working Group

Report

9 – 12 January 2023

(Paragraph numbering is the same as the Agenda Item numbering and does not necessarily reflect the order in which matters were discussed)

1. Welcome and opening remarks

1.1. Welcome and opening remarks

The chair opened the meeting and provided welcome remarks. She recapped the recent successes of the completion of B-12, 2 page flyers and RHC Engagement. She gave an overview of the content of the meeting of which key elements were to be reviewing previous activity and strategic planning.

The IHO Sec offered his congratulations for completing the review of B-12 Ed.3.0.0 noting it represented nearly three years work, much of which had been achieved through remote working. He reflected that the challenge for the group is “what’s next?” He noted that the focus of this meeting would be strategic planning and reminded the group that they were at liberty to consider their current mandate and work plan and critically appraise whether updates were required.

1.2. Domestic and Administrative arrangements

The hosts provided a brief on safety and domestic arrangements and the IHO Sec reminded the group of the normal meeting protocols. He advised the group that the report from the meeting would focus on actions and decisions, with links to presentations rather than summaries.

1.3. Introductions, apologies and approval of agenda

Introductions were made. Apologies received from Thierry Schmidt. Agenda was adopted unchanged.

Decision 1. Agenda adopted

1.4. Approval of CSBWG12 report and review of actions

CSBWG12 was tabled and approved. The CSBWG Actions were reviewed and updated where required. Several items were noted for discussion during CSBWG13.

Decision 2. CSBWG12 report approved

1.5. Chair Report to IRCC14

1.5.1. Outcomes and actions from IRCC14 - [Report](#)

The Chair went through the presentation made to IRCC14 and noted the actions that were requested of them. She highlighted the key component being the request for endorsement of B-12 Ed 3.0.0 ahead of submission to Member States (MS) for approval.

1.5.2. Review of ToRs and RoPs

It was noted that the ToRs and RoPs were available on the website but that their review would come after completion of the strategy sessions.

1.6. UN Decade of Ocean Science for Sustainable Development Calls for Action

The IHO Sec gave an update on the 4th call for action from the UN Decade of Ocean Science for Sustainable Development. He noted that the CSB initiative could be a good fit but that the deadline for submissions was the 31st January. He noted that this could be a significant piece of work as the work of the CSBWG is not programmatic in nature, so this structure would have to be developed before the proposal could be written. He suggested that this idea be parked until the strategy sessions had been completed as it may arise as an outcome of these deliberations.

2. B-12 review

2.1. New CL discussion following publication of B-12 Ed 3.0.0 (CSBWG12 Action 3)

The Chair noted that this was an action item from CSBWG12. The IHO Sec advised that there would have to be a clear rationale for releasing another CL on essentially the same topic, as the previous CL was still in force and could be referred to as required. There was a suggestion that a new CL should be sent because of the new version of B-12 and the change of CC0 license to DCDB. IHO Sec advised that if the group wished to go down this route the a request would have to be made to IRCC, but that he expected that the new addition of B-12 would not be enough of a justification and that the update to the licensing of data in DCDB was outside of the scope of the CSBWG. If a new CL is not advised, GM asked IHO DCDB to evaluate the handling of data licensing before B-12 3.0 and inform the WG in future meetings.

2.4. Related discussion topics from CSBWG12 - [Report](#)

Georgianna Zelenak (GZ) introduced the item and gave a brief on the two items that needed further work; these being inclusion of encoding information and the need for controlled vocabulary.

2.4.1. Topic 12 – Inclusion of Encoding Information

Brian Calder (BC) went through JSON encoding and JSON encoding schema and explained some of the challenges with using JSON. He noted that B-12 states what should be encoded, but doesn't make clear how to encode it. He updated the group on the work that had been undertaken to produce such a schema and provided a brief overview of the repository. He advised the group that CCOM has offered to stand up a public repository, including the schema and validation tools.

The group discussed the proposal and a number of considerations such as privacy/protection of personal information, where the location of such a repository should live (Inside or outside the management infrastructure of IHO), relationship with B-12 (in terms of co-management) and whether this would be a mandatory tool or merely a resource for those Trusted Nodes (TN) (or other data suppliers) that wished to use it.

IHO Sec reminded the group that the proposal will need to go to IRCC for review. The standard position for IHO is to favour keeping working material within the management infrastructure of the IHO. If the group are to propose that the repository will remain under CCOM, a very clear rationale (to people less familiar with this initiative and tech) would need to be provided.

Action 1. Create a task group to refine GeoJSON Schema proposal and report back to CSBWG14

Action 2. Consider the implications of GDPR rules

2.4.2. Topic 13 – Controlled vocabulary

Item discussed in previous agenda item.

2.4.3. Extra/new supplementary documents to compliment B-12

The Chair recapped that in revising B-12, some annexes had been removed and were now being managed as standalone documents within the DCDB framework.

3. Strategy Session 1 Review of where we are today

Chair introduced the plan for the strategic planning. She introduced the session and explained the aim was to first take stock of where we are today and to have a baseline so that we are in a position to develop our plan going forwards.

3.1. Recap of the ToRs

The chair went through the key tasks contained within the ToRs which are:

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

It was noted that there is no CSB definition in S-32. This is important for us to explain that this is not just data collection, rather its onward use for any purpose for which it is useful. An initial discussion was had regarding the existing mandate. It was noted that much has changed and that the ToRs may need to be updated following the strategic plan development.

It was noted that the existing definition of CSB was necessarily narrow so that it didn't alienate some stakeholders. Having said this, there was acknowledgement that this could change over time, but we would have to be careful not to lose the support of these groups

It was also noted that the key tasks don't obviously recognise the role of industry or the end users and that it would be useful to have wording that speaks to data collection currently broader or more sophisticated than our current definition. The group undertook to constantly explore what could be included in the future.

3.2 Review of actions

The group went through all existing actions and removed, update or resolved as required.

3.3 What has worked well and what hasn't worked well

The Chair led the group through the exercise and the following results were captured.

Worked Well

- B12 developed
- Joint efforts describing how you can contribute
- good job building the infrastructure (DCDB pipelines, initial trusted nodes, b-12)

- a consistent applied effort to include all relevant stake holders (HOs, industry, academia, etc). Very committed and involved members.
- Flyers created
- Establishment of CSB Coordinators for RHCs; CSB is a standing item on RHC annual reports/agendas
- Circular letters about acceptance of CSB raised the subject, got it discussed and has formalised the standpoint of MS
- success in demonstrating how a successful project can be done (eg: Rob Beaman).
- It has been demonstrated that data collected can be done inexpensively (ie: WIBL)
- demonstrated through SB2030 that in certain regions that this can be done
- VTCs involved many more contributions to B12 - more transparent & inclusive!

What has not worked (yet)

- the sensitivity of how CSB is regarded has put limitations on how we define it;
- national positions have been applied globally
- 7 years in and we're still struggling to get the word out there and the number of vessels to grow in data gathering
- putting a proof of concept out there to show other HO's how to put CSB on the chart
- Getting CSB through HO validations processes
- A best practices still doesn't exist
- Covid slowed our roll
- Inclusion of MBES and other valid sources of bathymetric data.
- Expanding beyond the single branch leader (eg: Fugro, PGS, Carnival)
- Many coastal states still believe this data is proprietary.
- The answer to the question, "how can i participate in CSB gathering/contributing", is still too difficult to answer.
- Have not been able to tell the story of how we're going to use all of this data...what this data will actually be used for.
- Providing feedback (including DATA) to contributors describing positive impact
- Still haven't written the story to clearly answer "why is CSB important"
- Cooperation needs to improve b/w CSBWG, GEBCO, SB2030
- Buy in is one thing, once loggers have been installed, the interest and/or technical know-how is not always continuous.
- Continuous feedback support and interest is often not maintained
- Do we need to revisit whether to use the phrase 'citizen science' more widely as well as 'CSB' to promote? Would people find this more relatable?
- Many MS look to their PCA for guidance/assistance. Focus has not been directed to the PCA.

4. USE of CSB – external and internal

Evert Flier (EF) introduced the topic. He recapped that the primary drivers for both GEBCO and the Nippon Foundation – GEBCO Seabed2030 Project (SB2030) are that there remain areas that need to be mapped, and there is existing data that should be shared. With CSB, he reflected that there is a significant way to go in convincing the HO

community that CSB is a valuable tool in the box. In terms of the current situation he noted that:

- There is an increased recognition and appreciation of the value of public access to seabed knowledge;
- Increased CSB activities worldwide which can no longer be ignored;
- Professional navigators increasingly use CSB instead of official nautical charts in remote areas;
- Scientific community has for a long time embraced CSB.

In terms of the desired situation he postulated that:

- CSB needs to be recognised by the HO community as a valuable additional tool for mapping remote areas or those where HOs lack resource;
- Demonstrate more and better use cases for CSB both for safety of navigation and for other purposes;
- Have the IHO CSB initiative be endorsed as a UN Decade activity project in support of achieving a fully mapped ocean
- Get better clarity over some of the legal issues inhibiting

In the following discussion it was noted that the CSBWG has a low percentage of members from HOs compared to other IHO WGs. Further, it was questioned to what extent the group actually understand the challenges faced by HOs with regard to CSB. It was noted that there is a perception that the MSR provisions in UNCLOS are a barrier and how this interacts with national law needs to be considered.

It was noted that the lack of standardisation or uniformity of CSB data presents a challenge for HO's to work with it in navigational products. A comparison was made to the pilot project run by the UKHO to use Satellite Derived Bathymetry in Navigational Products and perhaps something similar was needed for CSB. It was also suggested that the utility of CSB data be made clear to HSSC. Concern over to what extent CSB should be standardised given this would likely affect who and how participants get involved. Further, it was noted that for issues of data quality, existing standards such as S-44 should be used, and if this requires adapting those standards to accommodate the description of CSB data then this should be undertaken. It was suggested that a dedicated sub-group of the CSBWG could be formed to focus on HO related concerns issues. In closing, IHO Sec suggested that HOs are not just consumers of CSB data, they are key stakeholders in the decision making process of whether CSB is even permitted in waters under national jurisdiction.

5 Perceived barriers to CSB

Vice Chair introduced the session as to identifying perceived barriers to scaling CSB. This was an interactive session where participants were invited to brainstorm potential barriers. Following this exercise, 6 recurring themes were identified:

1. National Policy/Lack of Government Support

2. Lack of HO resources/Low priority
3. Lack of a standard support system for TNs
4. Technology: complex data cycle
5. Communications
6. Unclear/Lack of rewards/Incentives

6. Strategy Session 2: A Review of the evidence

Following the identification of the 6 high level barriers, the group were led through another interactive session where solutions that would help overcome these barriers were identified. These solutions were later refined into a list of Key activities or work items.

Barrier #1 National Policy/Lack of Government support

To set the scene, the Chair invited the IHO Sec to give a brief on the UN Early Warnings For All Initiative (EW4All) which is being led by the WMO. He explained that this initiative would require extensive nearshore bathymetry that CSB could help provide. As a consequence, he would be making a representation to the WMO SC-MMO in February and requesting that the WMO MS lobby within their respective governments to allow CSB within waters under national jurisdiction. He cited this as an example of activity that could assist in overcoming some of the barriers identified.

Action 3. IHO sec to make representation at SC-MMO re. the CSB problem and the need for near-shore bathymetry

Potential solutions:

- Clearer understanding of UNCLOS
- Understanding of where issues lie - collection vs distribution
- Understand the spectrum of issues HO have with CSB
- Get local media involved to influence public acceptance and interest in CSB, which will drive public and government support
- Outreach/engagement/understanding efforts that need to be aimed much higher in the MS governments (eg: disconnect b/w UN Decade endorsement and resistance to CSB)
- Demonstrate the strategic value of the addition of CSB data to government agencies / departments in the understanding of their nation's waters
- Submitting IHO CSB Initiative as UN Decade action
- Outreach re. grants or funding mechanisms
- Connect capacity building w/ CSB activity (especially in regard to funding mechanisms)
- Quantify the net savings for governments in the use of CSB data countered against their own HO survey efforts or sovereignty initiatives

- Quantify the potential net savings in recovery from a natural disaster or event (ie: tsunami, search and rescue event)

Key Activities Identified

1. Submit IHO CSB initiative as a UN Decade Action
2. Establish a subgroup to consider HO-specific issues/opportunities related to CSB

Barrier #2 - Lack of HO resources/Low HO priority

Potential solutions:

- Demonstrate the 80% solution of CSB data as a stop gap to proper, complete surveying = greater acceptance of CSB
- Reduce the need for resources. Eg: improve/implement automation of processes.
- Greater autonomy of the input of data scanning at HO's achieved by high confidence in the equipment onboard
- Collaborative Open Source Automation Tools for data validation
- Have HOs "certify" CSB solutions and specific Trusted Nodes and vessels to a certain quality level for data acceptance
- Improve messaging around the de-linking of CSB data for the chart vs CSB data for other uses
- demonstrate how CSB can help HOs monitor drought induced climate issues (low water level) and how that affects economic activities within their internal water.
- Propose a resolution to Assembly 3 acknowledging that CSB is crucial to the IHO's contribution to the UN Decade of the Ocean and GEBCO
- Request HOs that allow CSB in their territorial sea to report out at RHC meetings how they are using and support CSB initiatives. It may focus resources in CSB initiatives.
- Employ more staff
- Get CSB providers to tell the HOs that they're contributing with the expectations of seeing their contributions on a chart or similar bathy map.

Key Activities Identified

1. Establish a subgroup to consider HO-specific issues/opportunities related to CSB
2. Support CSB/SB2030 Coordinators in their RHC engagement
3. Establish a sub group of active Industry CSBWG expert contributors to discuss potential software tool support to HOs

Action 4. Draft a resolution for consideration by A3 relating to the IHO's commitment to the UN Decade via GEBCO and CSB

Barrier #3 - Lack of a standard support system for TNs

Potential solutions:

- Implement UNH's metadata validation tool and associated repo.
- Dedicated TN liaison
- Generating a template for an onboarding process (perhaps based off previous integrations).
- Creation of a TN community
- creating/supporting a communication channel for various TNs to collaborate with each other (e.g., <https://github.com/oceanmapping/community/wiki>)
- Improve communication docs that provide more general info on how potential data collectors/TNs can get involved.
- 'Buddy/mentoring' system? i.e. put those interested in becoming a TN in touch with another one to discuss processes etc.
- Funding support and certification for TNs
- Offer up an example TN implementation toolbox
- Provide FAQ Forums
- TN of the year
- Develop guidance on how to start a CSB initiative-- from generating the crowd to becoming an official TN at DCDB.

Key Activities Identified

1. Establish a subgroup of current TNs to clarify needs

Barrier #4 - technology: complex data cycle

Potential solutions:

- Clear itemization of each of the steps by diagramming
- Open source tool sharing for processing of CSB (tides? Uncertainty? Transducer draft? Interpolation best practices?)
- Tutorial / Walk-Throughs - Either as a Loom or README
- Determining what is that product(s) that is of value to the data providers and to the consumers. Identifying the product generators that should be a part of this process.
- Create a reference of the loggers, industry etc that are involved

- A "cradle to grave" roadmap to fully understand, appreciate and budget for all that is involved. (Hardware, transmission, cloud based storage, management, etc.)
- Have we involved enough the low hanging fruit like eg. ECDIS manufacturers, sounder manufacturer, VDR manufacturer etc. They are a key to easiness
- How about having a notification systems for contributors when their corresponding TNs submit and ingest data into DCDB ?
- almost like an app store that provide all the various solutions for all the various potential projects
- Create Working Groups focused on the clarification, and development of the various steps.
- DCDB should encourage USERS of bathy data to provide feedback loop on how the CSB data was used in research or product development

Key Activities Identified

1. Create Sub Group focused on the clarification, and development of the various steps.

Barrier #5 – Communications

Potential solutions:

- Can IHO propose a World Hydro day theme related to " CSB" ?
- Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)
- Define the potential social, environmental and economic benefits of CSB
- Express the vision of CSB (generate a "North Star" for this initiative) that can be communicated to the public
- Develop case studies and post on the IHO website
- More postings on the LinkedIn CSB group and connect it to your network.
- Present CSB at industry conferences and workshops
- Provide a marketing focused website separate from teh current CSBWG webpage on the IHO site.
- Backlog/roadmap that provides an opportunity to capture requested requirements for the data pipeline/DCDB work.
- Make sure CSB "wins" are distributed to appropriate media channels
- Can IHO youtube channel (if it exists) create a short video on CSB?
- Use "issues"/wiki function on proposed CSBWG github
- Get CSB data holdings known to the larger data science community (kaggle, etc...)
- Develop 2 pagers further by drafting sector specific articles for trade/sector specific publications. i.e. targeted but inclusive approach
- Make use of Hub Site. Could include a Story Map, pre-canned info, etc.

- Stand up a sub-WG to coordinate the Comms Plan with other groups. Stage 1 would lay out how to engage, who to engage with, etc...
- Show positive outcome of CSB data (products) even if CSB not to develop them.
- Is there a way to reach out/find Academia (students) who may be using CSB for advancing scientific knowledge? This can help CSB's showcasing efforts.
- Utilise SCOPE (and SCET?)
- Show positive outcome of CSB data (product) even if not developed by us.
- Getting those who are contributing (vessel owners) to give interviews on why they're doing so and what they're getting out of it.
- Demonstrate value of CSB to those that are directly contributing and let them spread the word on why others should contribute as well.
- Better visualize the CSB data for public awareness / interest
- Partner with Citizen Science Association and present at their conference.
- Develop focused materials for higher levels of govt (eg: brief slide decks)

Key Activities Identified

1. Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)

Barrier #6 – Unclear/Lack of Rewards/Incentives

Potential solutions:

- Certification/Badge given to Trusted Nodes that highlights they are "special" to the project. Could also be provided to individual contributors as well.
- Publicly recognize the value and contribution of sea time contributed
- Vessel owner league table for data contribution
- IHO to have a "wall of contributors"
- Provide guidance to TN on how they could provide feedback/ basic statistics of the data provider. Might be a TN activity to provide those metrics.
- Pursue endorsement of the UN Decade
- Take care not to dissuade those who may perceive there to be a competitive element to rewards - ensure that we incentivise all and provide a clear progression path
- This is one main concern to join sharing since it has to be clear what is the benefit and how we can leverage from that
- Explore the pros and cons of fiscal reward opportunities
- For TN, create categories for awards (eg: innovation, outreach, collaboration, low carbon)
- Medal of the OCEAN (MOTO), Order of the SEA (OOTS)
- Survey current TNs to see what incentives they might be interested in to gather preliminary feedback
- Concerted effort in developing what a feedback process may look like

- U.S. centric, but we can promote CSB contributions (sqnm of new bathy and trends) when we update the annual Progress Report on Unmapped U.S. waters.
- Do we try to maximise the IHO / Monaco Yacht Club relationship to launch a 'recognition' at the next show (Sept) and get the Prince to say something to get it going.

Key Activities Identified

1. Develop a recognition & incentive strategy plan

7. Planning for 2023 Industry forum

EF introduced the topic. He noted that there is the opportunity to hold CSBWG14 in Stavanger Norway 13-19 August 2023. The Chair recapped the content of previous industry day in Canada, noting that the general format would be a consultative forum. After much discussion it was agreed that we should be really clear about the purpose and audience for such an event, as well as the need to check the appetite of industry partners to participate. Accordingly, it was undertaken to form an informal group to further investigate options. It was also noted that the WOC may be able to provide a platform at the next Sustainable Ocean Summit. The notion of a CSB focused element of the Map the Gaps Symposium could also be considered.

Action 5. Establish a CSB Industry day working group/task team

Action 6. Explore opportunity for dedicated session at the next WOC SOS

Action 7. Explore opportunity for dedicated focus at MtG Symposium for CSB

Decision 3. CSBWG14 to be held W/C 13 August in Stavanger

8. Outreach

The Chair went through outreach activity to date. Key highlights included the SB2030 CSB RHC coordinator collaboration team Kick off meeting, which provided a useful forum to share experiences and get feedback/support, the seven '2 pagers' (covering Superyachts, Marine Contractors, fisheries, cruise ships, software/hardware industry, HOs, and Academic/scientific research) and the fifteen speakers on CSB related activities for CSBWG13.

9. Strategy Session 3 – Analysis – Where should we go and why? + 10. Strategy Session 4 – Expected/Desired outputs

The Chair recapped the strategy sessions that we had so far and in light of the direction of travel, proposed an adjusted approach to completing this work from the plan

indicated in the agenda. It was proposed that in one final session, the barriers, associated solutions and activities be reviewed to provide high level priorities for CSBWG which could then be used to define a new work plan. This list of high level priorities would then be compared against the existing ToRs to explore whether any changes would be required. This approach was agreed by the group.

The Chair led the group through a prioritisation exercise which resulted in the following High Level Priorities:

1. Submit IHO CSB initiative as a UN Decade Action

Lead: Evert Flier

Team: Jennifer Jencks, Sam Harper, David Millar

2. Gather and prioritize HO-specific issues/opportunities regarding national policy/ regulations related to CSB

Lead: Jennifer Jencks

Team: Evert Flier, Steve Keating

3. Gather and prioritize HO-specific issues relating to CSB data, including but not limited to Nautical Cartography

Lead: Pete Wills

Team: Giuseppe Masetti, Anthony Klemm, Hans Oias, Andy Talbot, Akim Mahmud

4. Support CSB/SB2030 Coordinators in their RHC engagement

Lead: Jennifer Jencks

Team: Belen Baron, Evert Flier, Anthony Klemm

5. Discuss and propose potential software tool support for HOs

Lead: Anders Bergstrom

Team: Emma Wise, Meredith Payne, Mathieu Rondeau

6. Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.

Lead: Guillaume Morissette

Team: Matt Zimmerman, Linden Brinks, Brian Calder, Colin Tomson

7. Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.

Lead: Brian Calder

Team: Shaul Solomon, Colin Tomson, Giuseppe Masetti, Guillaume Morissette

8. Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)

Lead: Tim Kearns

Team: Steve Monk, Meredith Payne, Akim Mahmud, David Millar, Derek Niles

9. Develop a recognition & incentive strategy plan

Lead: David Millar

Team: Matt Zimmerman, Linden Brinks

10. Maintain and update B-12

Lead: Guillaume Morissette

Team: TBC

As indicated in the list above, work item leads and associated teams were agreed for all high level priorities. It was acknowledged that all WG members could join any team at any time and were encouraged to reach out to the team lead if interested.

Action 8. Create a HO specific issue Sub-group.

Action 9. Chair team to review ToRs with agreed high level priorities and circulate to WG for approval via correspondence.

Action 10. Chair team to take work items and produce a draft CSBWG work plan for circulation and approval by the WG via correspondence.

11. CSB Project Related Updates

The Chair introduced a number of CSB Project related updates. It should be noted that these presentations were not necessarily taken in this order, with some of them being heard under Agenda item 8.

11.1. CHS Update

An update on the work of CHS was provided by Pete Wills/Mathieu Rondeau.

[Presentation](#)

11.2. NOAA Coast Survey Update

An update on the work of NOAA was provided by Anthony Klemm.

[Presentation](#)

11.3. Florida CSB Project

An update on the Florida CSB project was provided by Sarah Grasty.

[Presentation](#)

11.4. CIDCO Update

An update on the work of CIDCO was provided by Guillaume Morisette.

[Presentation](#)

11.5. SuperYacht Update

An update on work to engage the SuperYacht industry by Steve Monk.

Presentation

11.6. Cell Aggregation

An update on the work of Docktech on cell aggregation for CSB data was presented by Shaul Solomon.

[Presentation](#)

11.7. FarSounder Update

An update on the work of FarSounder was provided by Heath Henley.

[Presentation](#)

11.8. Teledyne FLIR Systems Data Processing Update

An update on the work of Teledyne Flir System's work was provided by Anders Bergstrom.

Presentation

11.9. CSB in the South Pacific Update

An update on the work undertaken by SB2030 in the South Pacific was provided by Belen Baron.

[Presentation](#)

11.10. Orange Force Marine Update

An update on the work of Orange Force Marine was provided by Colin Thomson

[Presentation](#)

11.11. IHO DCDB Update

An update on the work of the IHO DCDB was provided by Georgianna Zelenak.

[Presentation](#)

11.12. SB2030 Update

An update on the work of SB2030 was provided by Jamie McMichael-Phillips.

[Presentation](#)

11.13. RSA CSB Update

An update on the work of the RSA CSB project was provided by Cdr Christoff Theunissen.

[Presentation](#)

11.14. GLOS Update

An update of the work of the GLOS was provided by Linden Brinks.

[Presentation](#)

11.15. SeaKeepers Update

An update on the work of Seakeepers was provided by Katie Sheahan.

[Presentation](#)

11.16. NOAA Bathymetry Acquisition Module Update

An update was provided by Justin Cooper

[Presentation](#)

12. Closing Proceedings

12.1. AOB

Steve Keating informed the group that he has been asked to collaborate on a book that could have a dedicated CSB component. He sought to gauge the interest of the group. It was decided that he should report back with more information.

Action 11. Explore the possibility of a dedicated CSB reference book exploring the various tech, legal and social components.

12.2. Date and venue of next meeting

CSBWG will be held in Stavanger, Norway during week commencing 13 August 2023. Exact dates to be agreed post meeting.

12.3. Review of actions for CSBWG13

IHO Sec led a review of the actions which were agreed by the CSBWG.

12.4. Closing remarks by Chair

The Chair reflected on impressive output from the meeting and noted that this represented a step change for the CSBWG. She thanked everyone for their participation and enduring commitment.