

# The IHO Data Centre for Digital Bathymetry

## *Development Update*



# Webpage Update

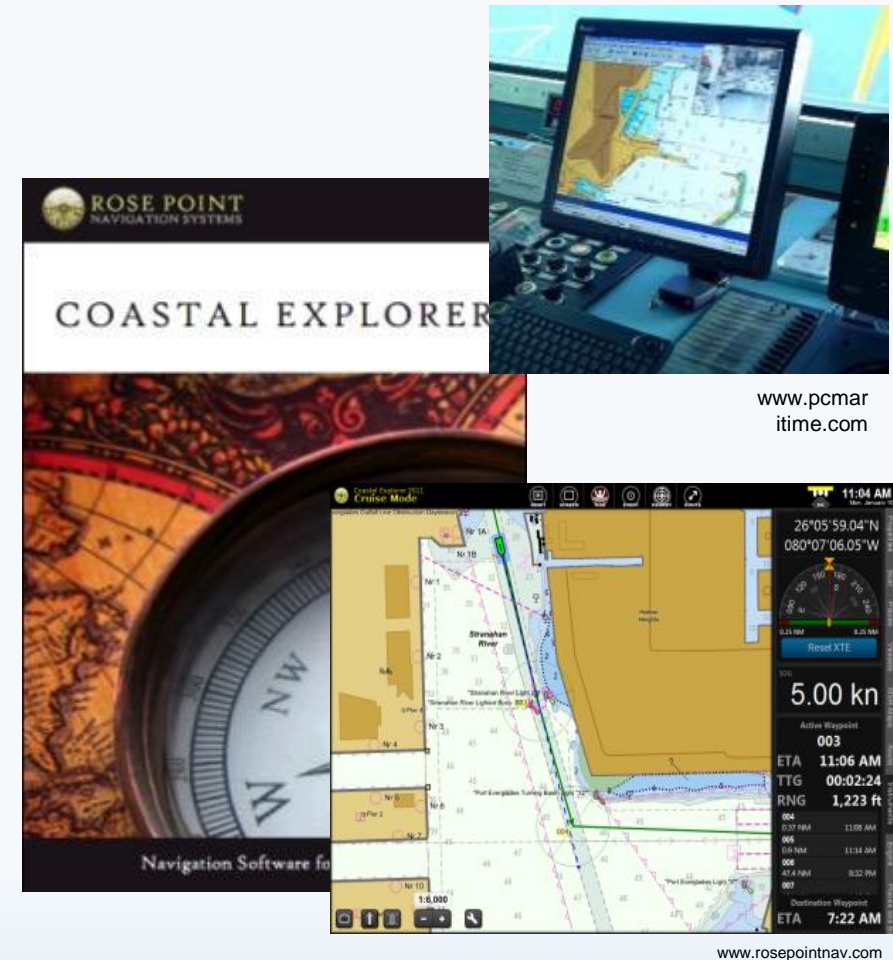
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<https://www.ngdc.noaa.gov/iho/test/>



# IHO DCDB Pipeline

- **Active Trusted Node:** Rose Point Navigation Systems
- Using their navigational system software, mariners can enable a modified electronic charting system log file to *record position, depth and time.*
- Mariners can capture metadata about vessel and equipment.
- Whenever the mariner updates the software or chart catalog, the data is sent to Rosepoint who then *transmits the data to the DCDB* via HTTPS post.





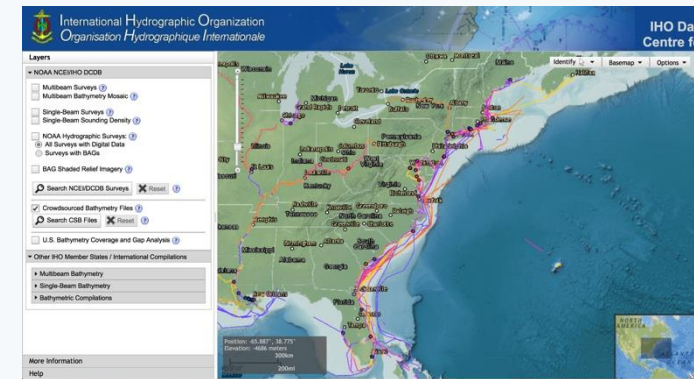
# IHO DCDB Pipeline

**Data discovery and access via our map viewer.**  
**Data delivered as a collection of files.**

```
{
  "platform":
  {
    "uniqueID": "ROSEP-e8c669f8-df38-16e5-b86d-9a79606e9478",
    "type": "Ship",
    "name": "SS Dinghy",
    "length": 65,
    "lengthUnitOfMeasure": "meters",
    "IDType": "IMO",
    "IDNumber": "1008140"
  }
}
```

**CSB data log file**

```
lat,lon,depth,time|
47.666520,-122.098525,21.49,20161017T234638Z
47.666518,-122.098525,11.98,20161017T234739Z
47.666517,-122.098527,14.63,20161017T234839Z
47.666515,-122.098527,17.16,20161017T234935Z
47.666490,-122.098472,19.72,20161017T235044Z
47.666505,-122.098522,20.18,20161017T235141Z
47.666477,-122.098507,20.42,20161017T235241Z
47.666512,-122.098432,20.63,20161017T235342Z
47.666497,-122.098417,20.33,20161017T235443Z
47.666512,-122.098470,20.33,20161017T235548Z
47.666507,-122.098490,20.57,20161017T235644Z
47.666533,-122.098453,20.33,20161017T235832Z
47.666575,-122.098445,20.33,20161018T000042Z
47.666585,-122.098460,20.21,20161018T000236Z
47.666417,-122.098443,18.32,20161018T000337Z
47.666417,-122.098443,15.27,20161018T000438Z
47.666433,-122.098473,12.68,20161018T000538Z
47.666490,-122.098562,10.06,20161018T000638Z
47.666490,-122.098560,12.65,20161018T000738Z
47.666492,-122.098552,15.88,20161018T000839Z
47.666487,-122.098527,18.32,20161018T000939Z
47.666398,-122.098182,20.12,20161018T001038Z
47.666393,-122.098185,20.30,20161018T001045Z
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47.666375,-122.098180,20.70,20161018T001047Z
```

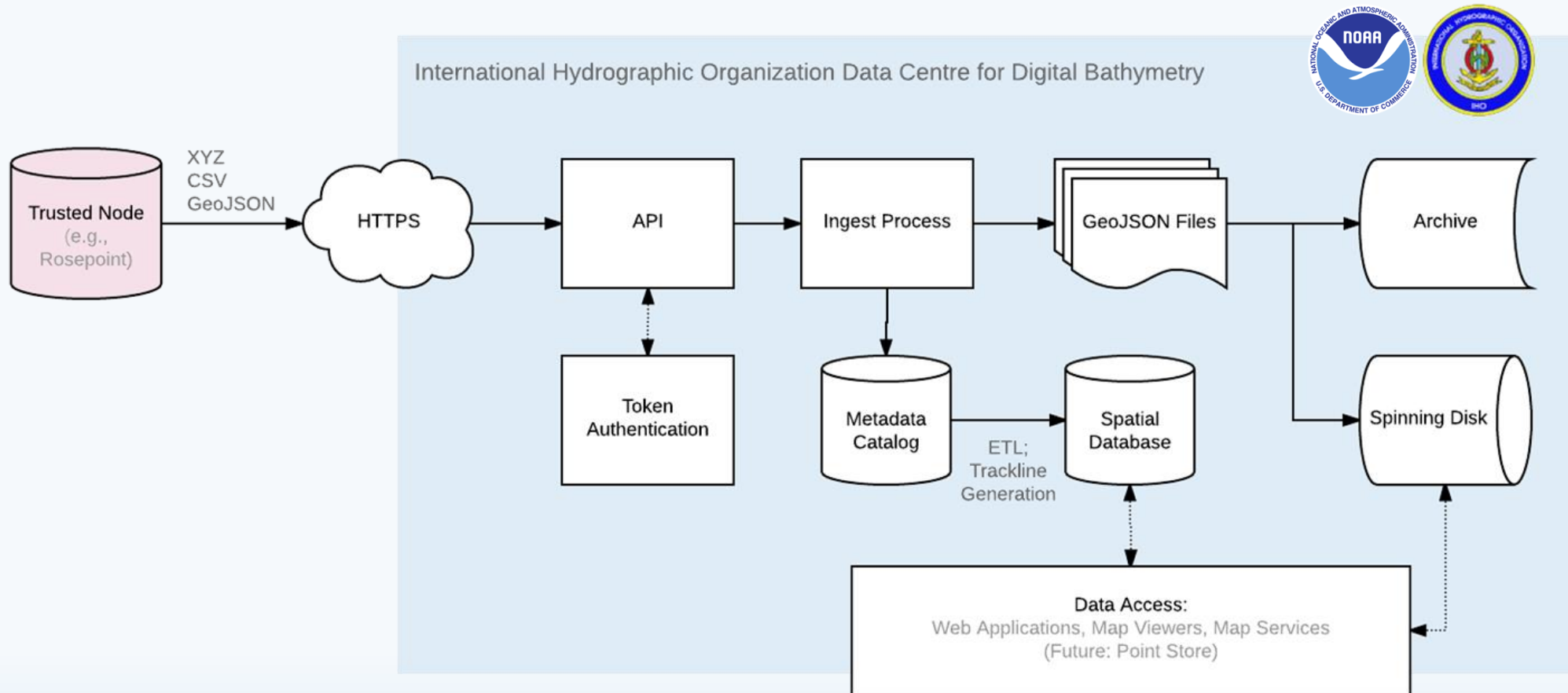


**Data and  
identifying token  
are submitted to  
DCDB via HTTP  
post**

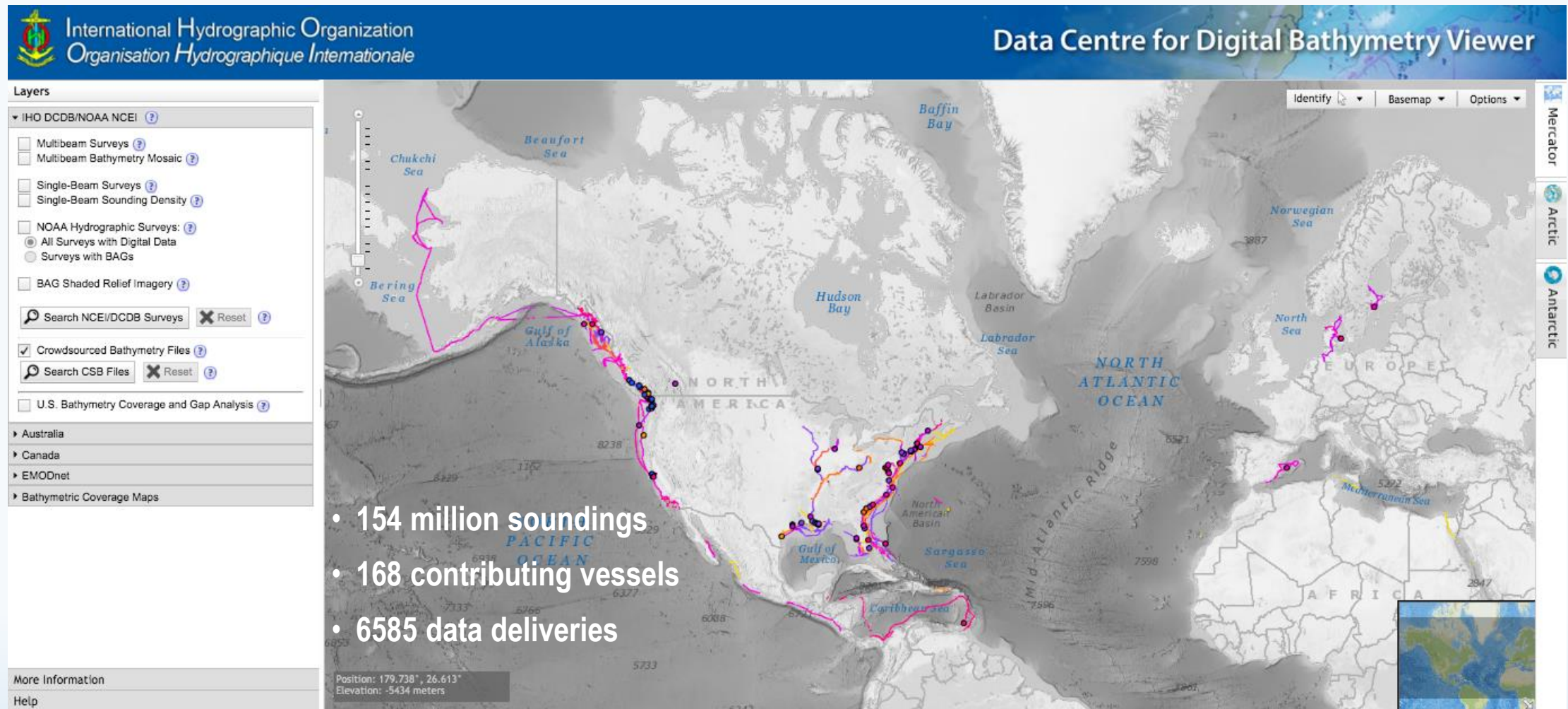
**Frequent  
update of  
viewer**



# CSB Data Pipeline



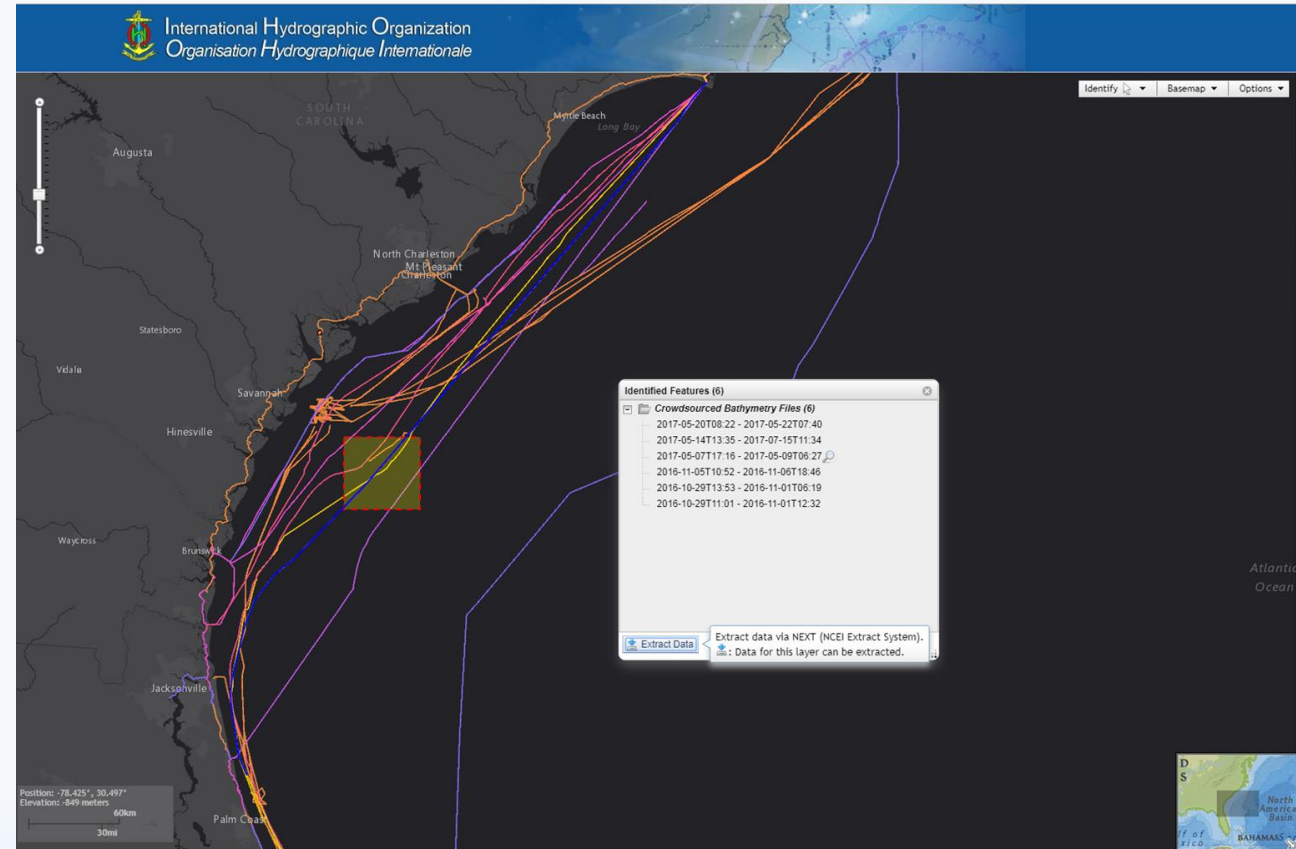
# IHO DCDB Database





# Current & Next Steps

- Expand beyond pilot data provider to include more trusted data providers in CSB project
  - **FarSounder**
  - **Macgregor**
  - **James Cook University**
  - **CIDCO**
- Continue to ingest, archive, create tracklines of where data was collected to visualize on map, and provide individual file-based delivery of data.
  - Limitations: Data aggregation, processing, and grid generation remains the responsibility of the end user.



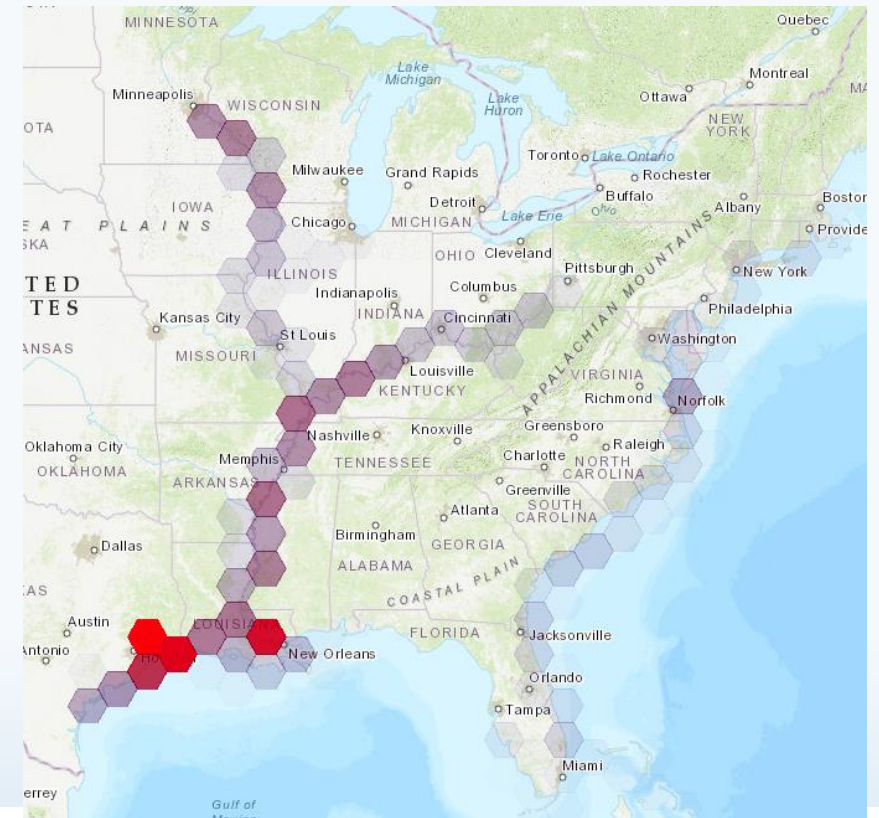
# Current & Next Steps

Implement point storage (cloud) technology to better handle and store bathymetric data as a seamless collection of points.

DCDB could then provide services to:

- Generate bathy grids of a given area using user-specified resolution
- Show the data density, guiding future data collection efforts
- Query the data collection, providing statistics on the bathymetric measurements surrounding the given location
- Allow the user to extract the raw data from a given area and download in a user-specified format

*A point store of this size and capability is currently not feasible to implement on premise.*





# ESRI-DCDB Cloud Pilot

Esri agreed to partner with NCEI/DCDB on a limited-time, cloud-hosted pilot project for no charge.

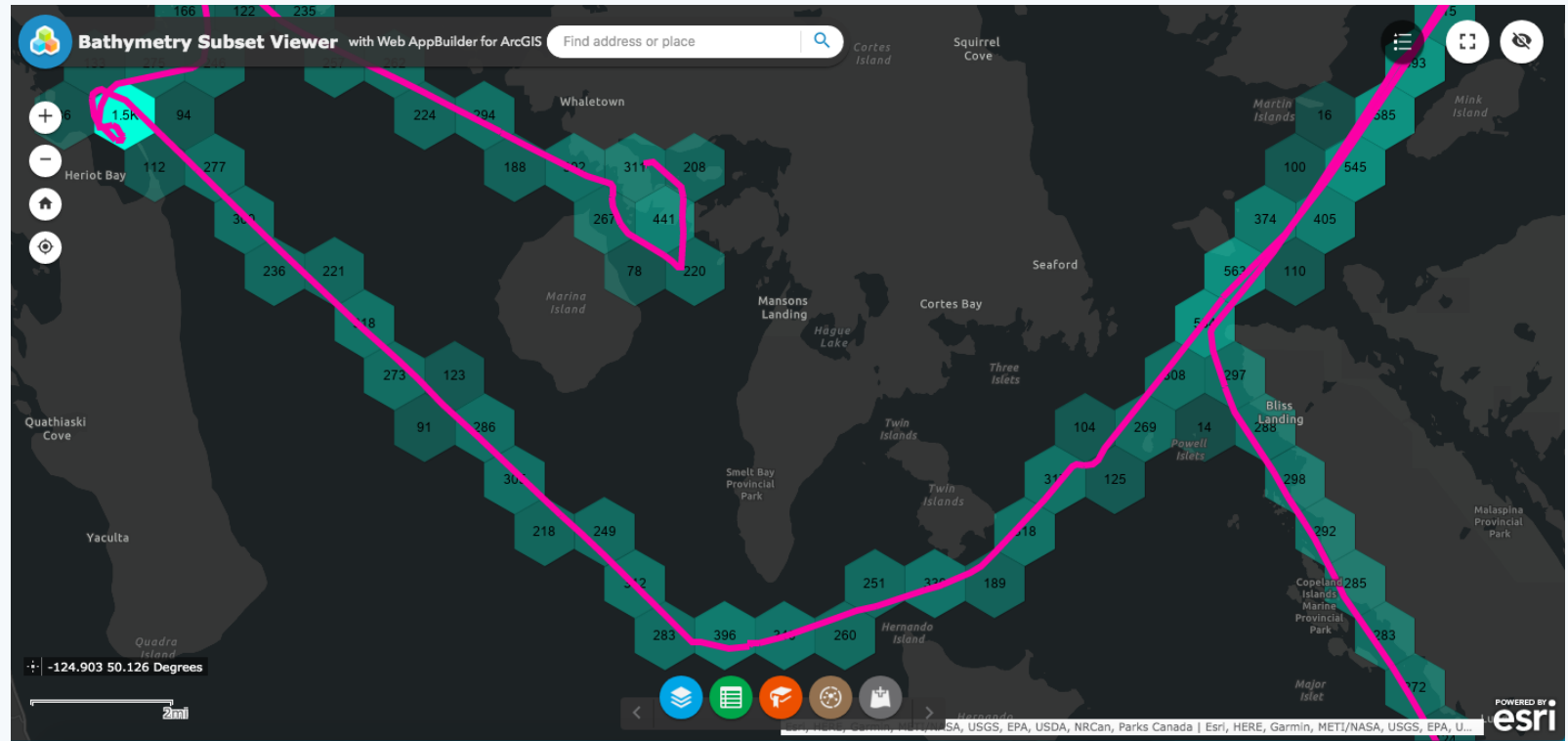
## Objectives:

- Evaluate the suitability of the ArcGIS Enterprise software suite for meeting the CSB data discovery, visualization, and data delivery requirements.
- Provide insight as to the cloud requirements to support the Esri software for this purpose, including predictors for future growth.



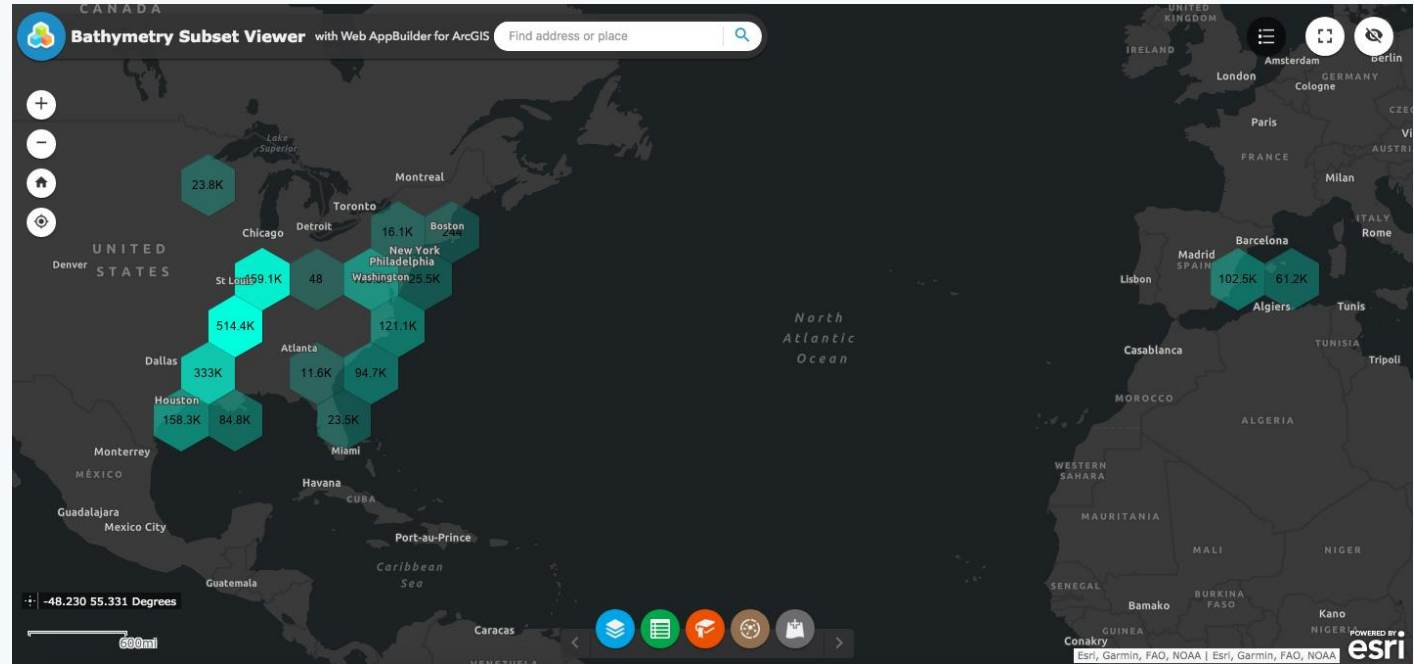
# ESRI-DCDB Cloud Pilot

- Esri stood up the ArcGIS Enterprise components within their AWS environment.
- DCDB delivered a snapshot of ~152M CSB points and Esri ingested the data.
- Esri is experimenting with re-constructing tracklines from the points using their GeoAnalytics Server



# ESRI-DCDB Cloud Pilot - next steps

- NCEI will create map services using cloud-hosted ArcGIS Enterprise and evaluate performance
- NCEI will create simple demo web applications that consume these services and make the data accessible to stakeholders
- Confirm whether these will meet NOAA, CSBWG, and Seabed 2030 stakeholder requirements





# Seabed 2030-funded CSB Pilot Program

The Seabed 2030 Project Team activity budget allotted US\$40,000 for Year 2 towards crowdsourcing.

Proposal: **Purchase and supply generic data loggers to a few regional CSB mapping projects as a proof of concept.** This would be a great way to:

1. collect data in under served areas
2. grow excitement about the CSB initiative
3. develop a repeatable regional CSB mapping project strategy.

The intent would be to replicate some version of Dr. Robin Beaman's CSB on the Great Barrier Reef Project.



# Seabed 2030-funded CSB Pilot Program

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## 1.UKHO:

- The UKHO is the charting authority for many remote and data starved areas and is currently conducting surveys in a few remote areas over the next year.
- They have expressed interest in being provided ~100 data loggers.
- In return, they would have to guarantee they could provide the staff to hand these loggers out, assist local mariners in set up, act as a data assembly center, and provide a copy of these data to the IHO DCDB.



# Seabed 2030-funded CSB Pilot Program

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## 2.SANHO

- South African Navy Hydrographic Office has voiced their support of the CSB concept and have described a “study on CSB in the South African context” that was tasked to the Institute for Maritime Studies (IMT) which is a division of Armscor, South Africa.
- A similar offer to the UKHO was made to SANHO/IMT.





# Seabed 2030-funded CSB Pilot Program

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Step 1: find potential pilot programs

Step 2: identify a variety of inexpensive data loggers that could be purchased en masse depending on the situation



# Seabed 2030-funded CSB Pilot Program

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Next steps...



# Geographic Filtering

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# Data Flow (in a perfect world)

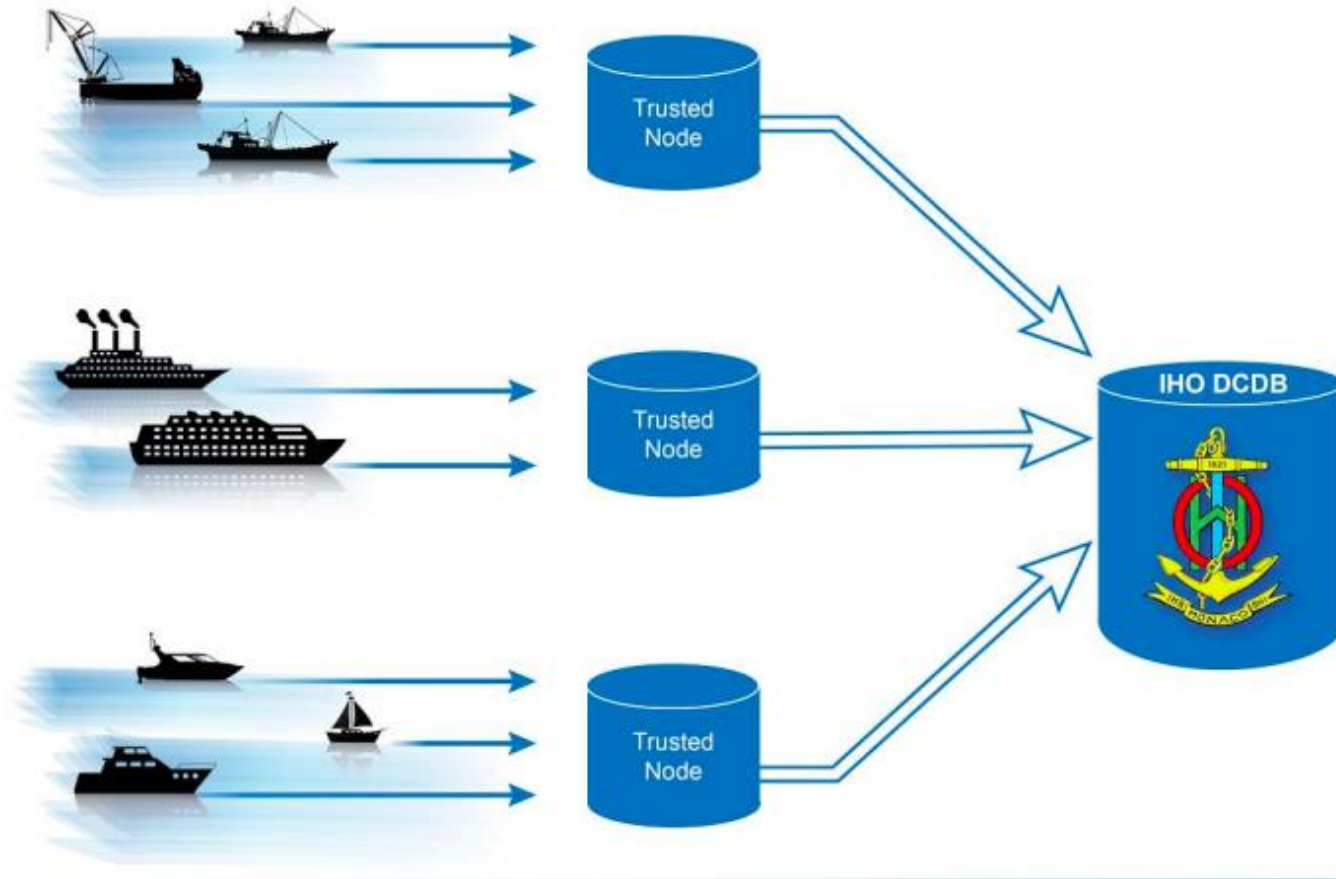
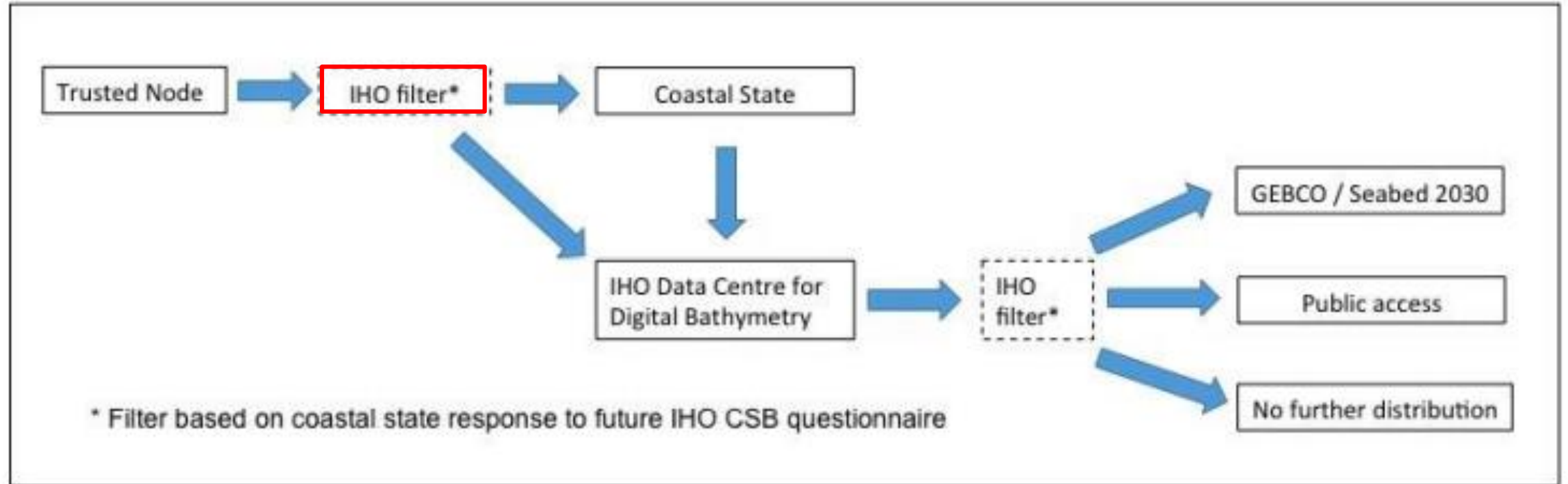


Figure 1. Data flow from vessels, through Trusted Nodes, to the DCDB.



# Data Flow (in today's world)



Currently working to apply a set of topologically correct polygons for each EEZ & TS where each polygon is attributed with flags indicating the restriction(s) - YES/NO



# Geographic Filtering

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- Based on the results of the CL, the DCDB is being asked to filter out data collected from the waters of **all coastal countries not included on that list of 12**. This includes:
  - Countries we know are pro-CSB but haven't replied for whatever reason (eg: Canada).
  - Non-IHO member states
- Since CSB is stored as files (and NOT points), if any part of a file falls within non-YES country's EEZ, it will be thrown out.
- In most cases: 1 survey = 1 file





# Geographic Filtering

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- **James Cook U.:** Australia is not on the YES list
- **Rosepoint:** Plenty of data in Canadian waters. Canada is not on the YES list
- **CIDCO:** Canadian waters
- **FarSounder:** "We've started uploading data from the coast of **Canada** going up through the Northwest Passage, we also have some data off the coast of **New Zealand** and a transit from Boston to Antarctica (through the **Panama** canal along the **west coast of South America**) that are in queue..."

Most CSB data coming in to the DCDB, that is not in U.S. waters, will not be made available to the public or GEBCO/Seabed 2030.

