

CSBWG Work Item D

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

Submitted by Anthony Klemm

SUMMARY

Executive Summary: This document provides details on activities conducted related to gathering and prioritizing HO-specific issues relating to CSB data, including but not limited to Nautical Cartography

Action to be taken: See below

Related documents:

Work Item Team Members: Giuseppe Masetti – Denmark
Hans Oias – Sweden
Andrew Talbot – United Kingdom (UKHO)
Michel Breton – Canada
Akim Mahmud – USA (NGA)
Anthony Klemm – USA (NOAA)

Work Item Background

This Work Item is important for the development and sharing of best-practices on processing and the utility of CSB for Hydrographic Offices, including supporting safe navigation.

Current Work Item Purpose

The intentions of this work group is to facilitate collaboration between Hydrographic Offices on best practices of how to use CSB data from the DCDB. This includes providing recommendations back to the DCDB on how to improve data support and access, as well as sharing methods on processing/correcting CSB data, and evaluating its quality.

We feel that as more CSB is used and evaluated by Hydrographic Offices, it will provide a catalyst to for more potential contributors and users to participate in CSB.

Work Item Update

Work Item	Title	Priority <i>H-high</i> <i>M-med</i> <i>L-low</i>	Next milestone	Start Date	End Date	Status <i>P-planned</i> <i>O-ongoing</i> <i>C-completed</i> <i>S-superseded</i>	Remarks
D-1	Produce guidance for use of CSB data for SOLAS nautical cartography and other products	M	Hans (Sweden) has demonstrated example usage of S-44 Annex A matrix for CSB data; Canada, USA, and other HOs to document and share comparative uncertainty/quality assessment methodologies			Ongoing	NOAA currently using 10m horizontal uncertainty estimation, and CATZOC C depth precision definition to quantify uncertainty values; Still working on more robust uncertainty estimation
D-2.1	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	H	Develop, share, and collaborate on CSB outlier detection algorithms and AI models both spatially and in a timeseries space Work Group requests addition of Speed field (SOG from GNSS receiver) to be added to mandatory data fields from contributors to aid in Data quality assessment and outlier detection			Ongoing	Empty datafiles and erroneous data within files (data with raw depth = 0.0m, etc...) continue to be a significant burden and source of friction to efficient processing. Outliers in data also continue to be a persistent and critical issue. NOAA currently using Computer Vision and statistical functions to flag outliers in CSB timeseries data, but the results are very aggressive (more than optimal number of false positives). NOAA also building large training set to feed more robust ML/AI models;
D-2.2	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	H	Develop and share Data Engineering solutions to query DCDB at routine time frequency to pull and process latest data (e.g., at a monthly period)			Ongoing	NOAA currently has a working solution to pull latest data (at 1 month schedule) using Point Store API and custom DCDB scraper script.

D-2.3	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	M	Need clarity from DCDB on path forward for TUG RANGER timestamp offset correction			Ongoing	Should/can it be updated in the DCDB for others to use corrected timestamp of +7168 days? Need to encourage more nav systems to share freely with DCDB. Need to grow the crowd, to release the power of big data.
D-2.4	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	H	Work Group requests addition of Speed field (SOG from GNSS receiver) to be added to mandatory data fields from contributors to aid in Data quality assessment and outlier detection			P	Is there a process to formally request this change? How will this request be evaluated and approved/denied?
D-2.5	Evaluate the CSB data stored in the IHO DCDB for use in nautical cartography.	H	Collaborate between HOs and other organizations on best practices to highlight and detect bathymetric discrepancies with CSB data			P	(Canada/CIDCO example in the St. Lawrence Seaway).
D-3	Engage with industry to ensure the required tools exist to efficiently use DCDB-hosted CSB data for navigational products.	M	The need was highlighted to engage with ECDIS manufacturers to add software capability to log and transmit CSB data to increase CSB collector pool			P	It is expedient to act now as ECDIS manufacturers develop new systems compatible with S-100
D-4	Engage with other IHO WGs to ensure suitable standards exist for describing CSB data and displaying CSB data on ECDIS.	L	No updates at this time				

Progress Since Prior Meeting

- Sweden has demonstrated how the S-44 Annex A matrix may be used to characterize the quality of CSB data; Note: HOs are not required to use the Annex A matrix but it may help
- NOAA has developed a cursory open-source outlier flagging algorithm using CV and statistical methods in a timeseries dimension (although further testing and modification of parameters is required as current script produces many false-positives). Collaboration on tools/methods to effectively flag outliers in CSB data is of utmost importance to this Work Group.
- Canada has produced full data pipeline for processing CSB data and has incorporated some CSB data into their Charts and NavWarning assessment tool
- Denmark has incorporated CSB data into their latest national bathymetry model (has not yet made it to the for-navigation products)

Reporting

The team is using the work items to track progress from meeting to meeting. We have met once during this intercessional period and have intermittent communications as a group.

Planned Work & Timeline

See Work Item Update table, specifically D-2.4, D-2.5, and D-3.

Issues/Risks/Concerns/Barriers

Risks/Barriers continue to be resourcing; Most HOs only have one person designated to focusing on CSB. We need more collaboration and communication between HOs on progress/ideas, especially when it comes to automated tools for flagging outliers. Without robust automated outlier flagging capabilities, CSB data requires too much person-hours to evaluate and clean to be used in navigation products.

Proposed Changes to Work Item

None.

Action to CSBWG

The CSBWG is requested to:

- A. **Note** the information provided;
- B. **Take** any other actions, as appropriate.