

Crowdsourced Bathymetry Working Group



CSB Working Group Task

The CSBWG was originally tasked by the IRCC to develop a draft IHO publication on policy for trusted crowdsourced bathymetry (CSB).

This document will provide guidelines on the collection and assessment of CSB data for inclusion in the global bathymetric data set which is maintained in the IHO Data Centre for Digital Bathymetry (DCDB).

Our task has now expanded to facilitate Crowdsourced data collection, management and distribution worldwide and contribute to global initiatives like Seabed 2030.



CSB Working Group 6th Meeting

- Chair (Jennifer Jencks, USA) and Vice-Chair (Serge Gosselin, Canada) of CSBWG
- Representatives from four Member States
 - Canada, Norway, UK and USA
- Observers and expert contributors from the World Ocean Council, the NF-GEBCO Seabed 2030 Project, ONE Data Technology Co, Dongseo University and Farsounder INC
- Remote participation by: Denmark, GMATEK, Sea-ID, ChartWorld/SevenCs and TeamSurv
- Assistant Director David Wyatt represented the IHO Secretariat

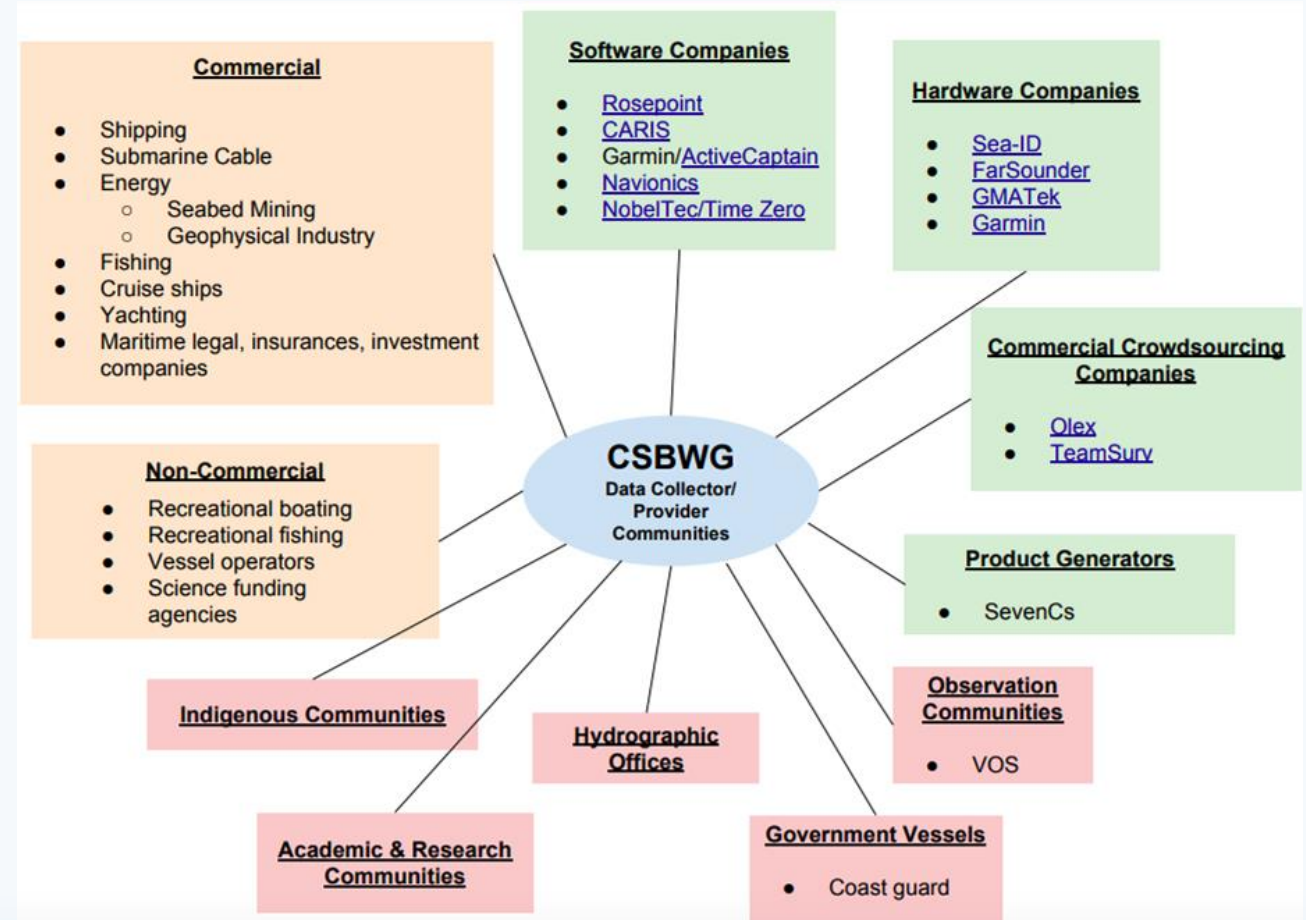


Hosted by the NOAA's National Centers for Environmental Information, on 19-21 June 2018



CSB Working Group 6th Meeting

- Provided updates on a number of ongoing CSB-related projects.
- Discussed future tasks approved by IRCC10 as a result of the adoption of the revisions to the ToRs of the CSBWG.
- Focused on **future outreach strategies** for which various sectors were identified and 5 headline topics (need, how, what, incentives and benefits) were defined to increase contributions and participation
 - These would be further developed at the next meeting.



Hosted by the NOAA's National Centers for Environmental Information, on 19-21 June 2018



CSB Industry Workshop

Goal: To showcase a variety of current industry CSB participants and discuss the potential for future collaborations to advance the IHO CSB Initiative.

Key Objectives:

- Raise awareness of corporate leadership/opportunities to stimulate action for the collection and sharing of CSB data;
- Discuss CSB acquisition methods/procedures/opportunities;
- Information sharing on transit/CSB data acquisition and exchange formats and protocols;
- Determine tools, methods and protocols to leverage/stimulate a generic participative approach for CSB data collection
- Develop synergies with global initiatives including Seabed 2030

Representatives from: CIDCO, Da Gama Maritime, EGS Survey (representing ICPC), ECC, ESRI, FarSounder, Fugro, GMATEK, Hypack, Olex, Secunda, SevenCs/ChartWorld and Teledyne CARIS



Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 12-13, February 2019



CSB Industry Workshop

- Industry reps. given an initiative overview, short presentations on current industry partner projects, examples of CSB data usage by HOs and other projects, and tech. perspectives.
- Discussion on how to expand the initiative into various maritime sectors, what methodologies were appropriate to incentivise data gathering activities, how data could be made available and what recognition strategies were desirable.
- ***These discussions and recommendations will pave the way towards improved private-sector participation in the collection of CSB.***



Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 12-13, February 2019



CSB Working Group 7th Meeting

- Chair (Jennifer Jencks, USA) and Vice-Chair (Serge Gosselin, Canada) of CSBWG
- Representatives from eight Member States
 - Canada, Denmark, India, Italy, New Zealand, Norway, UK and USA
- Observers and expert contributors from ONE Data Technology Co, Dongseo University, Farsounder INC, Da Gamma Maritime Ltd, GMATEK Inc, and Fugro.
- Assistant Director David Wyatt represented the IHO Secretariat

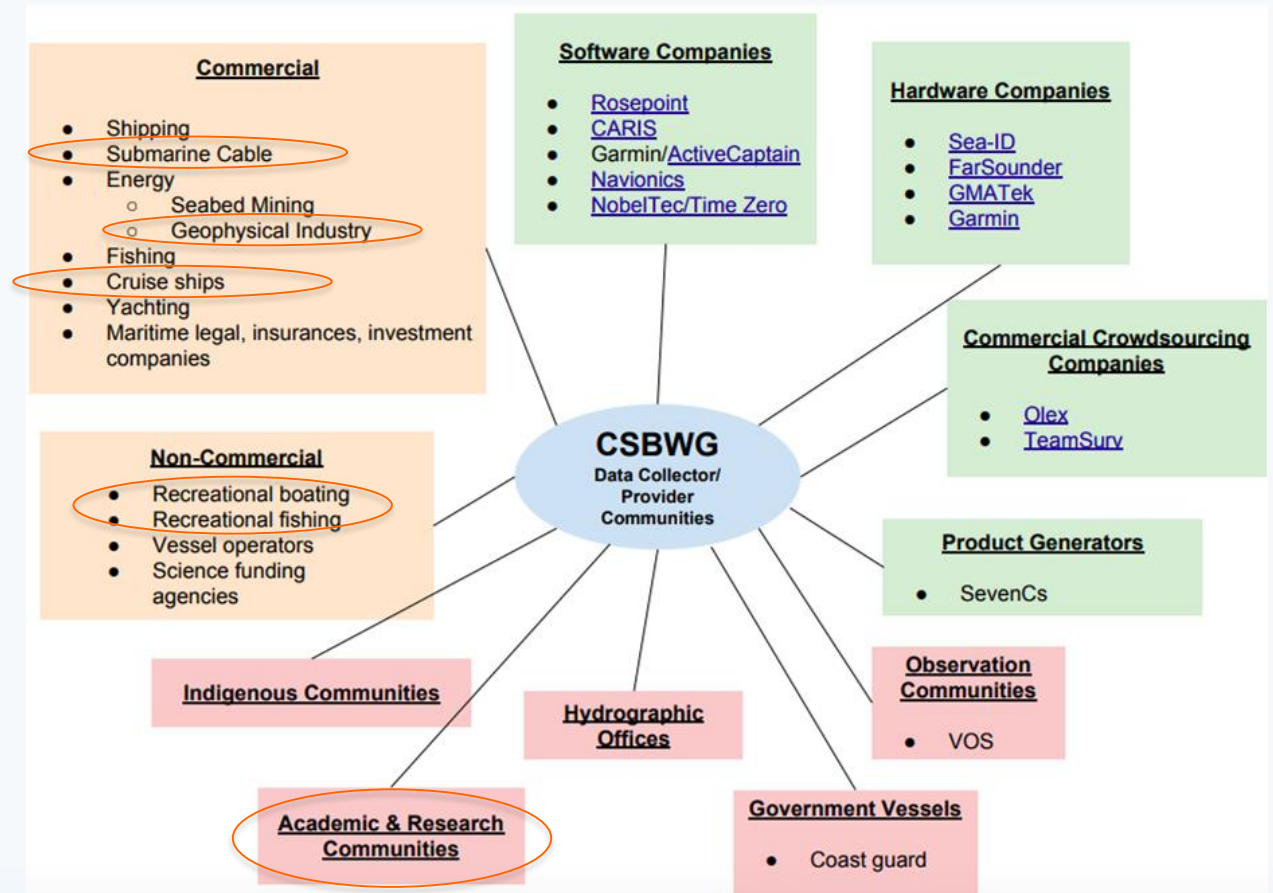


Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 13-14, February 2019



CSB Working Group 7th Meeting

- Representation at events & meetings is essential to raise awareness & progress contributions & participation.
- Current outreach strategies will focus on the Geophysical, Research Vessel, Cruise Liner, Submarine Cable, & Recreational Leisure sectors.
- Leading organizations & companies within each sector to be identified & approached to act as CSB ambassadors.
- Closer liaison with various IHO bodies, groups/organizations, & projects still needs to take place (eg: DQWG, MSDIWG, Seabed 2030)



Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 13-14, February 2019



CSB Working Group - Significant Highlights

Cruise Liner: Carnival Cruise Line & MacGregor

- The Macgregor Maritime Data Engine (MDE) is a data normaliser that collects, standardizes and stores data from a ship's Voyage Data Recorder (VDR)
- Working to implement a single interface between MDE and the DCDB that can connect the Carnival fleet

Marine Survey: Fugro

- Signed data submission agreement with DCDB
- Contributed over 20 transit surveys




CSB Working Group - Significant Highlights cont...

Seismic Survey: PGS

- MoU signed by PGS CEO
- Test data currently being evaluated by Norway

Research Vessel: Antarctic Treaty Consultative Meeting 42 (Prague, Jul '19)

- Working Paper drafted by Norway
- Assisted/co-sponsored by Italy, New Zealand and USA
- Stronger resolution for countries to commit their research vessels to contribute to bathymetric data collection.

| | (type) | (number) |
|---|--|----------|
|  | XLII Antarctic Treaty Consultative Meeting Prague • Czech Republic • 2019 | ENG |
| Agenda Item: | | 15 |
| Presented by: | Norway, Italy, New Zealand, the United States | |
| Original: | English | |
| Submitted: | (date submission) | |

Hydrographic Surveying of Antarctic Waters
Working Paper submitted by Norway, Italy, New Zealand, and the
United States



IHO DCDB Database

International Hydrographic Organization
Organisation Hydrographique Internationale

Data Centre for Digital Bathymetry Viewer

Layers

- IHO DCDB/NOAA NCEI
 - Multibeam Surveys
 - Multibeam Bathymetry Mosaic
 - Single-Beam Surveys
 - Single-Beam Sounding Density
 - NOAA Hydrographic Surveys:
 - All Surveys with Digital Data
 - Surveys with BAGs
 - BAG Shaded Relief Imagery

Search NCEI/DCDB Surveys Reset

Crowdsourced Bathymetry Files

Search CSB Files Reset

U.S. Bathymetry Coverage and Gap Analysis

Australia
Canada
EMODnet
Bathymetric Coverage Maps

More Information
Help

Position: 179.738°, 26.613°
Elevation: -5434 meters

- 154 million soundings
- 168 contributing vessels
- 6585 data deliveries



CSB Use Cases – NOAA Chart Adequacy Assessment

Describes NOAA & George Mason University collaboration to:

- Use CSB to assess NOAA nautical chart adequacy
- Determine when areas require updated survey information
- Identify chart discrepancies before an incident occurs.

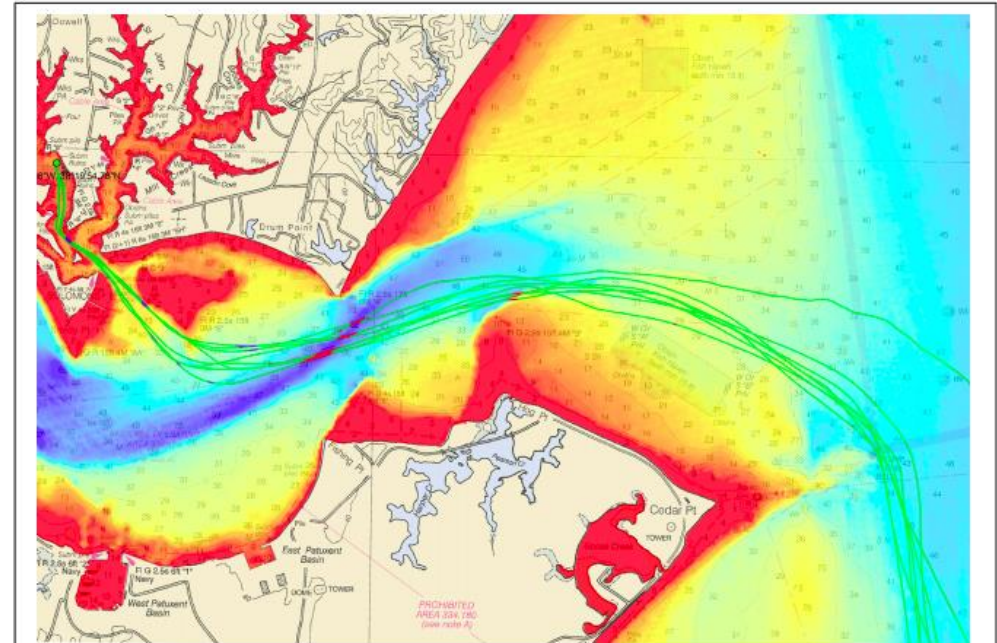
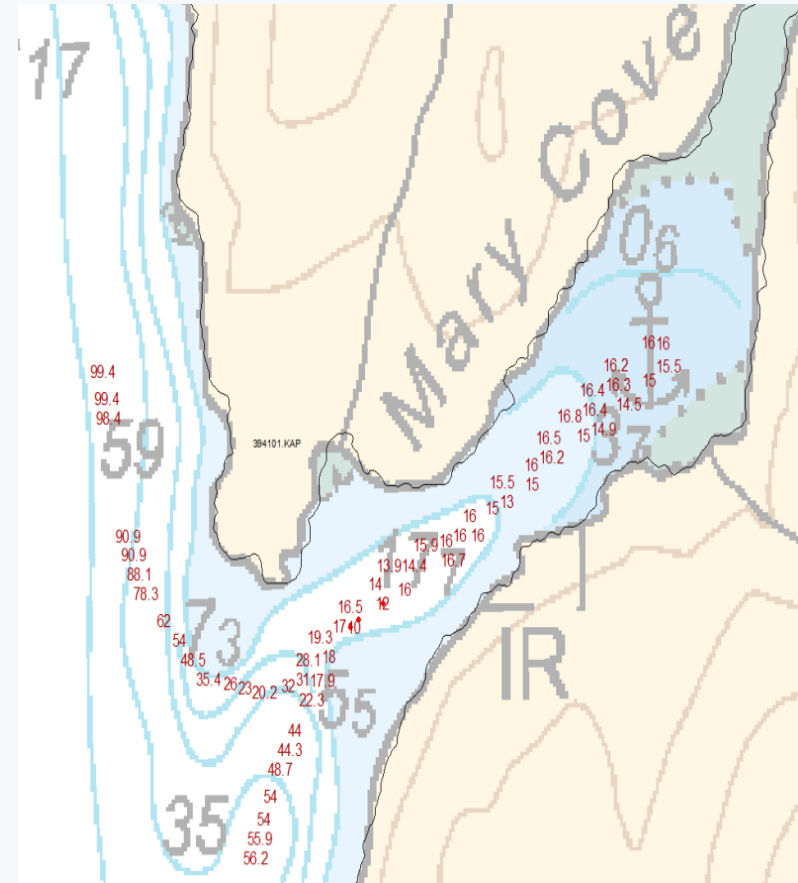


FIGURE 5 | NOAA's Bay Hydro II crowdsourced bathymetry test tracks in green overlaid on multibeam survey data demonstrates how changes can be detected. Image courtesy of NOAA.



CSB Use Cases – CHS Inside Passage

- CHS has used CSB to update several IP charts along coastal routes.
- A systematic comparison of charted depths < 10 m yielded improved charted channel depths, data density and improved chart compilation in areas that were surveyed with singlebeam.
- CSB helped prioritize survey areas for the following survey season and initiated the publication of Notices to Mariners.



CSB revealed some chart compilation problems.
Don't use the chart to figure out how much anchor chain you need!



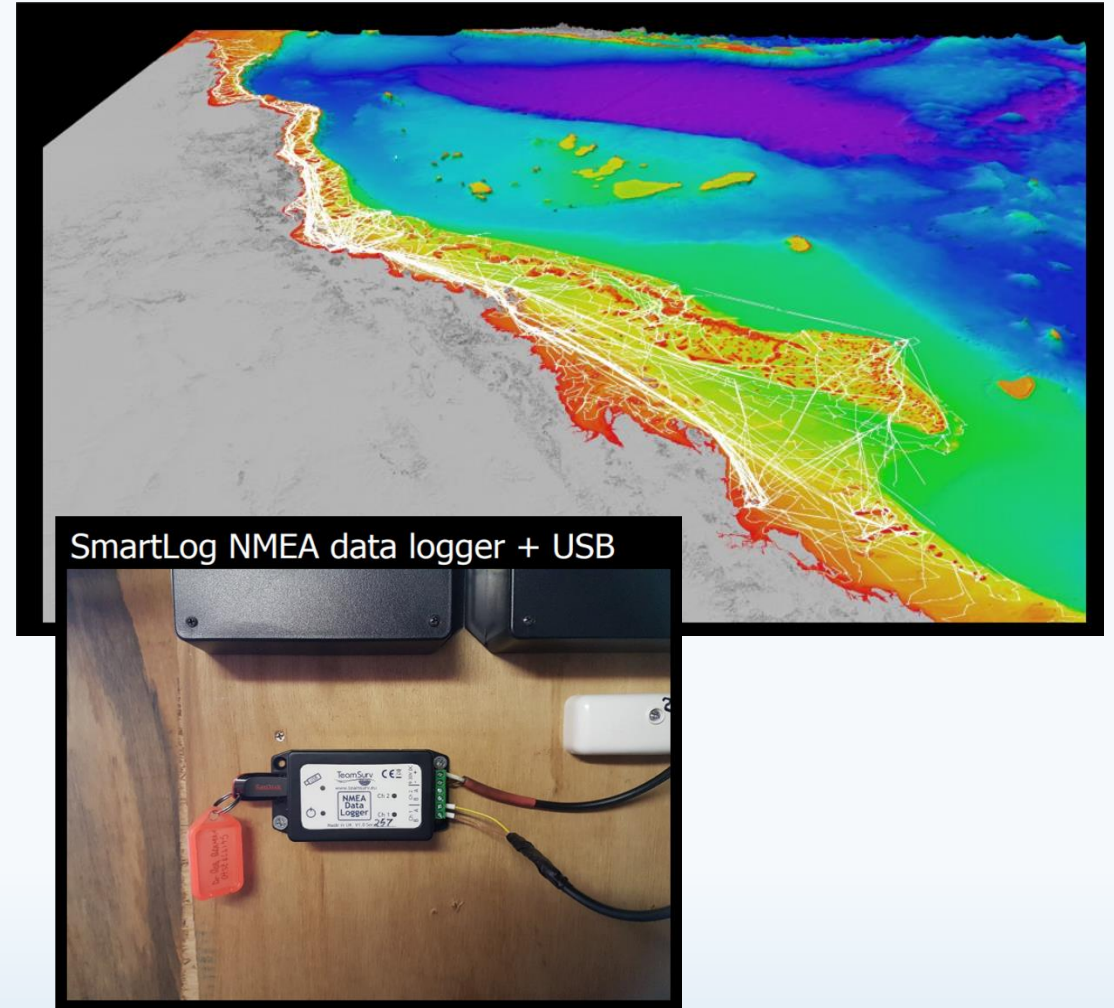
Why CSB? – by Pete Wills (CHS)

- The potential is enormous as is our coastline.
- We have always received reported shoals from mariners and put them on charts.
- CSB is an evolution of the mariners reporting system.
- We still need to assess the quality of data however it comes in.
- We have very old sparse surveys or no surveys in many areas.
- Mariners have better positioning and sonars today than much of the older data.
- Free



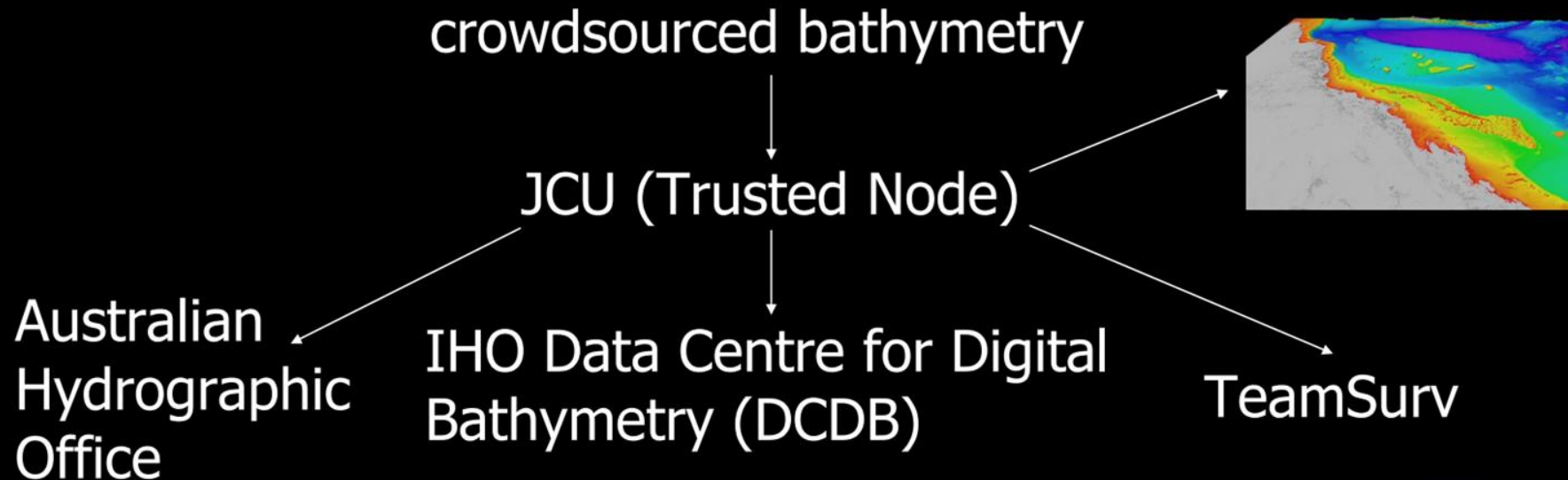
Use Case – Great Barrier Reef Project (James Cook U.)

- ~40% of GBR shelf is mapped with in situ depth soundings, with a need to preserve, share and fill the data gaps
- Many vessels on the GBR (from expedition dive boats to recreational fishing boats) use some type of echo sounder and GPS for safe navigation and guiding activities
- In 2018, James Cook U. started the ‘Crowdsourced Bathymetry on the Great Barrier Reef’ project to collect CSB from voluntary vessels
- Partnered with the Great Barrier Reef Foundation to establish a pool of TeamSurv SmartLog USB data loggers.
- This project is also an activity of the Citizens of the Great Barrier Reef, which gives people an increasing role in contributing valuable citizen science data to improve a fundamental dataset that helps the Reef.



Use Case – Great Barrier Reef

CSB data flow



Problems Encountered

There continues to be a need to overcome skepticism within parts of the IHO community and sections of the marine domain where an overly cautious focus on potential, although untested, legal issues and concerns on commercial exploitation of data is observed.

- *Increased awareness and information as well as stakeholder engagement/involvement should all help to overcome these reservations.*

There is a growing concern over the apparent lack of dedicated resources available within national HO's to process data available via the DCDB.

- *This is an issue that will need to be addressed for the full benefits of CSB to be realized and will require for HO's to consider engaging efforts and resources, including the development of automated processing, to integrate CSB data into their routines.*



Other Items of Note

The continued importance of liaison with other IHO bodies, as well as appropriate engagement with industry to progress the work items, was identified as a key enabler for the project.

There is a need to showcase various use cases of CSB data to indicate the benefits and how MS can utilize 'free' data for their own national uses.



How many HO's feel about Crowdsourced Bath. Data



Final Thought – *UN Decade of Ocean Science for Sustainable Development*

- **195 UN member states** have given their support/approval
- SDG14 will not be achievable without a comprehensive map of the world ocean floor
- Some of these same member states do not fully support the CSB activity in their EEZ, yet have limited resources or capability to collect the data themselves.

