



QINSy

QPS QINSy is navigation / positioning and reporting software used on board offshore construction vessels, pipe-lay barges, drilling rigs, seismic research vessels and all manner of hydrographic survey vessels (Surface and sub-surface). QPS is a market leader in the offshore renewable energy industry, the dredging industry and port communities.

Qimera

QPS Qimera is probably the simplest yet most powerful post processing application available. Built on the strengths of QINSy and Fledermaus and optimized for the latest computing technology, Qimera is feature rich and extremely easy to use. Able to work with QINSy data files, plus many other raw sonar file formats, the Qimera Dynamic Workflow revolutionizes the efficiency with which post processing can be completed.

Qastor Connect Server

Precise navigation - Using wired or wireless methods, QPS Qastor interfaces to most devices outputting NMEA data strings to AIS transponders/receivers and to the QPS Connect Server. Connect typically supplies ENC updates and meteorological data feeds to Qastor users, but is also capable of distributing other types of information (like VTS feeds or Qastor common files).

Qarto

The strength of Qarto is the very fast and automated ENC production. Qarto makes possible the short turn-around times from survey to chart that are necessary for the safe operation of the busy waterways. Qarto vn3 distinguishes itself by its efficient way of data storage and by its principle based on semi-static base cells that are updated with highly dynamic hydrographic data. Completely updated ENC base cells are ready for distribution very shortly after the survey being completed.

Fledermaus

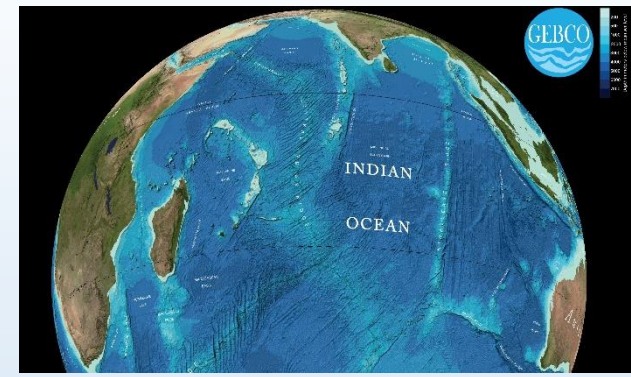
Fledermaus is an industry leading interactive 4D geospatial visualization and analysis tool. Commercial, academic and government clients use Fledermaus to interact with massive geographical datasets of numerous data types for ocean mapping and land-based projects. The intuitive 4D display allows clients to rapidly gain insight and extract more information from their underlying data. This provides our clients with added value in data interpretation efficiency, quality control accuracy, data analysis completeness and project integration. All of which promotes clear communication.

UNDERWATER MAPPING TECHNOLOGY AND APPLICATIONS

QPS and MD Systems

Elisabeth J.Y. Kim

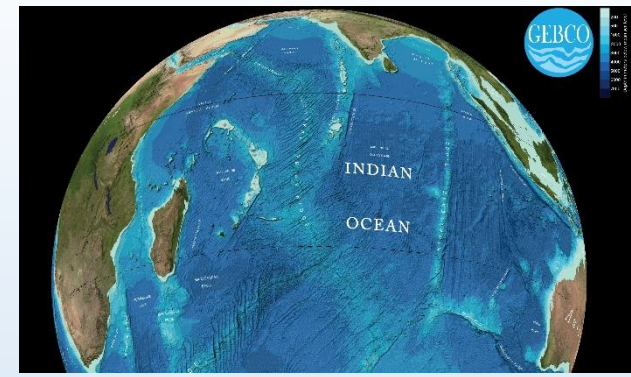
Ocean Mapping Is Exciting..



.. and the more we learn about our seafloor, the more we understand scientific processes and their impact on commerce, shipping, safety of navigation, climate change and the coastal environments.

Using Acoustics. Acoustic systems (single-beam echosounder, multibeam echosounder, and side scan sonar) are efficient tools capable of monitoring the environmental (physical and biological) evolution.

Ocean Mapping Is Exciting..

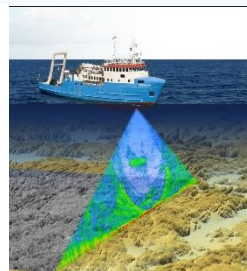
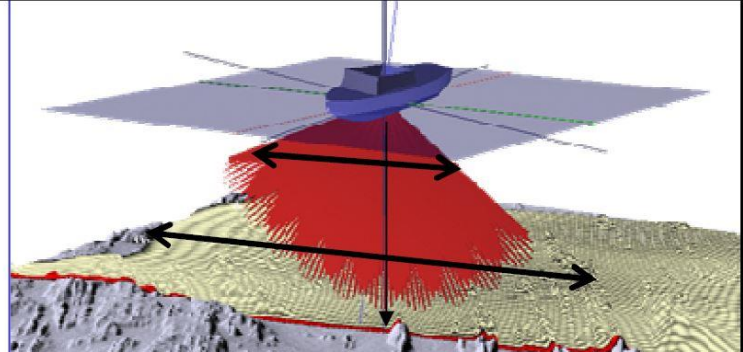


About This Talk:

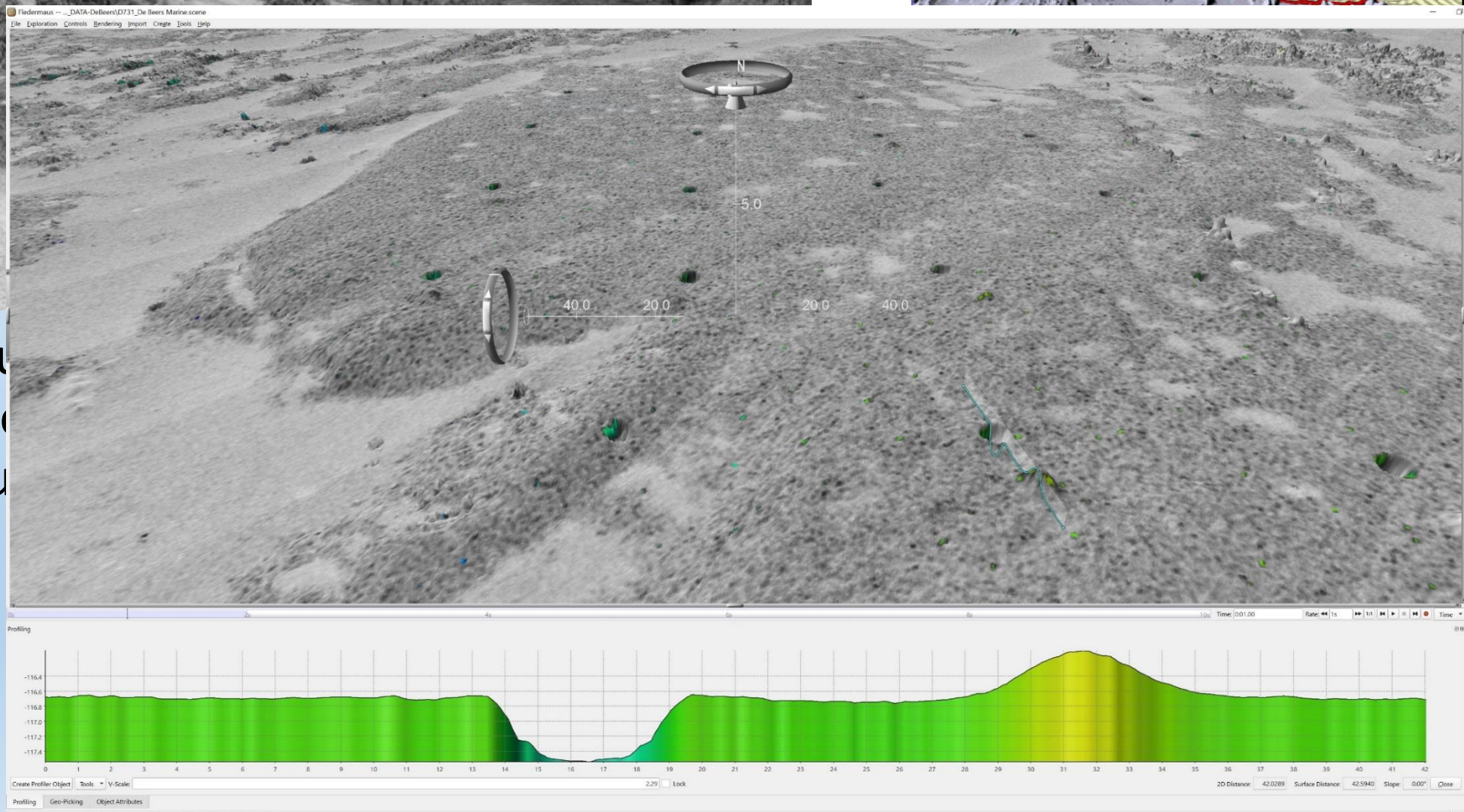
- Principles of echosounding, and especially MBES
- MBES type and choosing
- MBES data types
- Emerging technologies with MBES data
- Sharing results – linkage with GIS
- Summary & Take Home Message



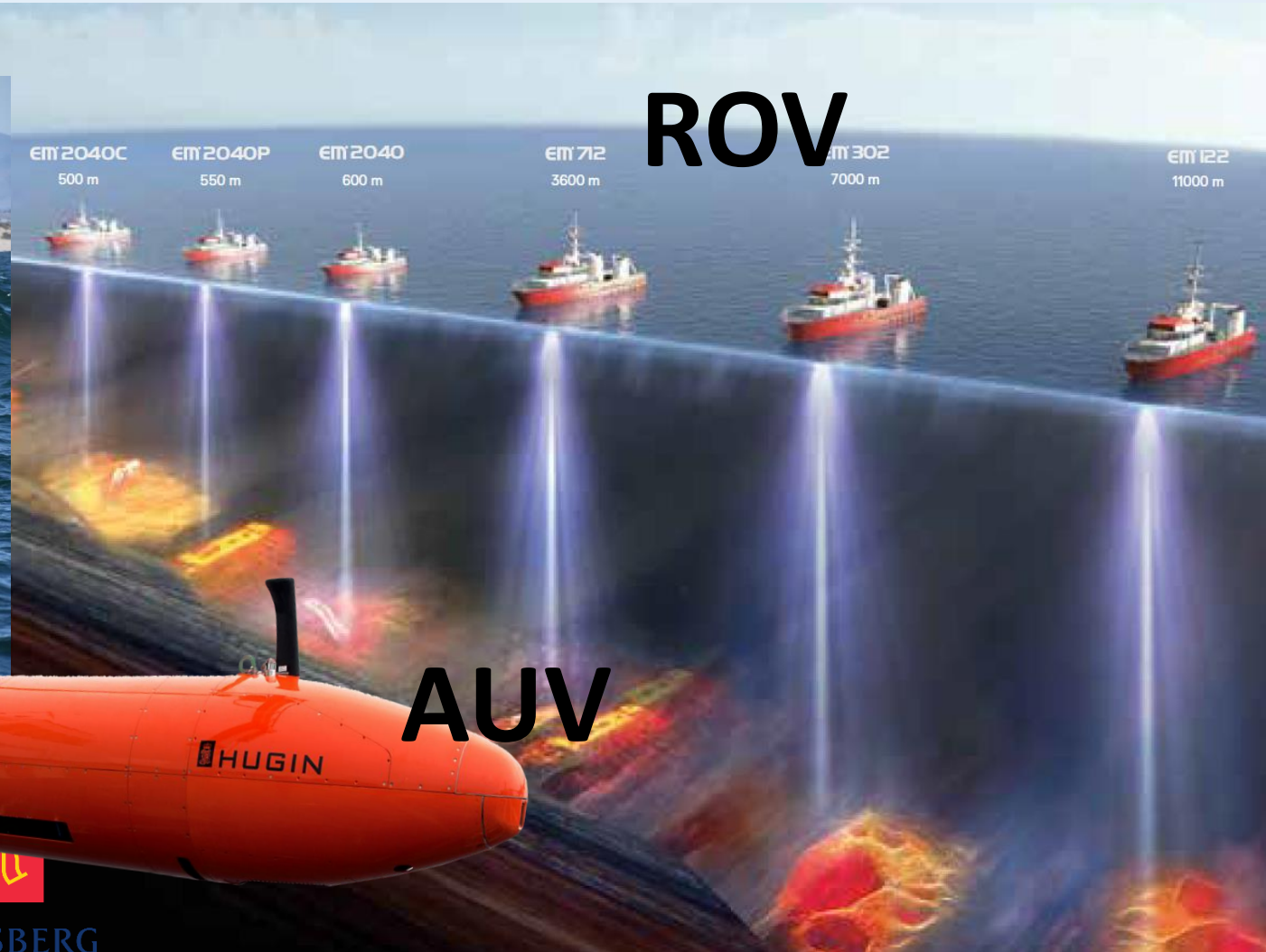
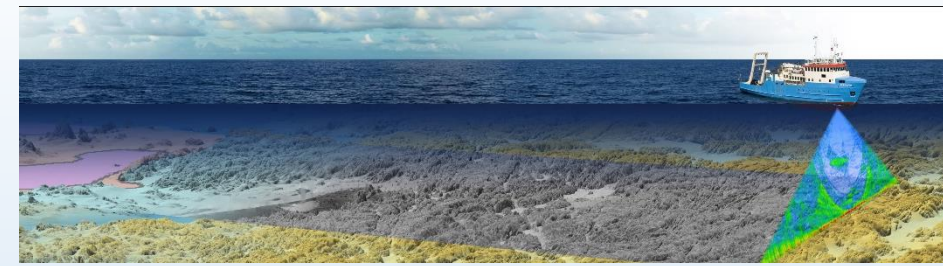
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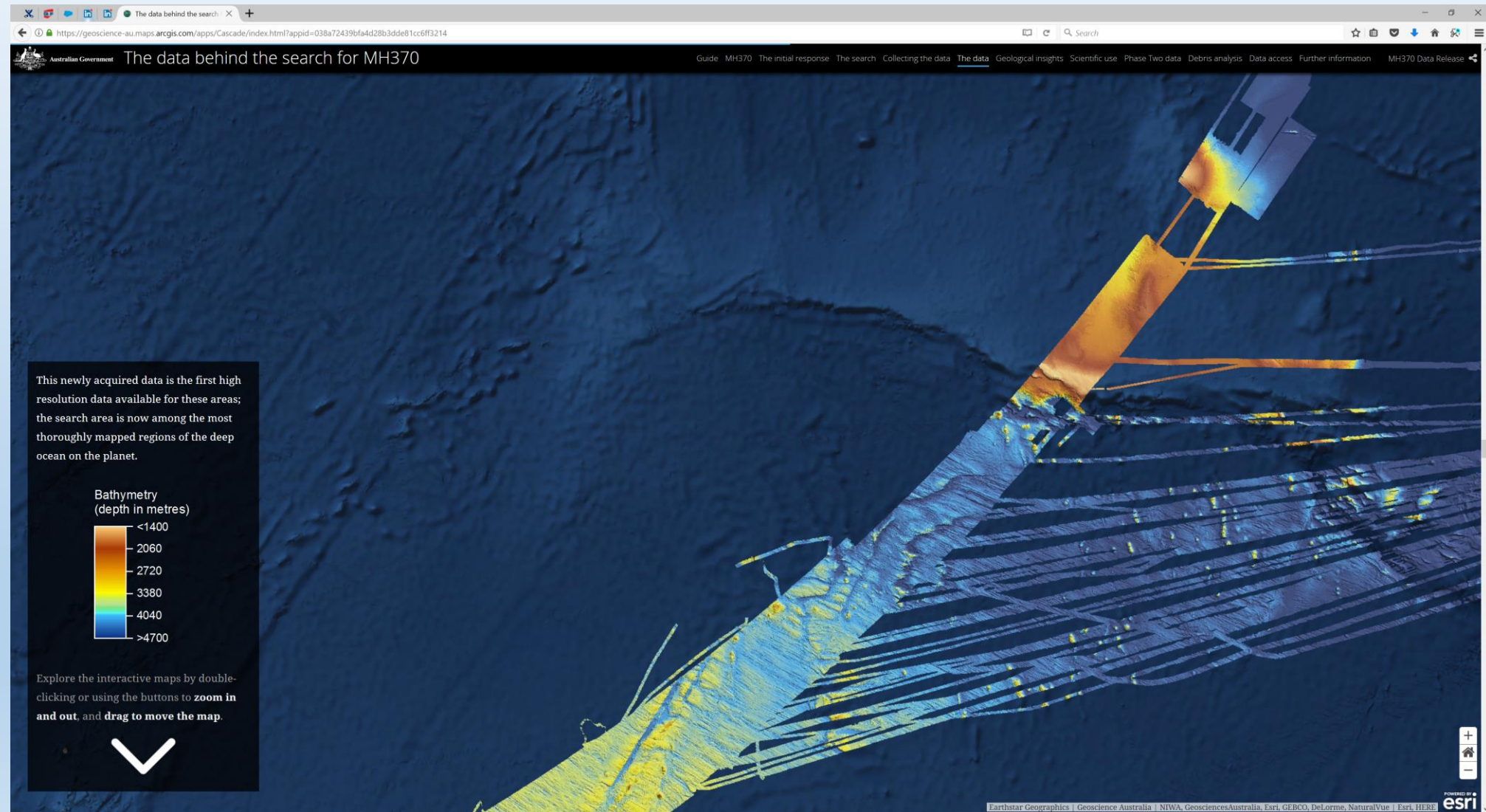
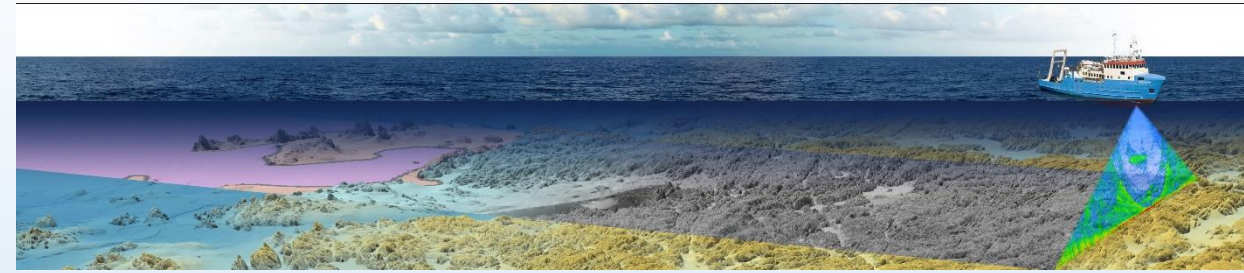
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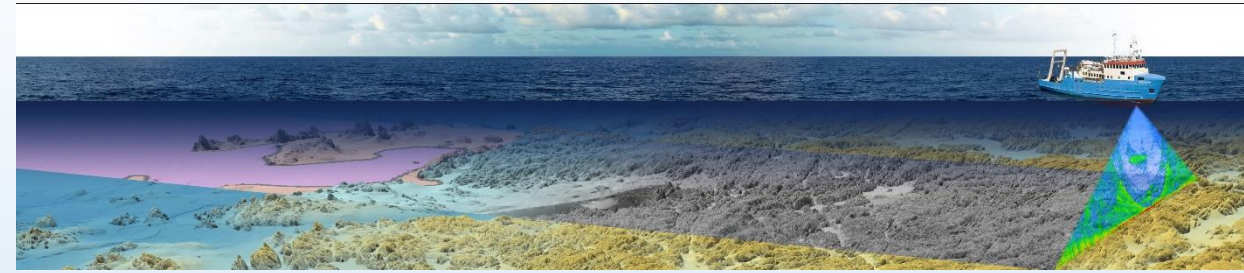
MBES Installation and survey:



Modern Day Example



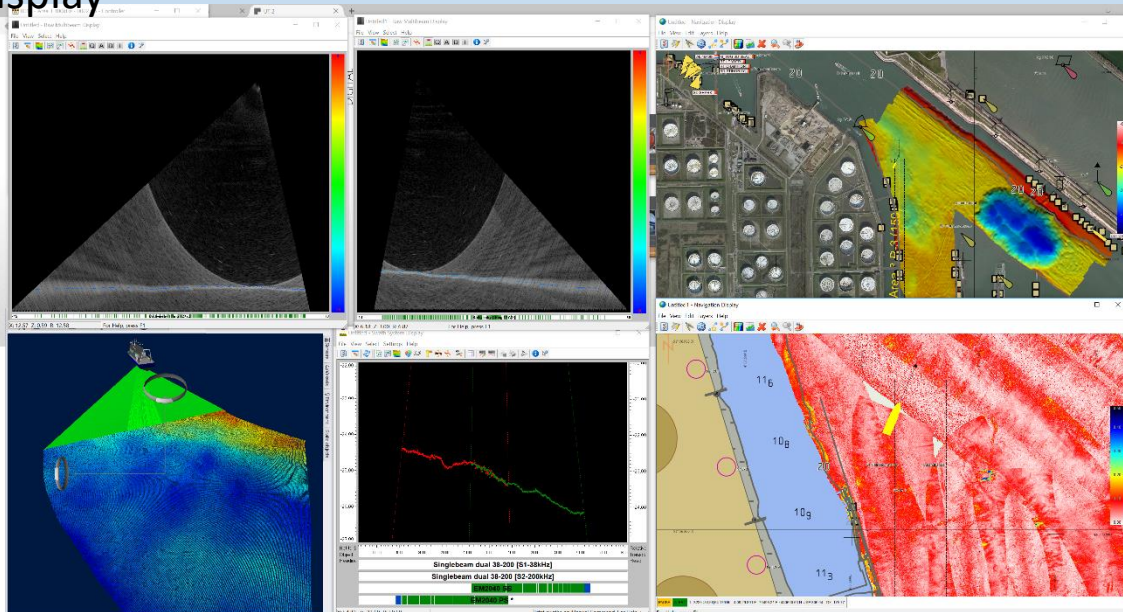
MBES Data Types



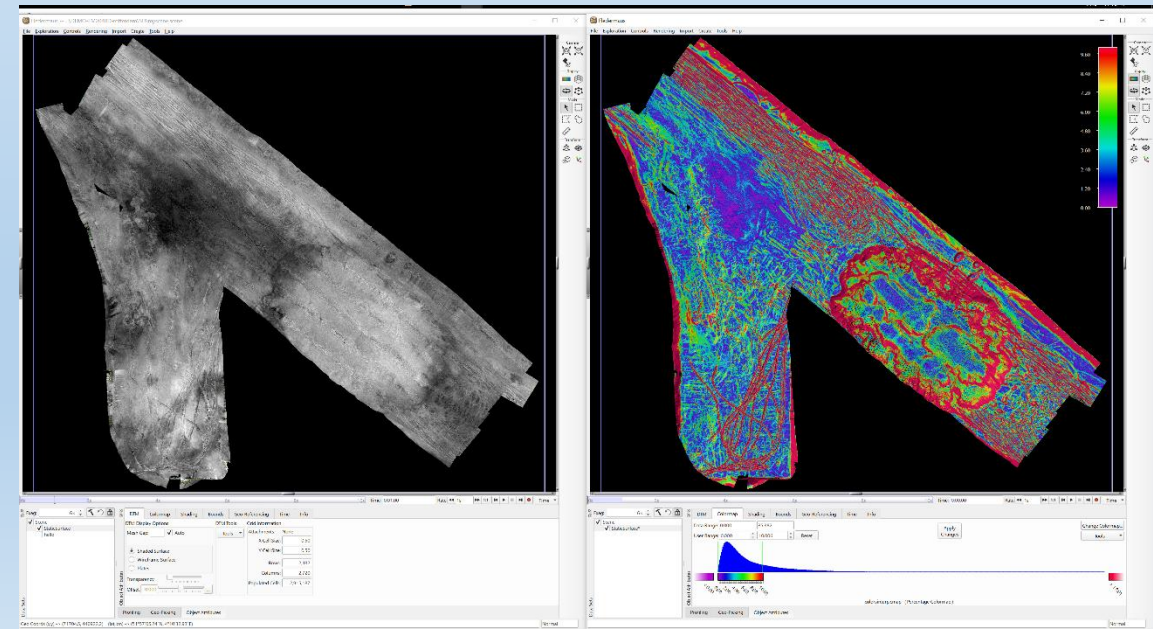
geo-referenced:

- Bathymetry; point cloud or surface, and derived slope/roughness
- Backscatter (amplitude / signal strength)
- Water Column

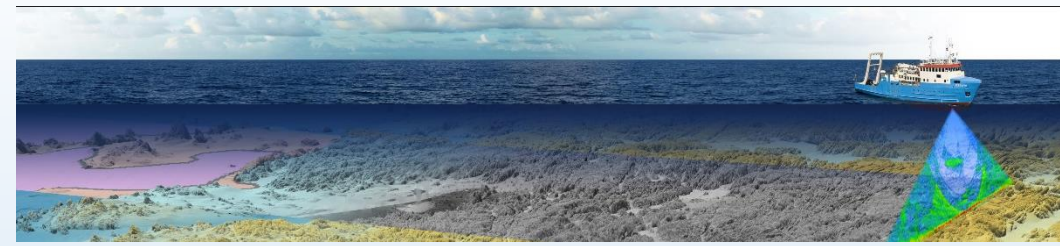
Data display



Processed results

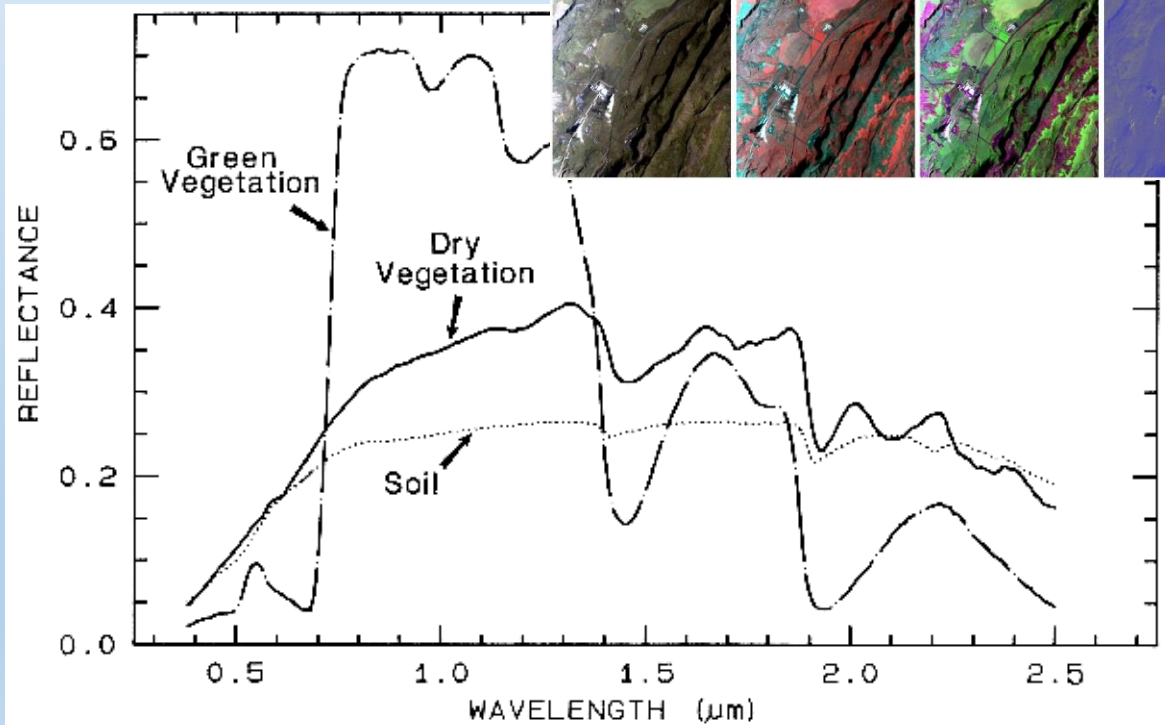
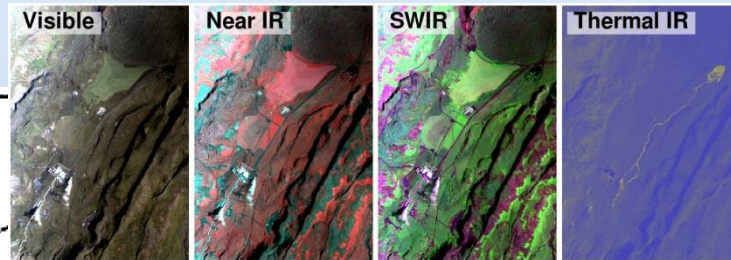


Multi-Spectral Multibeam



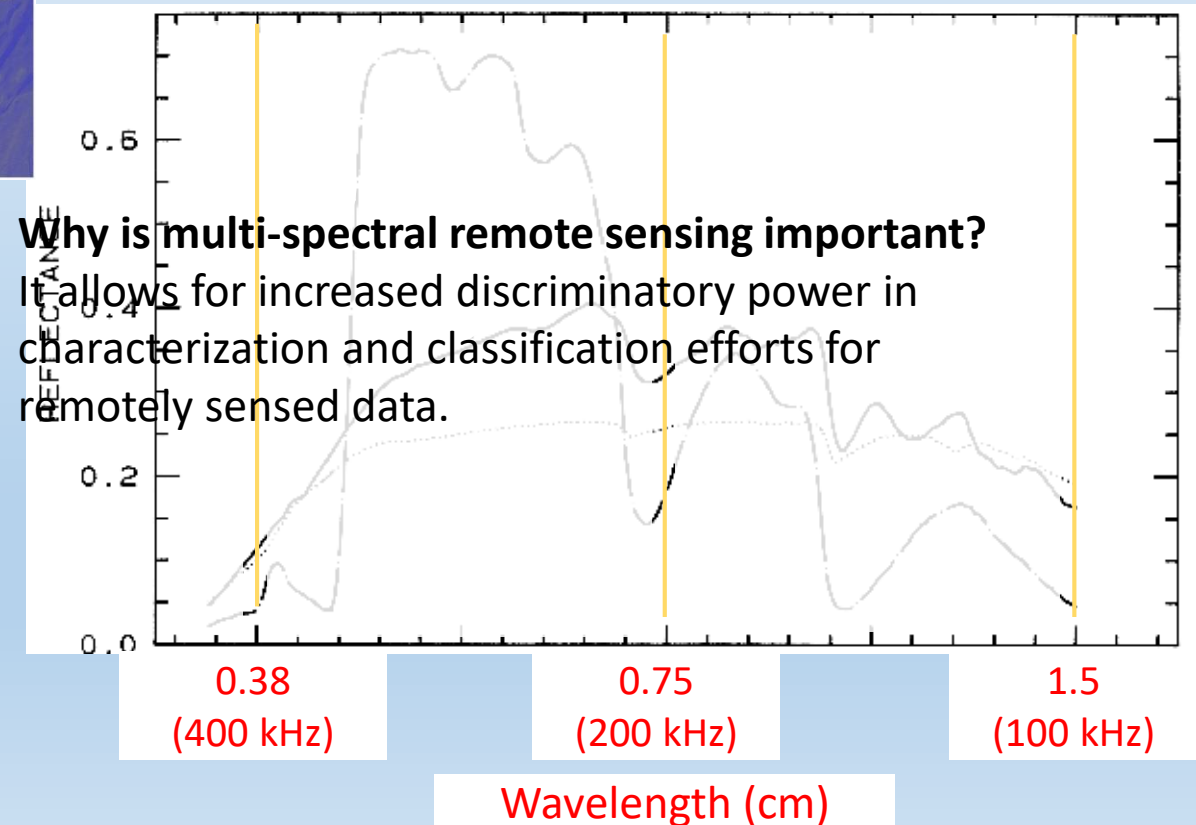
Multi-Frequency MBES backscatter, and learning from Remote Sensing:

Electro-Magnetic



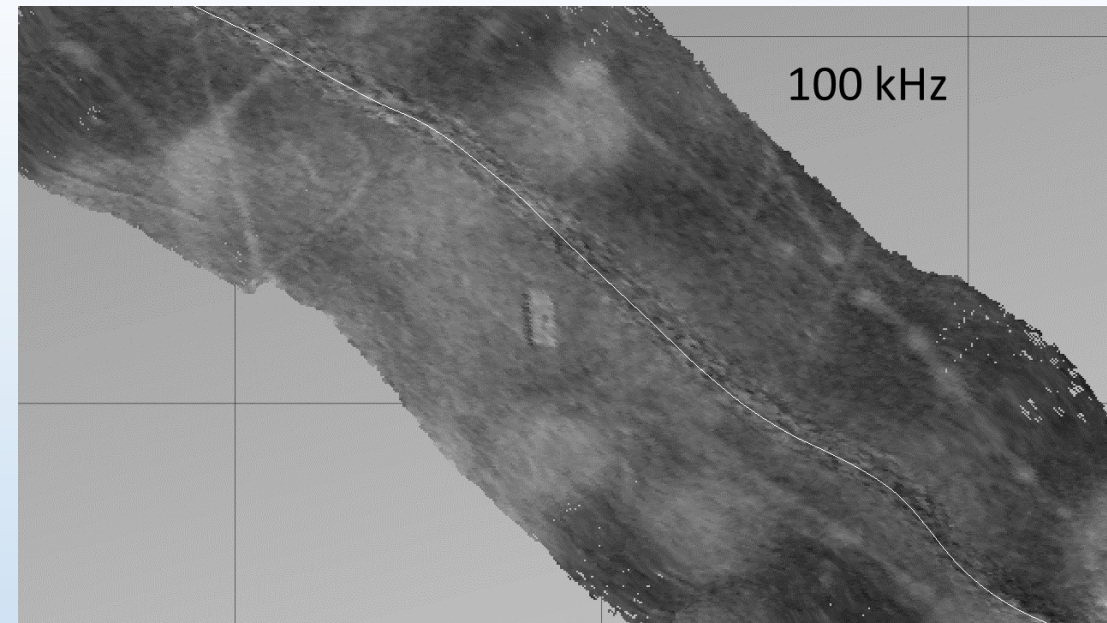
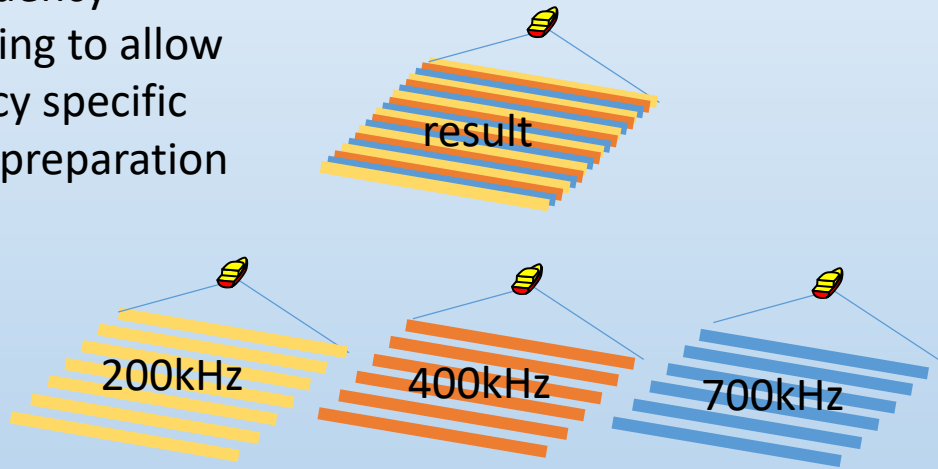
If we can do this with electromagnet sensors,
can we do it with acoustic sensors?

Acoustics



Multi-Spectral Multibeam: New Capabilities

1. Need to unravel the frequency sequencing to allow frequency specific product preparation

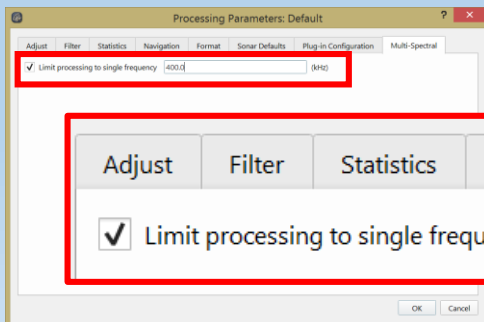


2. Need to honour the physics, specifically frequency dependent radiometric and geometric corrections. FMGT has always done this.

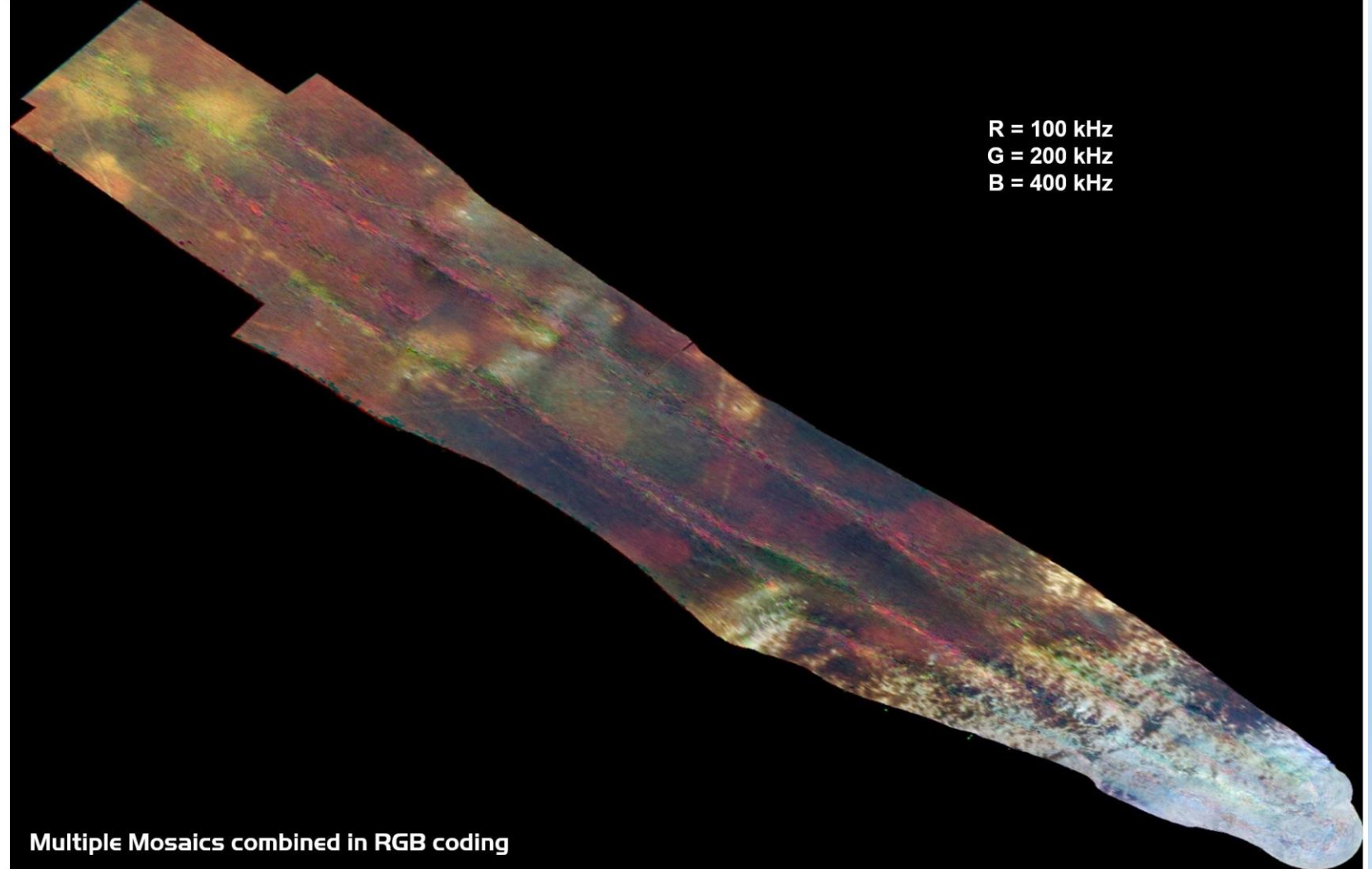
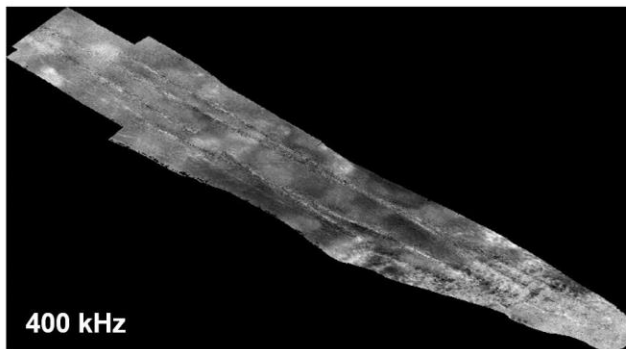
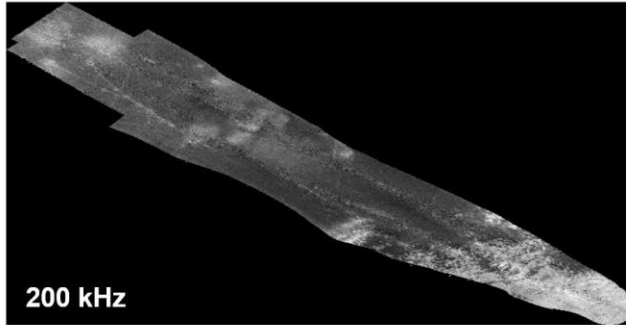
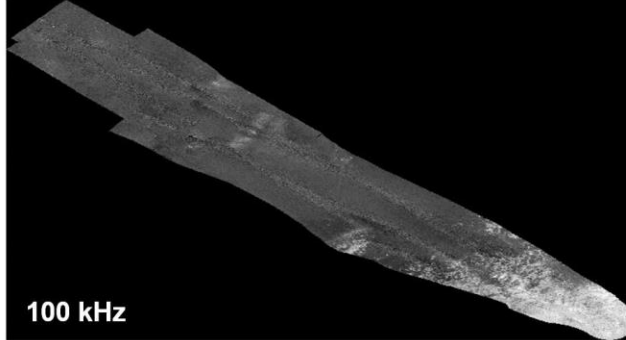
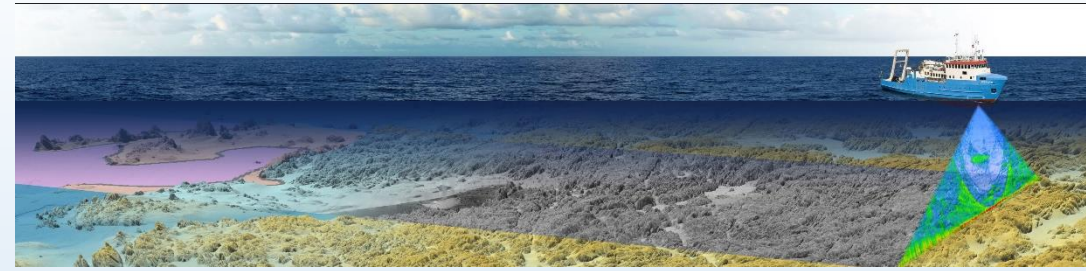
$$BS = EL - SL + 2TL - 10\log_{10}(A) + BP(\theta)$$

Frequency dependent ensonified area (A) can vary by factor of 4 to 16 (~6-12 dB), depending on beamwidth/pulsewidth limited regime

Frequency dependent attenuation (in TL) can vary by tens of dB, depending on water depth

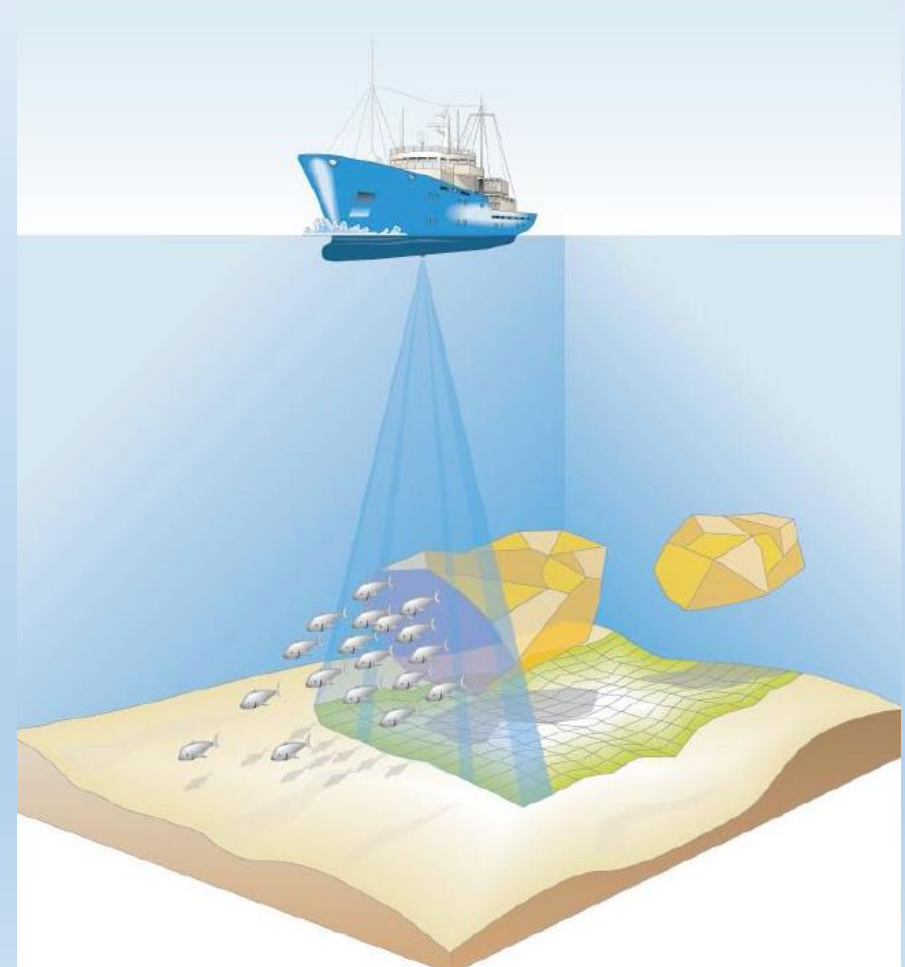
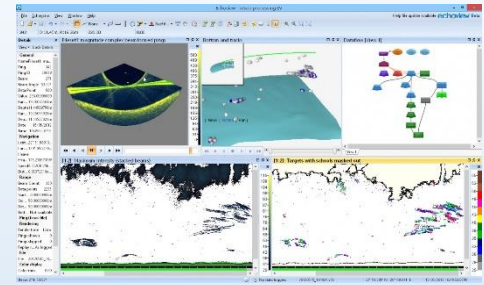


Multi-Spectral Multibeam

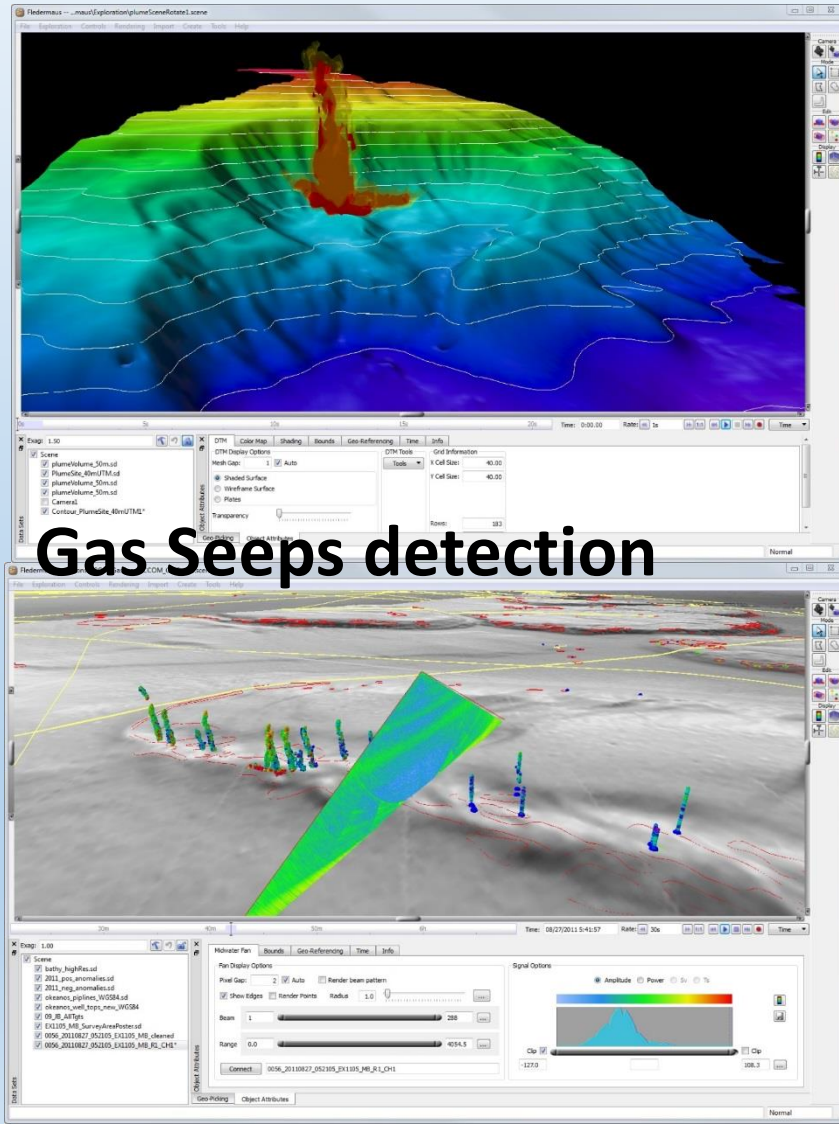


MBES And Water Column Data

- Fish Stock Assessment
 - Schools and individual fish
 - Biomass and density
- Fish Behaviour & Ecology
 - Swimming movement
 - Fish size
 - Interactions
- Seabed Habitat Classification
 - Bottom feature calculations
 - Substrate classification (PCA; k-means)

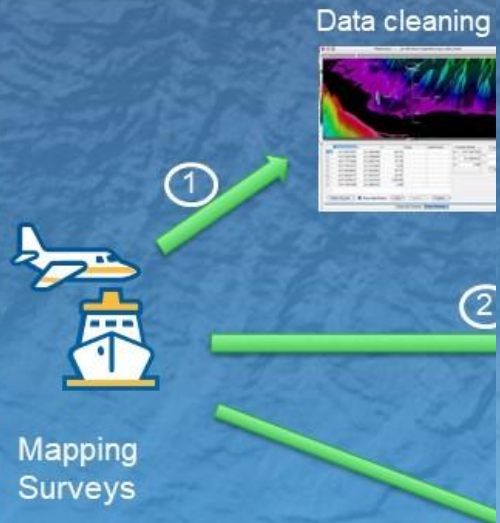


MBES And Water Column Data



GIS And Sharing Ocean Mapping Data

A Maritime Data



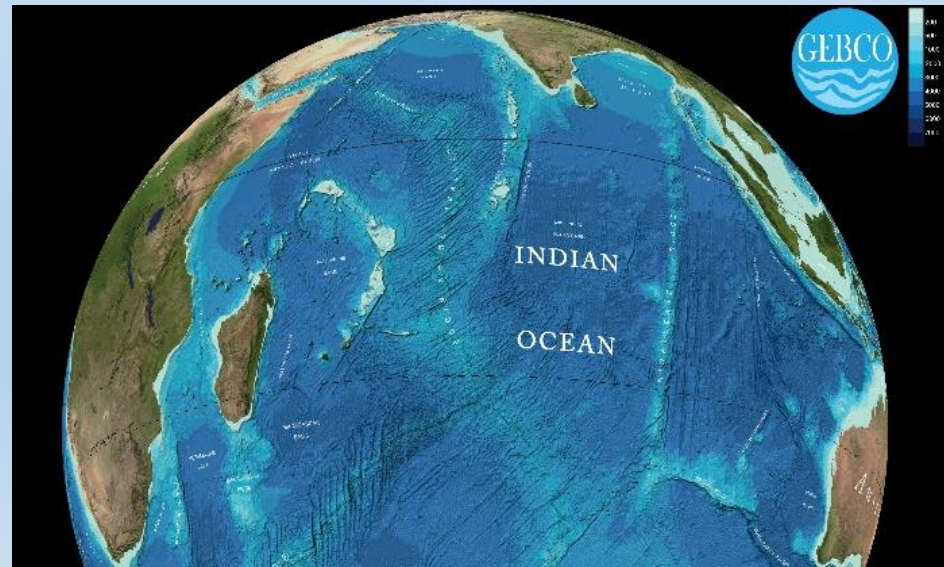
Making Mapping and GIS Available Across Organization(s)

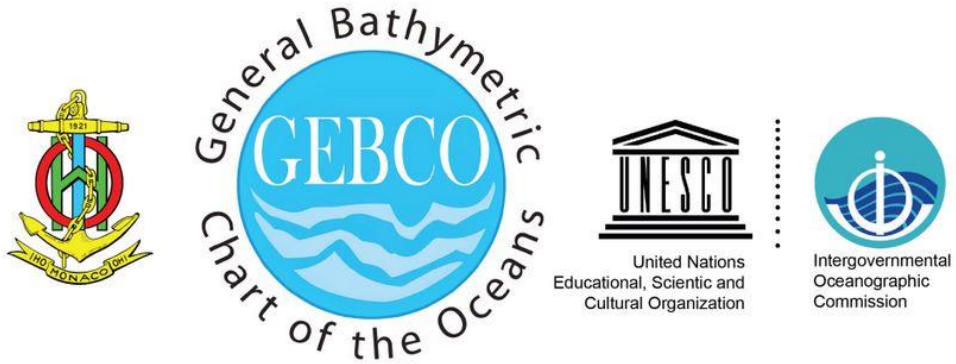


- ① New bathymetry and metadata
- ② Geodetic, AtoNs, Hazards, Po
- ③ SVP, CTD, Tides, Currents, Se backscatter, etc.

Take Home Message:

- Ocean Mapping Is Exciting!
- **Collect once, use many times.**
Other data than just bathymetry (physical nature of seabed), and other consumers (e.g. habitat mappers and ocean scientists).





15 NOVEMBER 2017
BUSAN, SOUTH KOREA

Hosted by:
THE HYDROGRAPHIC SOCIETY OF KOREA
and
KOREA HYDROGRAPHIC AND OCEANOGRAPHIC AGENCY



THANK YOU.

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