Hydrographic Services and Standards Committee

HSSC-7

Open Session

Status of crowd-sourced bathymetry development

November 2015

Gilles Bessero

IHB

JOURNÉE MONDIALE DE L'HYDROGRAPHIE

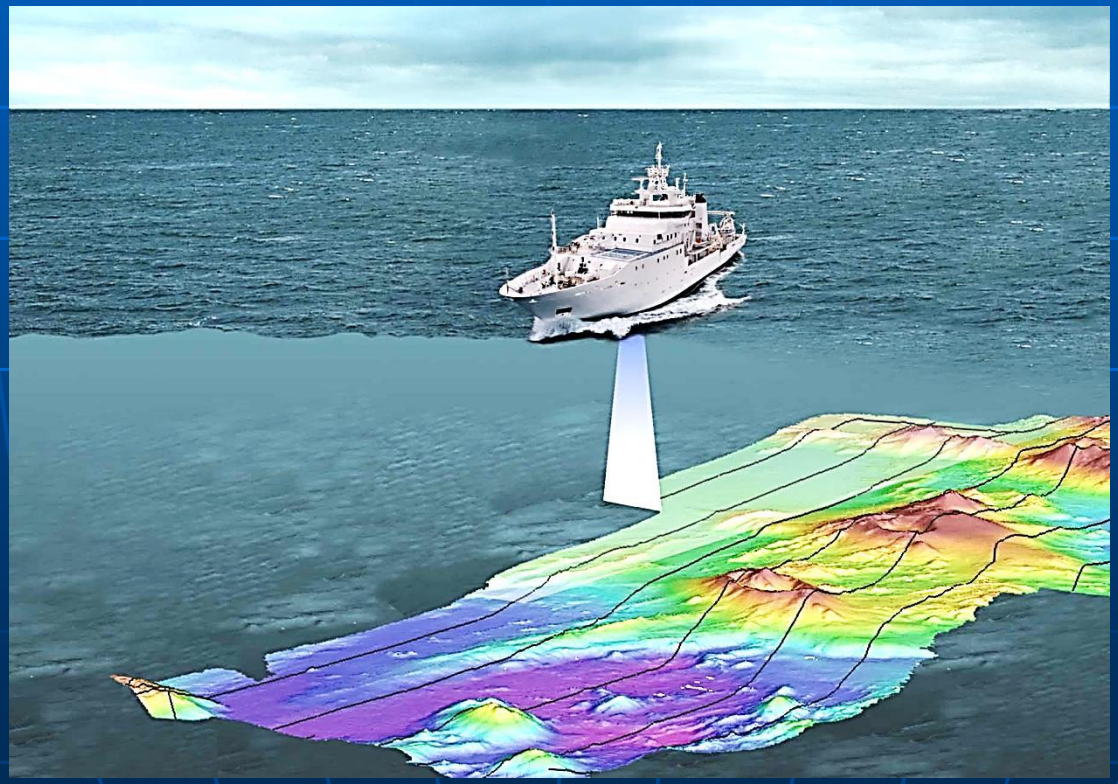
WORLD HYDROGRAPHY DAY

«Nos mers et voies navigables - encore à cartographier et explorer complètement»

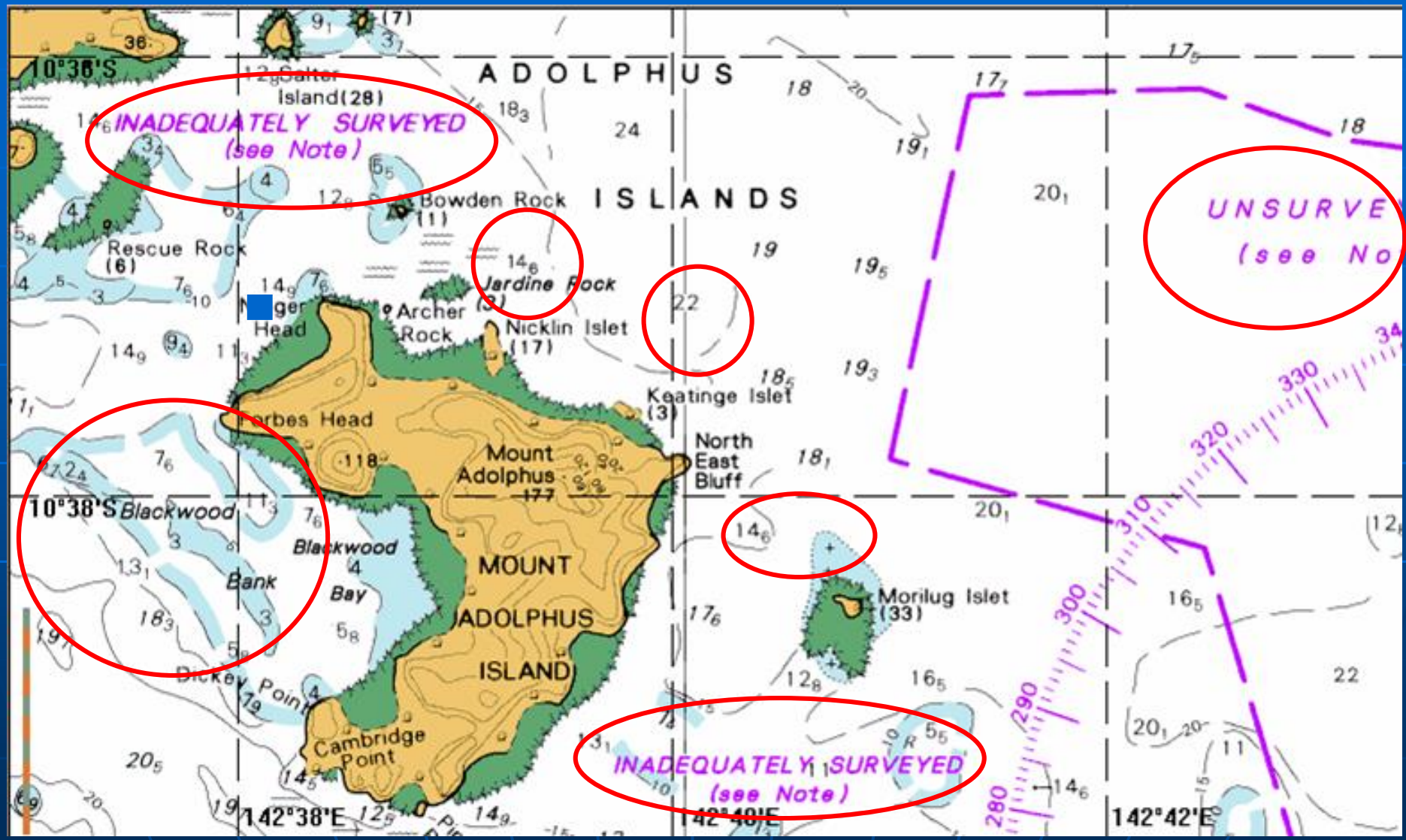
«Our seas and waterways - yet to be fully charted and explored»

An uncomfortable fact:

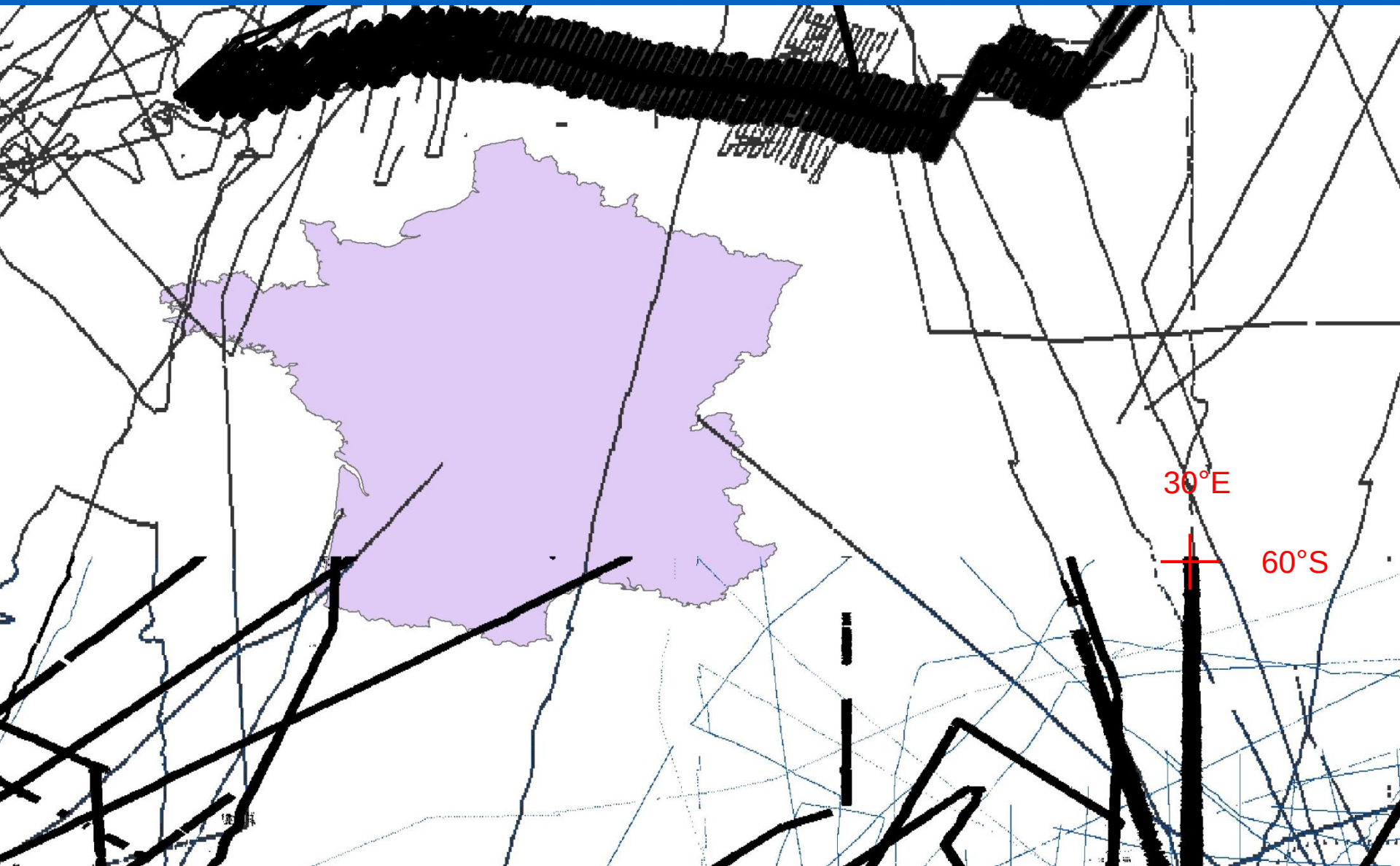
" … we have significantly higher resolution maps of the Moon, Mars and Venus than most of the world's seas and oceans "



Status of surveying worldwide



How little data in some oceanic areas

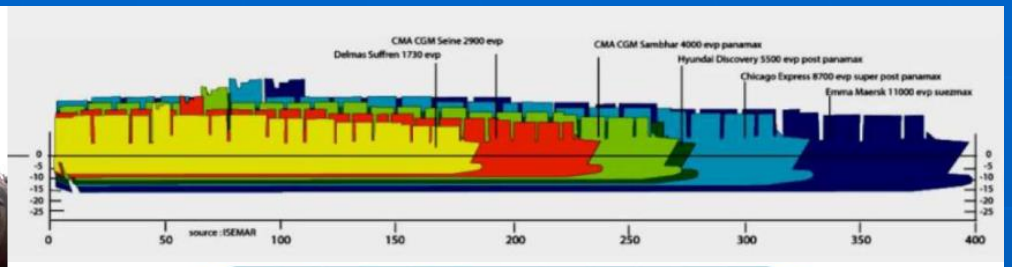


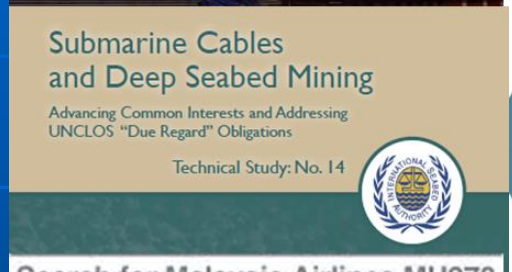
Survey and charting status 2015 (source: IHO C-55)

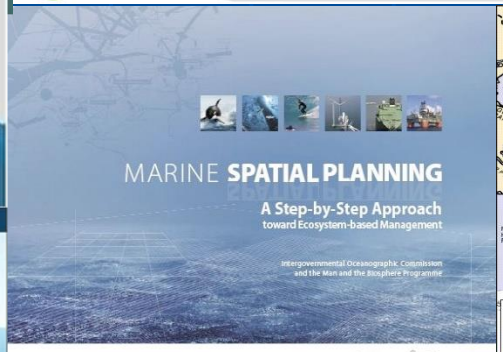
Unsurveyed or **requires better data** (0-200m deep)

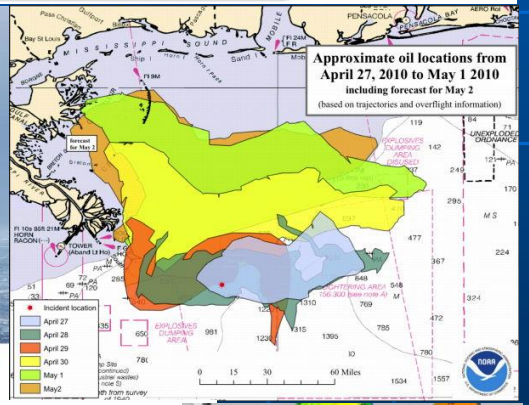
- SW Pacific >95%
- Polar regions > 95%
- W. Africa >80%
- Caribbean >80%
- Australia ~ 65%
- Greece 65%
- USA ~ 40%
- UK 30%
- France 19%

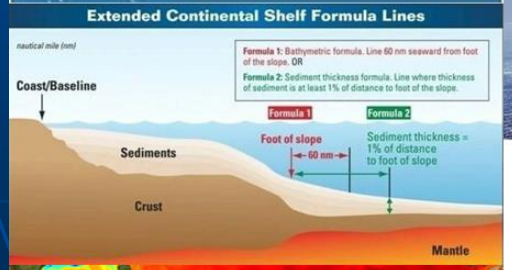
Why does this matter?

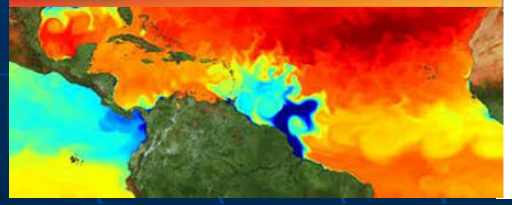




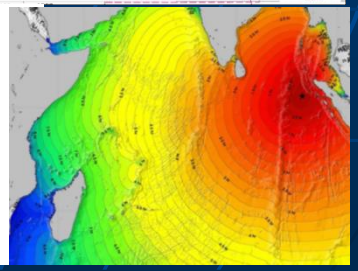






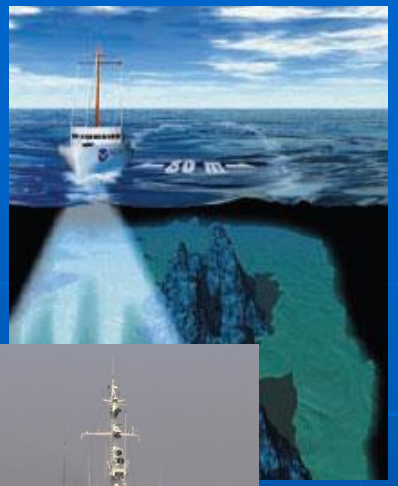


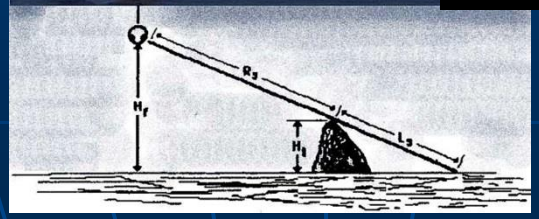
When Bathymetry Determines Who Might Live and Who Might Die



Global surveying capacity

- 35% reduction in government fleet in 25 years





Can we do something about it?

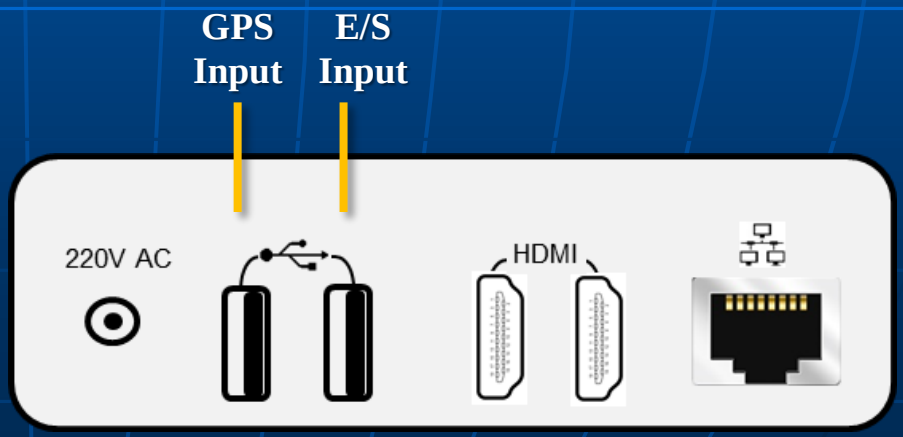
- Raise awareness on the importance of hydrography
- Maximize access to existing data
- Promote alternative / stop-gap data collection
  - ✓Satellite-derived bathymetry
  - ✓Crowd-sourced bathymetry
    - Collection of depth data by ships and boats using their navigation echo sounders during their normal voyages
    - Reinvigorate the initial principles of the GEBCO project using widely available modern technologies

Crowd-Sourced Bathymetry (CSB)

- Low cost – high impact
- Non commercial
  - community based
- Proof of concept initiative led by IHO and PYA (Professional Yachting Association)
  - Mariners' self-help programme
  - Logger in every professionally crewed ship
- CSB Working Group established to develop guidelines

Sea-ID LOGGER

- Stable clean 220 V AC power input - UPS is essential
- GPS and digital echo sounder with standard NMEA string output
- System set up for daily data download of ~200 kb data file
- Suitable location to mount 20 cm logger box
- Logger is believed to work up to 10 years



Crowd-sourced data collection

observers send alert to HO *(if appropriate)*

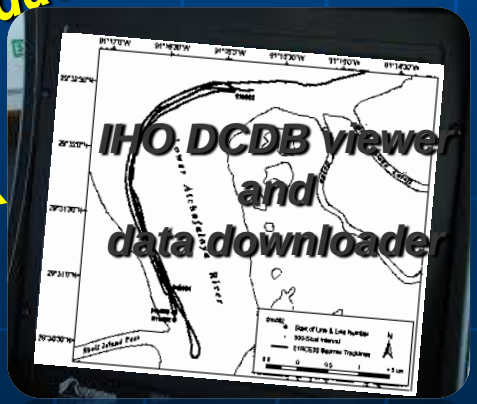
HO produces new or revised chart

data uploaded (at mariners' convenience)

HO's access DCDB for normal chart updating cycle

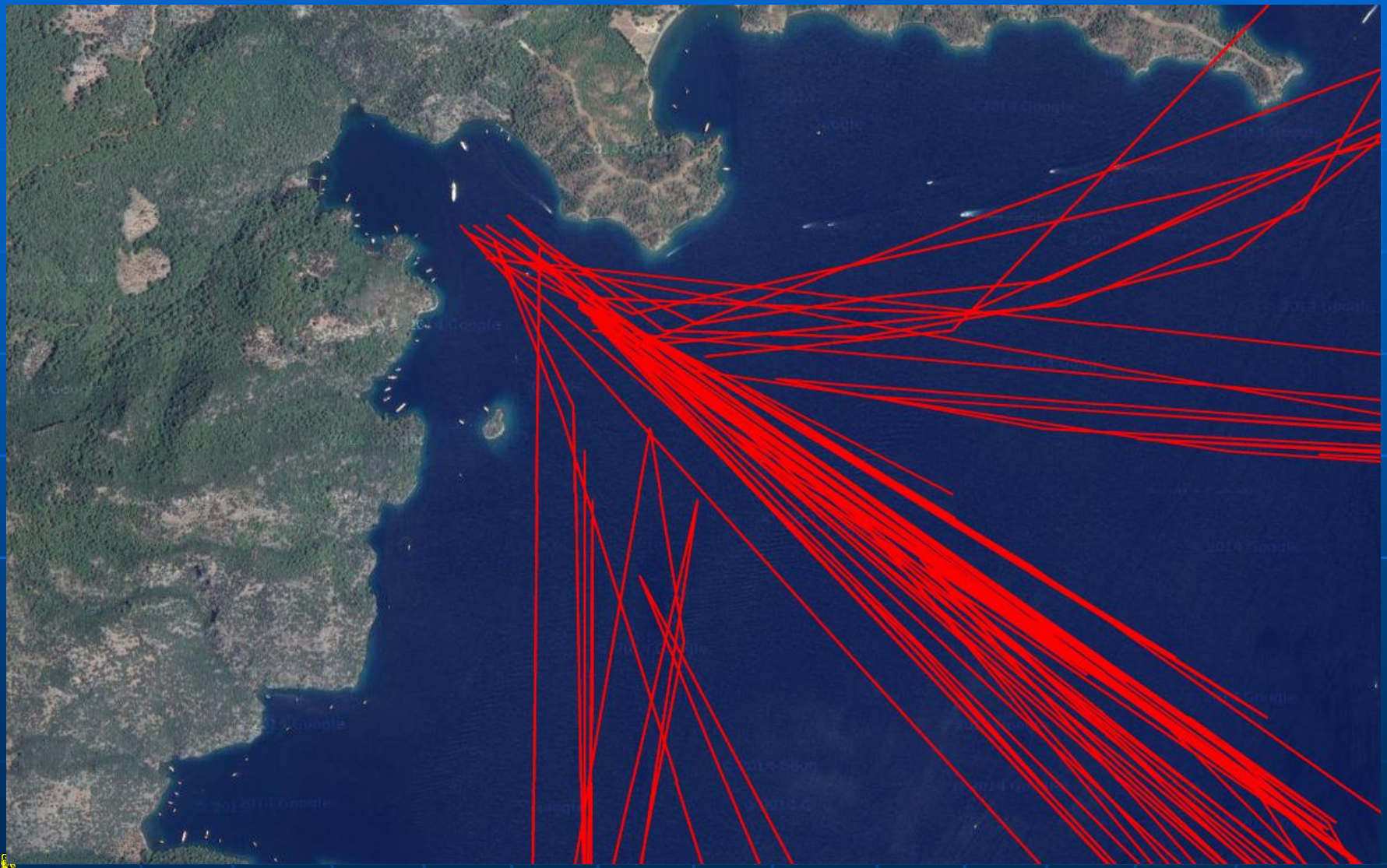
IHO Data Centre for Digital Bathymetry (DCDB)

Public access to DCDB

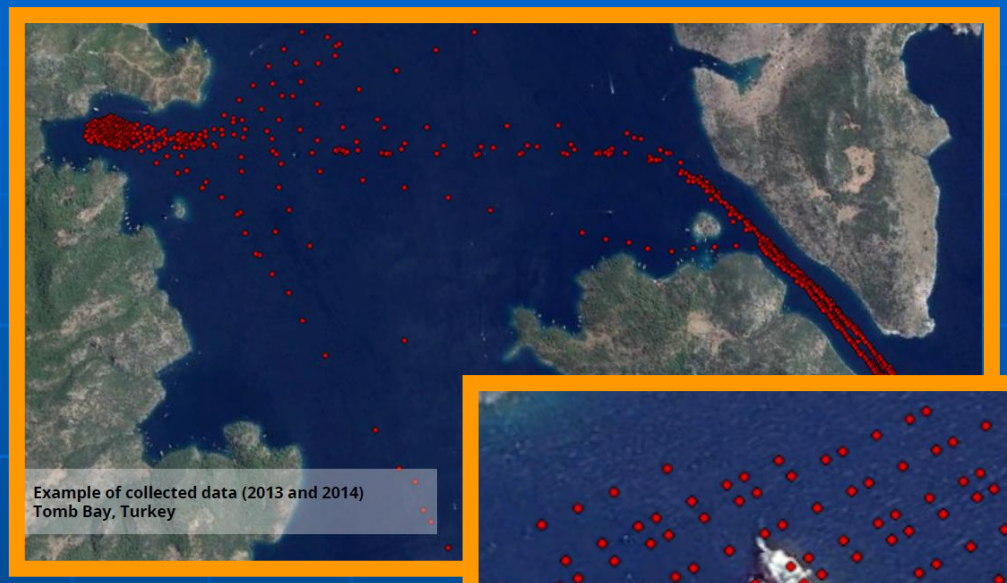


- *near real-time update*
- *view all data*
- *users download and use data "as is"*

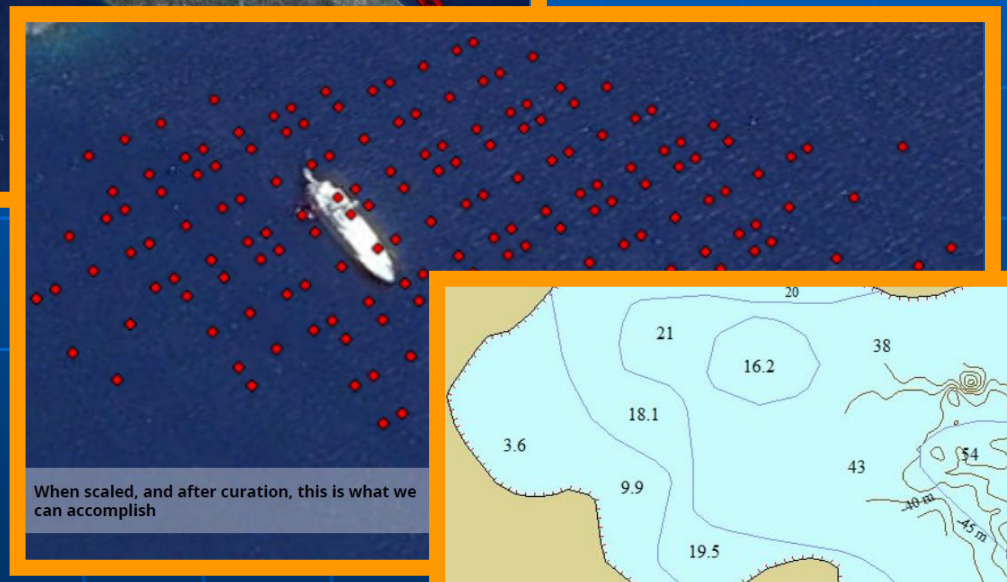
Sample data set



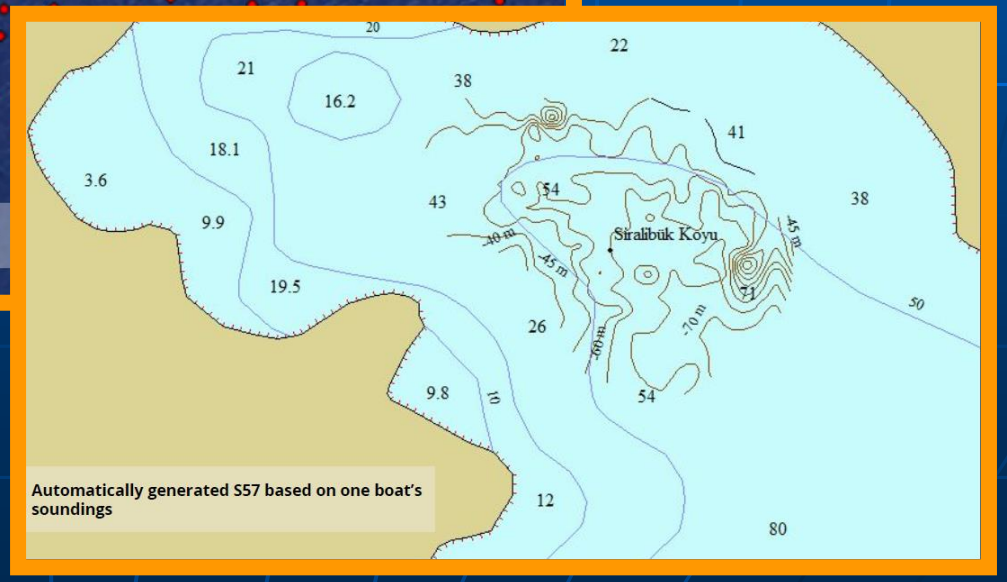
Sea-ID Super Yacht Project: example of overlay output created by Jeppesen



Example of collected data (2013 and 2014)
Tomb Bay, Turkey



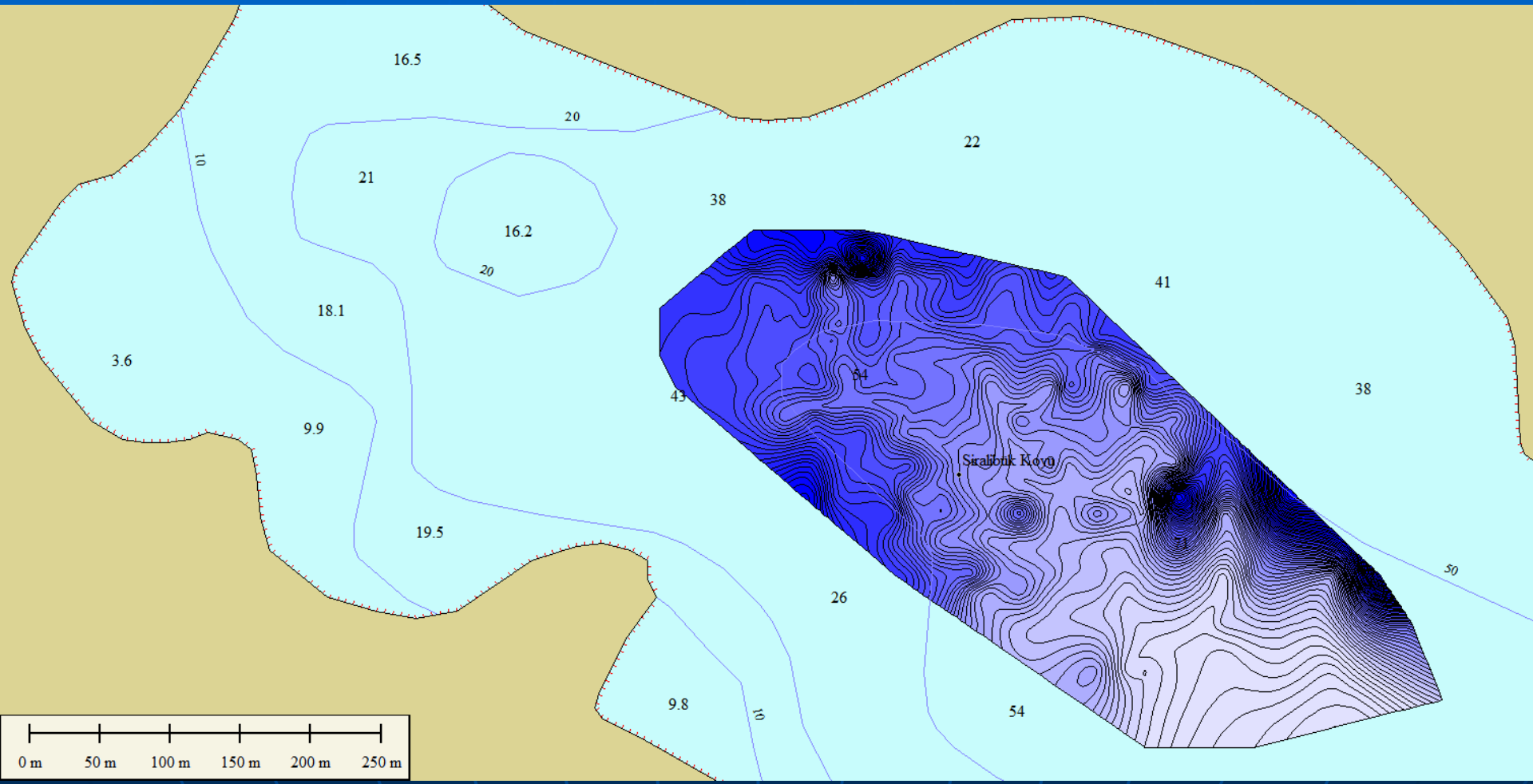
When scaled, and after curation, this is what we can accomplish



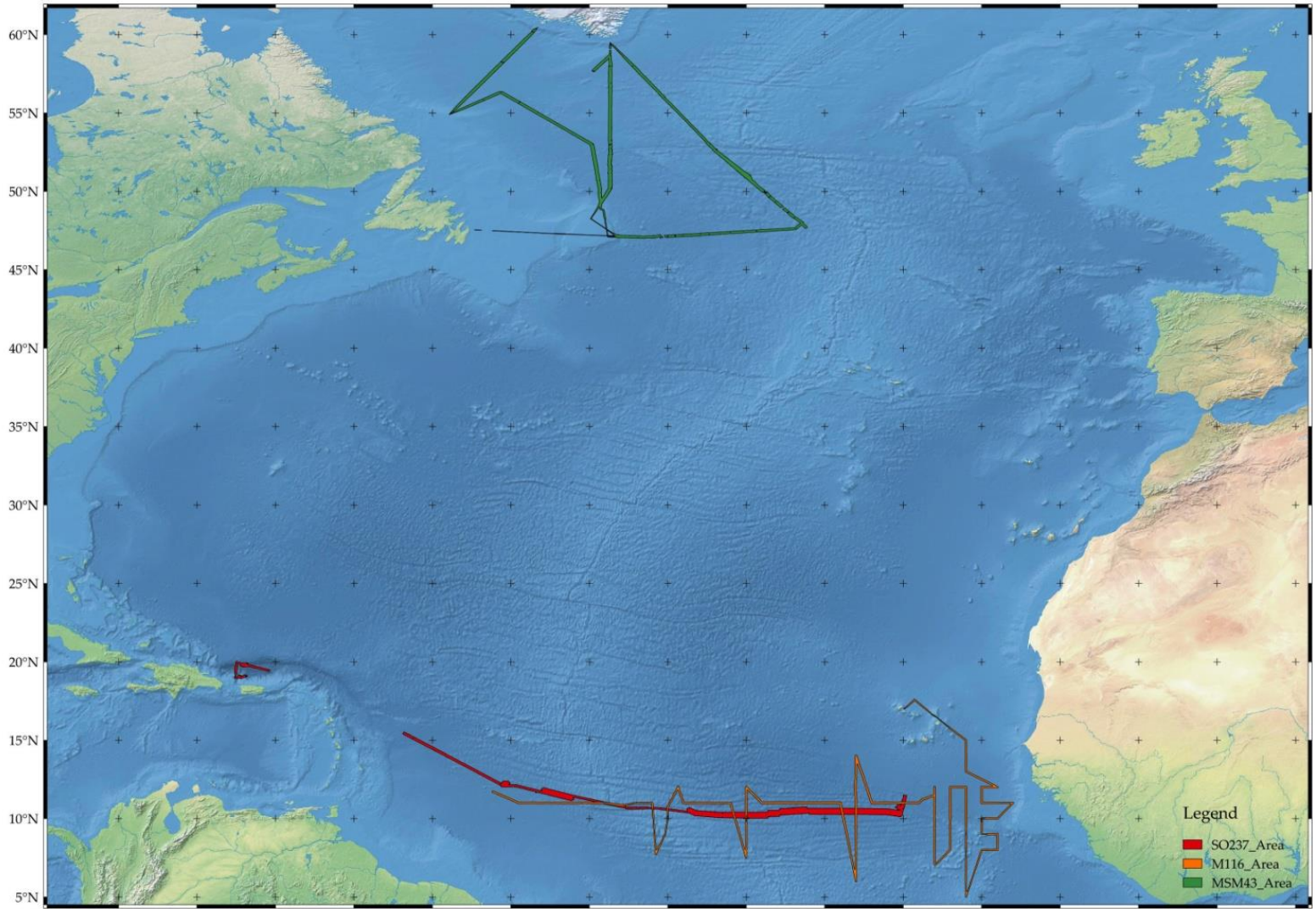
Automatically generated S57 based on one boat's soundings

Potential Crowd-Source Data Usage:

Depth charts



North Atlantic Seabed Mapping Project

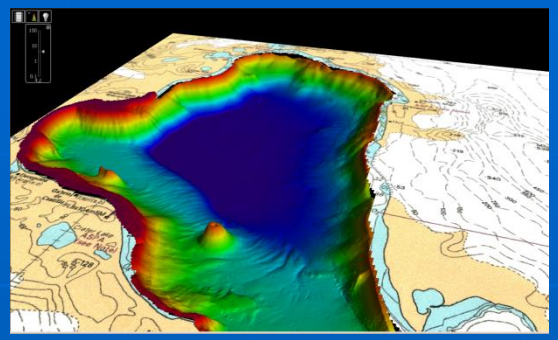


- Transects collected January to February 2015
- Transects during physical oceanography cruise April 2015
- Transects during a physical oceanography cruise May 2015

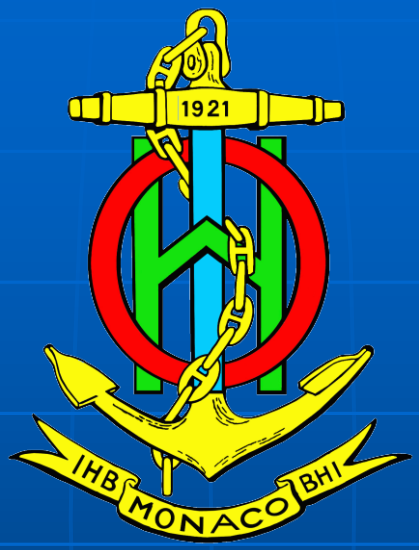
IHO CSB Working Group

- Decision of the 5th Extraordinary International Hydrographic Conference
- Objectives:
  - ✓Prepare a draft IHO publication on policy for trusted crowd-sourced bathymetry for submission to IRCC in 2016
  - ✓Include guidelines on the collection and assessment of CSB data, not only for potential use for charting purposes but also for its wider use in non-navigational applications.
- Chair: Lisa Taylor (USA – NOAA/NCEI)

Next steps :



- Gather data
- Refine upload and download portals on DCDB
- Develop IHO guidelines to assess CSB data quality for use in charts
- Collect more data sets and explore methods for quantifying uncertainty values
- Engage with commercial organizations already established (Olex, TeamSurv, etc.)



For further information:

info@iho.int

www.iho.int