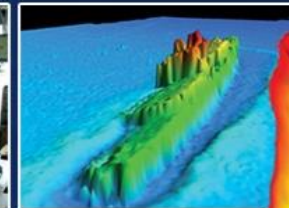




CIDCO

Centre interdisciplinaire de développement
en cartographie des océans

Interdisciplinary Centre for the Development
of Ocean mapping



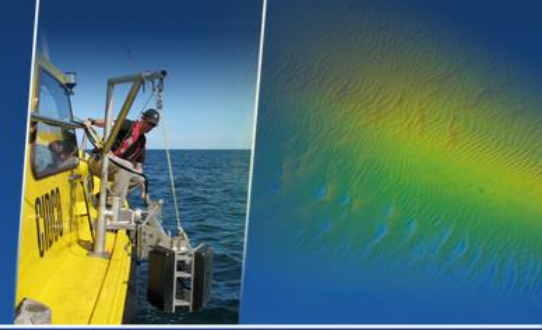
Crowd Sourced bathymetry in Northern Canada (CSBNC)

November 9th 2019 (Second Seabed 2030 Arctic – Antarctic – North Pacific Mapping Meeting 2019,
NH, USA)



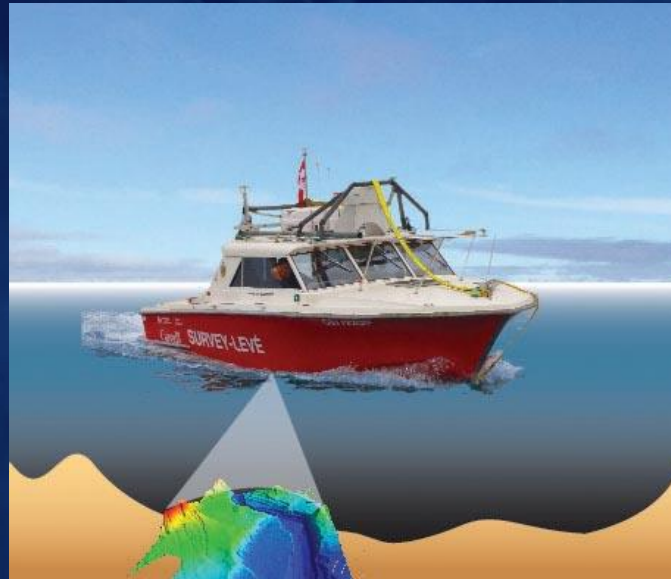


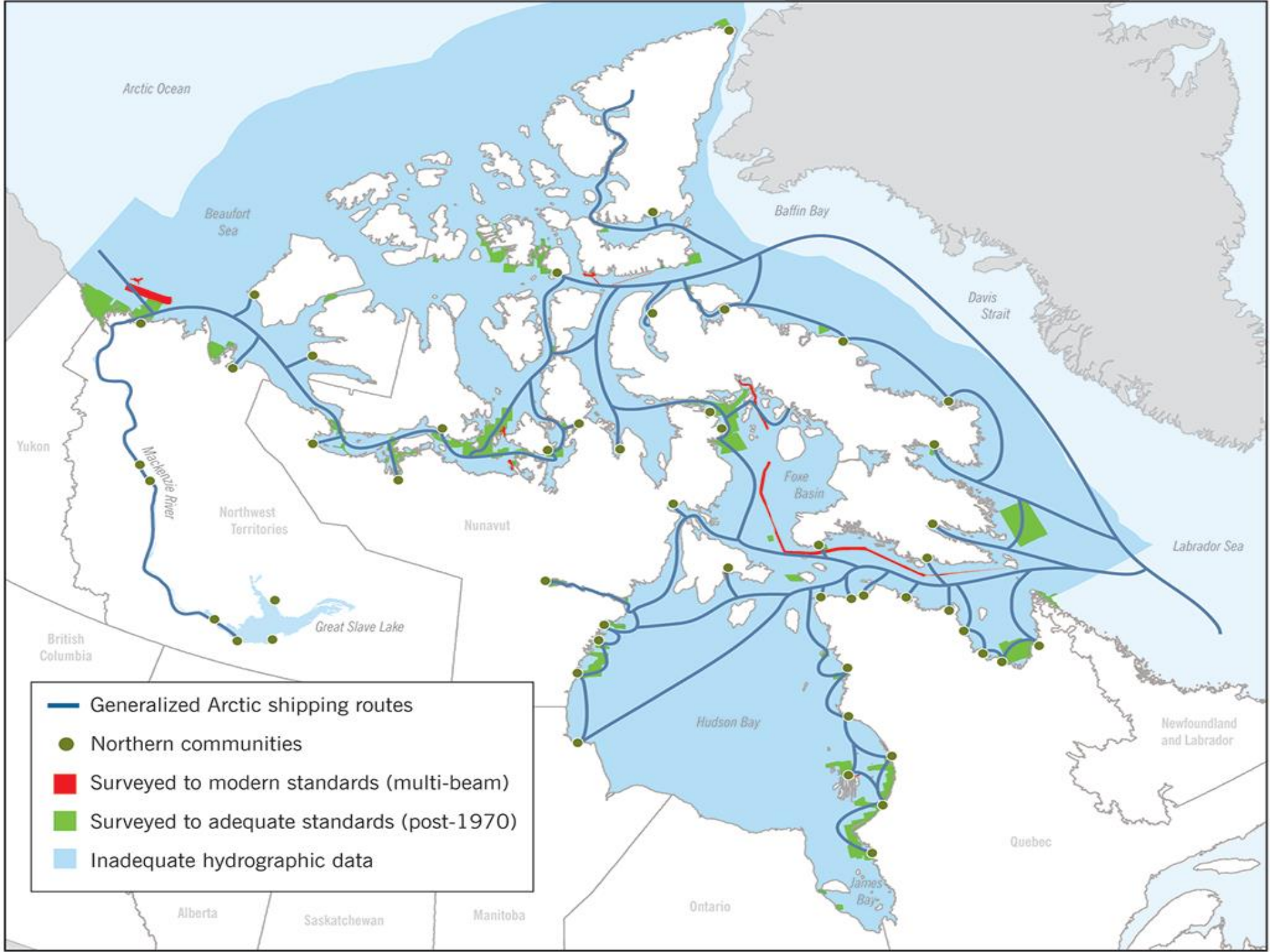
The Canadian Arctic: A vast territory



4.4 million km² (47% underwater):

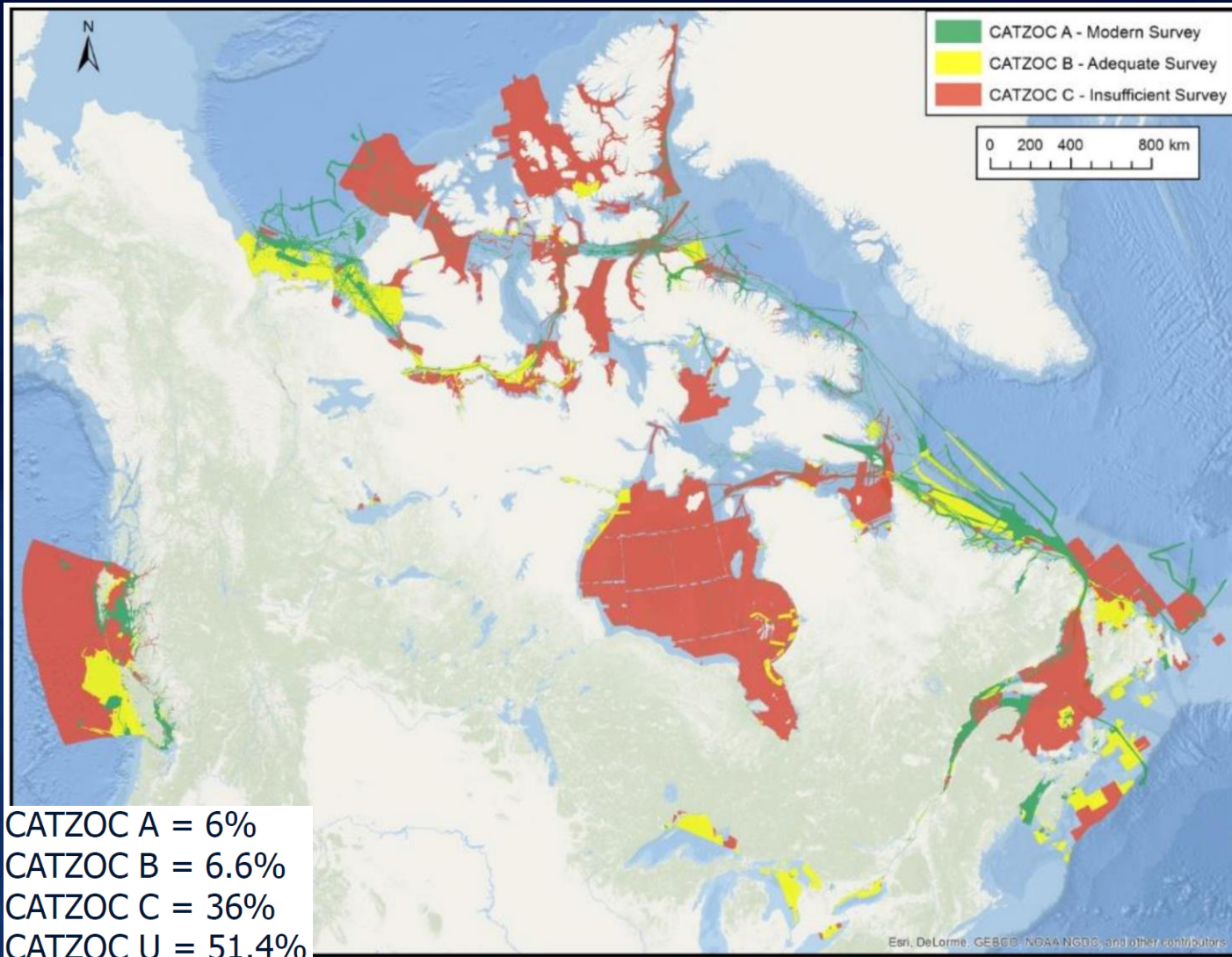
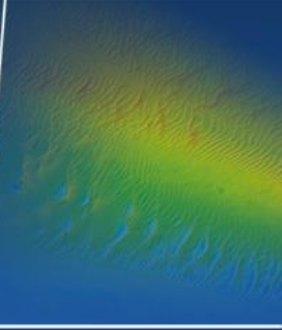
- ~ 28% of the combined Primary and Secondary Low Impact Shipping Corridors are surveyed to either adequate or modern standards.





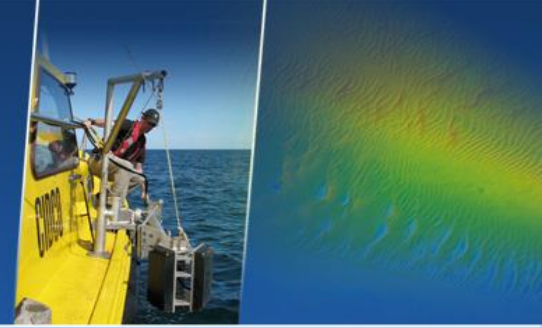


Category zone of Confidence (CATZOC)





Proposed approach



Collaborative bathymetry :



- Pre-qualified systems (HydroBall / HydroBox)
 - * **Fully integrated systems with GNSS L1/L2 capabilities, inclinometer and SBES**
- Collaboration with Local communities
- Automatic data processing and dissemination

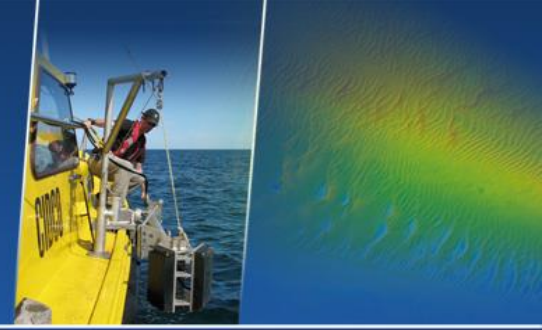
More reactive and cost effective than

- Survey teams from the South
- Conventional hydrographic tools





Project results



Systems were developed allowing **non experts to collect Hydrographic data:**

- Pre qualified systems: HydroBall and Hydrobox

Training was successfully provided to **indigenous communities**

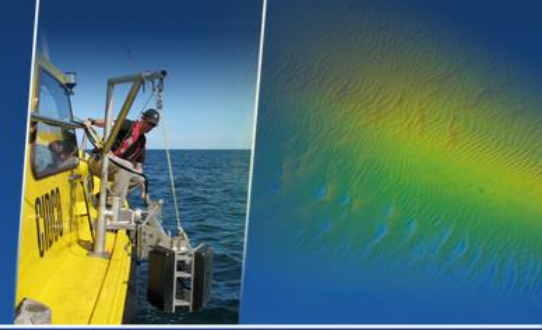
A **workflow to automatically process bathymetric data** was put in place:

- GNSS PPP (NRCan CSRS-PPP)
- SVP modelling (Hycom)
- Automatic filtering





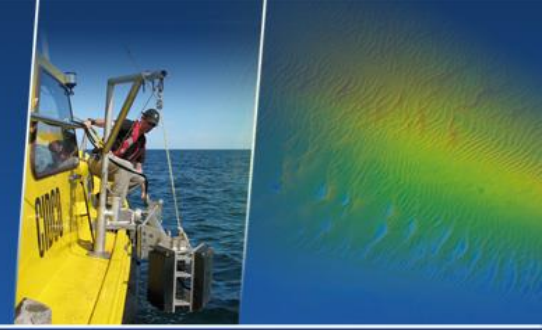
Lessons learned



- **A reliable project coordinator** is mandatory
- Chosen trainees need to **be motivated**
- **Community members** need to have greater **involvement** in the project.
- **Need to ensure robustness of processing workflow.**
- **Efficient dissemination of the data is needed.**



Next steps:

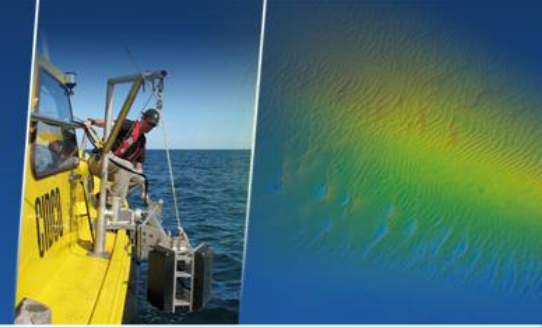


The main objective: provide a **scalable turn key solution** for the **life cycle of hydrographic data**.

- Upgrade data acquisition sensors
- Improve **community engagement**
- Ensure **robustness of data processing** workflow
- **Disseminate** the data to: **web-portal** and **IHO DCDB**
- **Expand** to other **Northern Communities**



Community engagement



- **Determine needs** of communities and discuss benefits

- Provide **extensive and frequent consultation** with communities

- Provide **useful products** in timely manner.

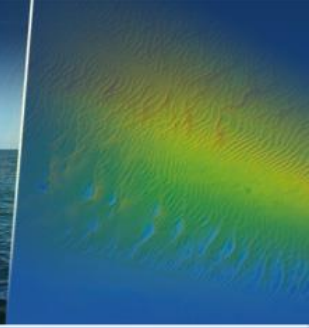
- **Expand** to other interested communities

Following initial project, Northern communities are gaining interest for CSB (Arviat, NU has requested training for data acquisition).



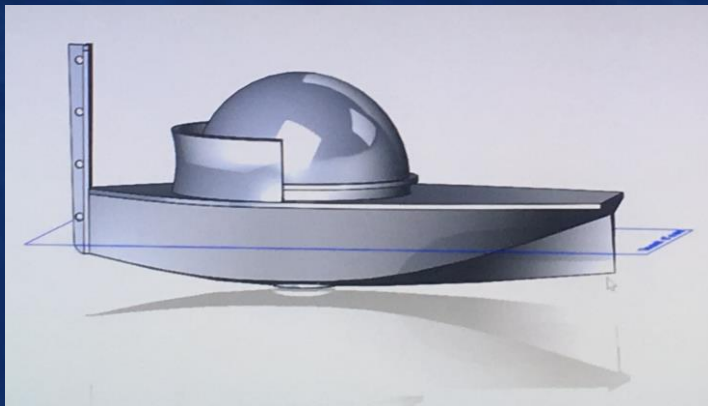


Pre qualified systems



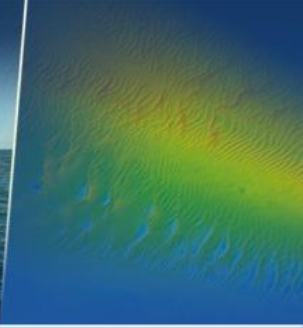
HydroBall:

- Improved **hardware** for automatic data processing capabilities
 - Improved **hydrodynamics** for faster towing speeds
 - **Decrease GNSS signal interference**
- * A prototype is currently being worked on by UQAR (University of Quebec in Rimouski) to augment towing speeds.





Pre qualified systems



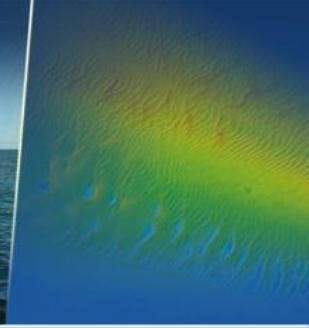
HydroBox:

- Evaluate performance of low cost sensors (GNSS)
- Increased sensor compatibility: compatible with multiple different sonars and data formats
- Improved **hardware** for automatic data processing capabilities

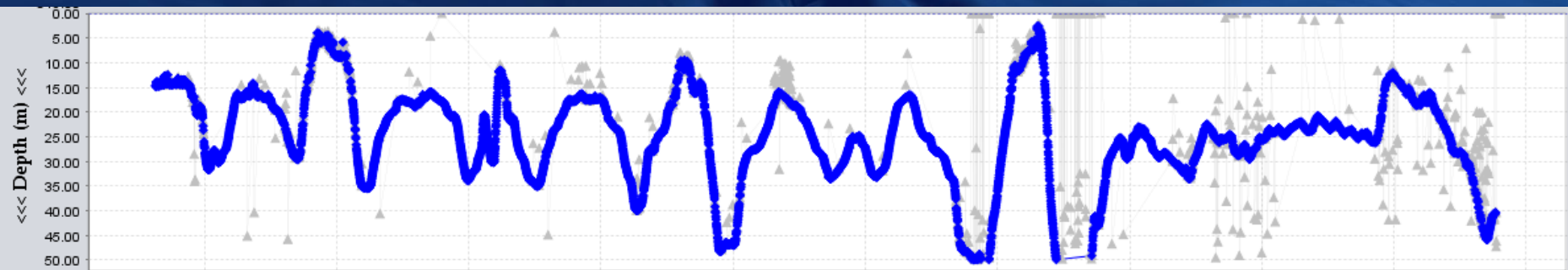




Data processing

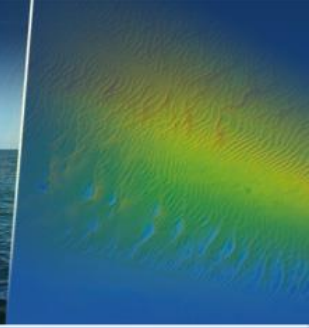


- Ensure the **robustness of the workflow** by incorporating other data sets: **other CSB sources**
- To **validate and establish tools for vertical referencing** of CSB GNSS data in the Arctic (HyVSEPs + hydrodynamic models).
- Develop **automated data cleaning tools** for outlier detection.



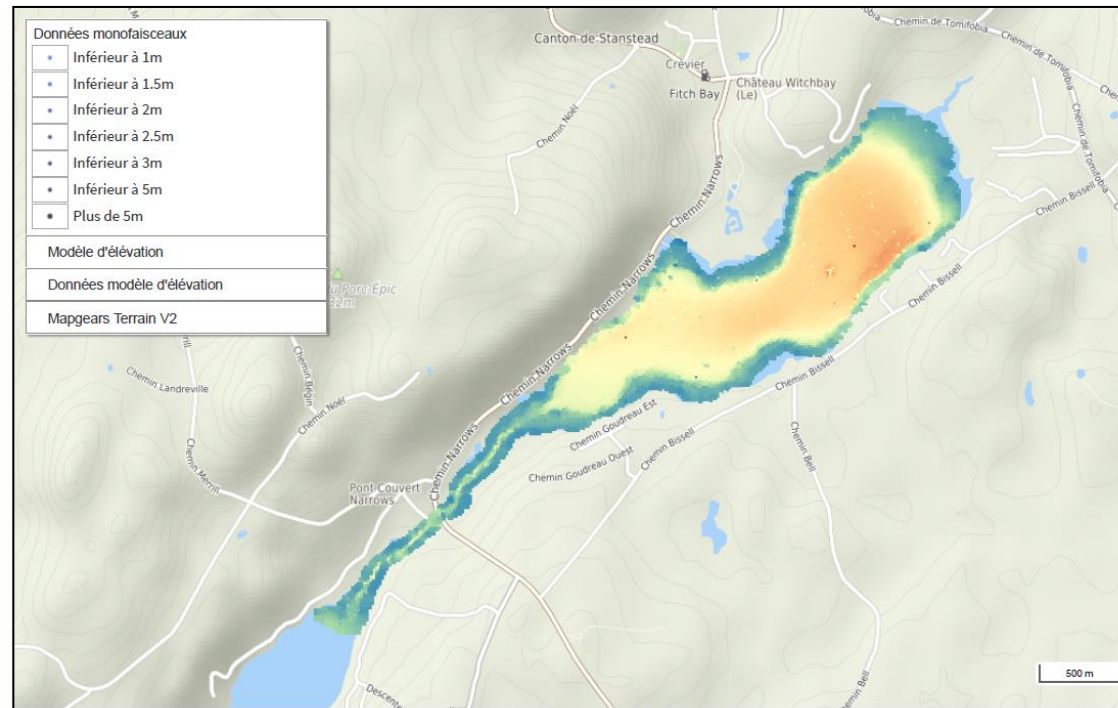


Data dissemination



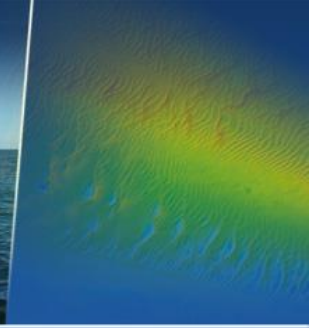
- Provide useful products to Northern communities

CSB data visualisation

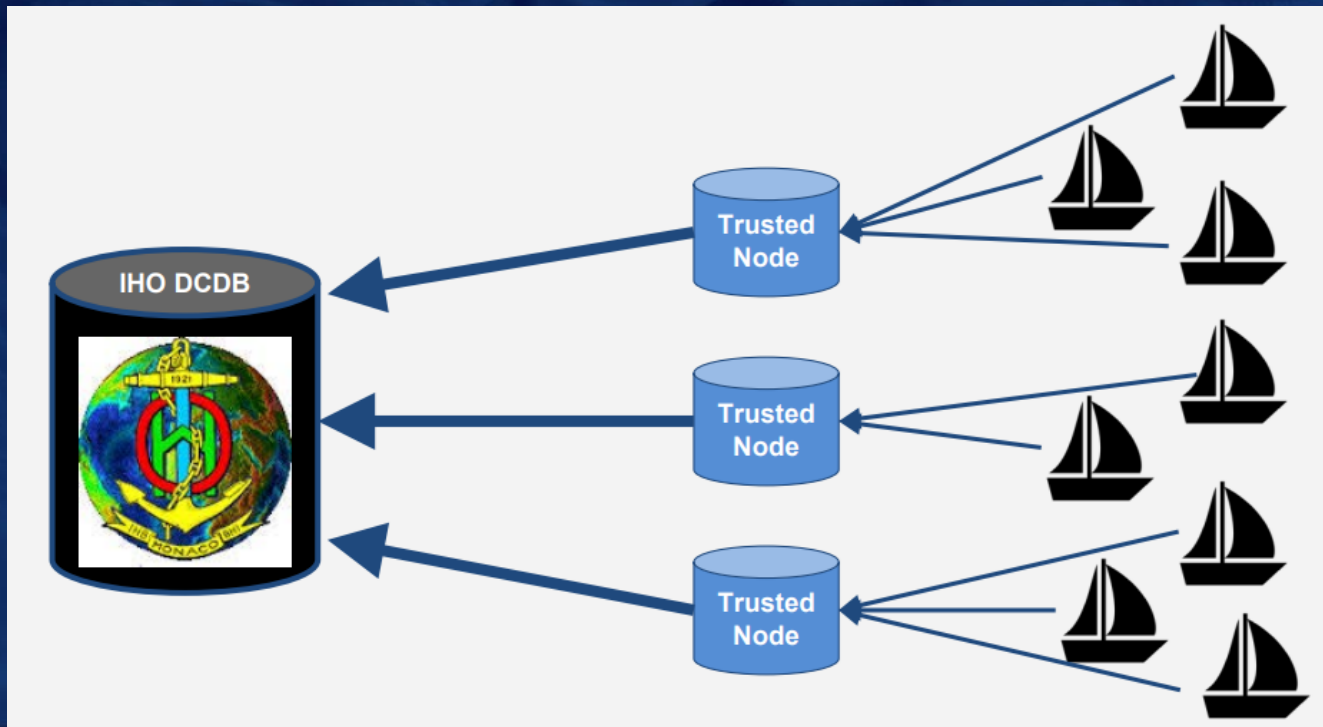




Data dissemination

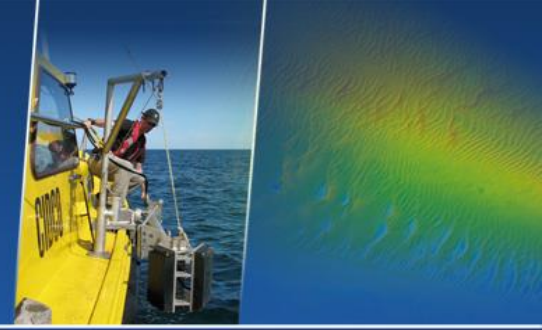


- Add data dissemination capabilities
 - IHO DCDB Trusted Node
 - Contribute to IBCAO





CSBNC next steps

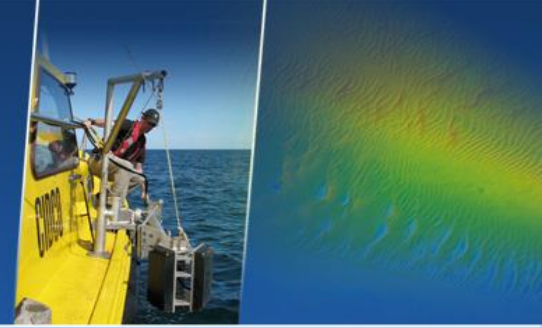


To ensure the life cycle of hydrographic data is complete:

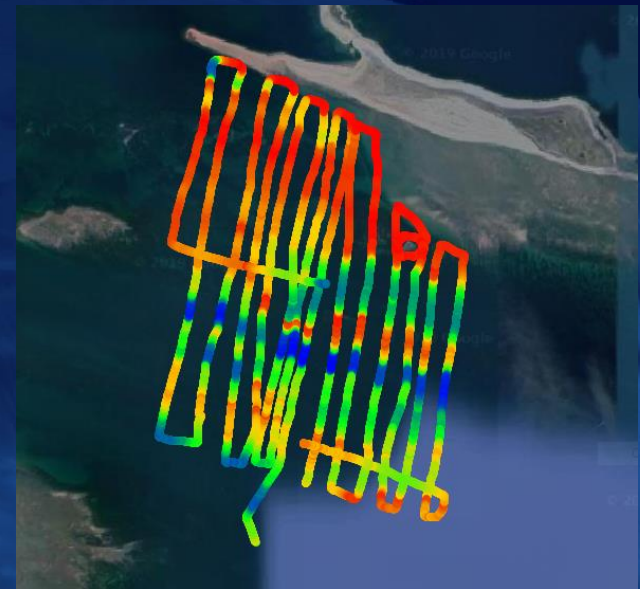
- Efficient and easy to use data acquisition systems
 - * In the works
- Community engagement
- Private ship owners to use HydroBox systems
 - * In the works
- Robustness of processing workflow
- Dissemination to IHO DCDB, WEBPORTAL
 - * In the works



Active CSB initiatives

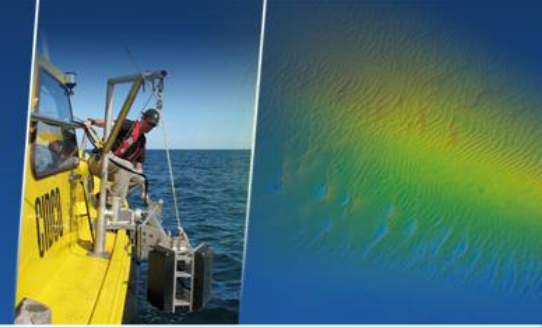


- Arviat, NU: Request from community for HydroBall training:

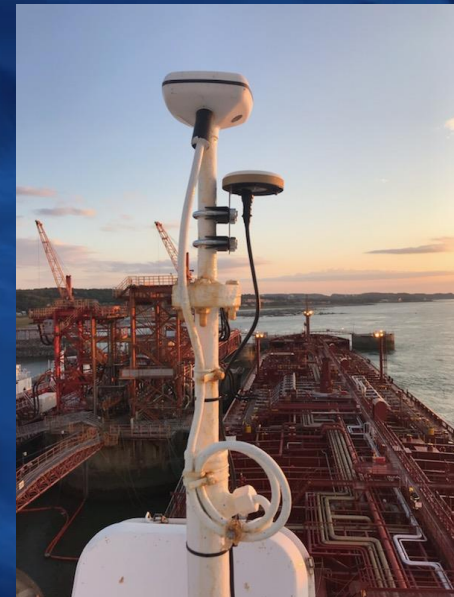




Active CSB initiatives

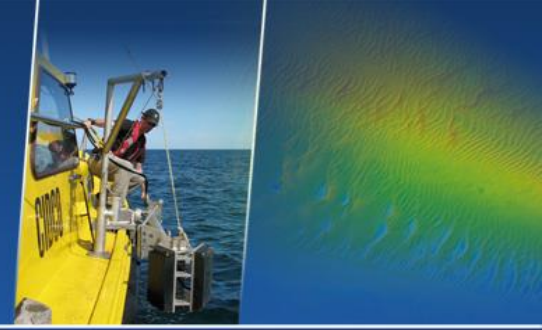


- CHS: installed Hydrobox on Laurentia Desgagnés oil tanker for water depths measurements during winter season





Current status



- COMREN in collaboration with CHS have submit a Innovation project proposition to Defence Research and Development Canada (**DRDC**) for a **3 year CSB project in Northern Canada**
 - Feedback will be provided by late Fall for the acceptance of the project or not.

In the meantime COMREN objectives:

- Contribute to IHO DCDB and become a trusted node.
- Become a member of the CSBWG.
- **Contribute to IBCAO**



Thank you

