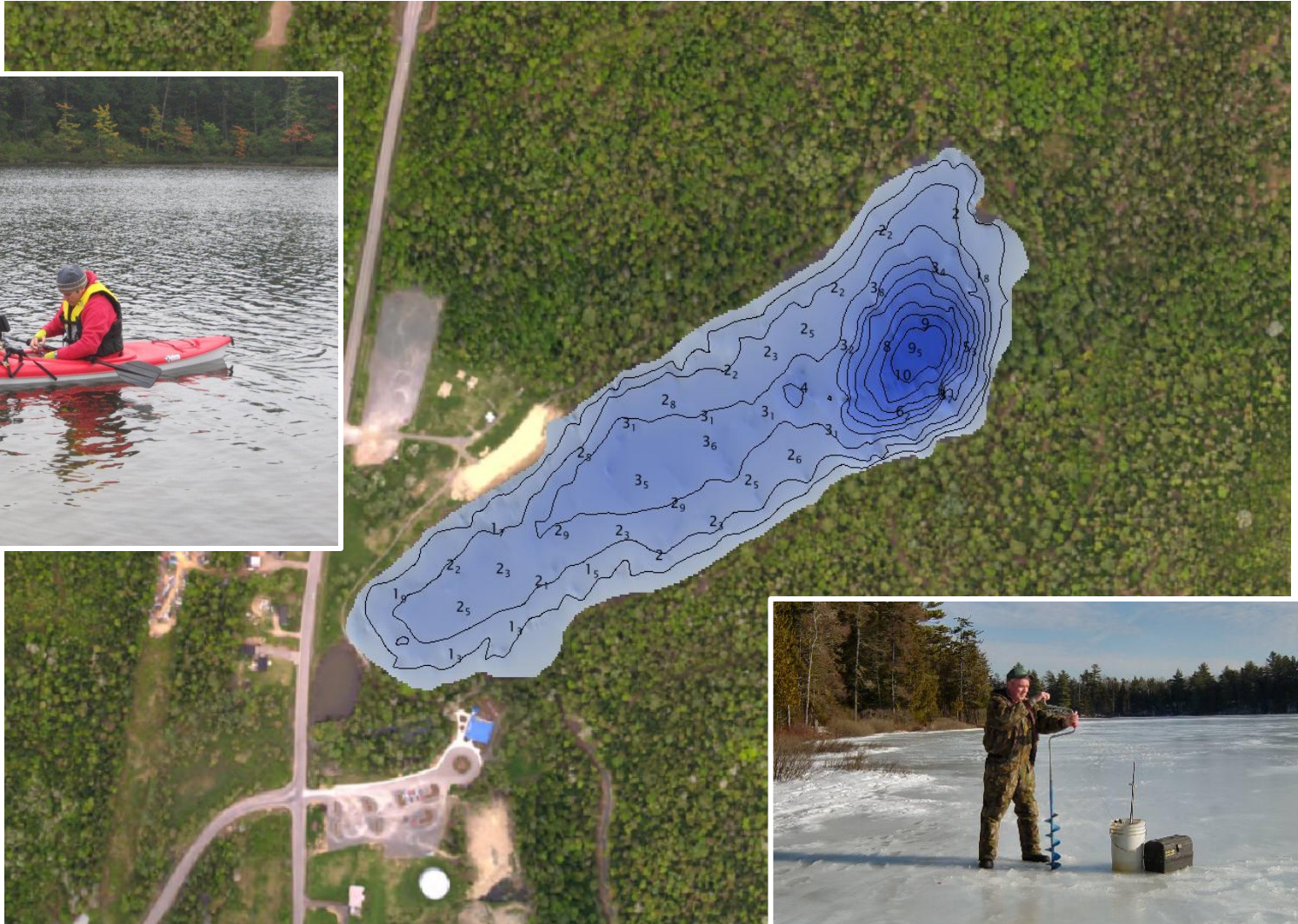


# New Possibilities

**5<sup>th</sup> ROPME/RSAHC Riyadh**

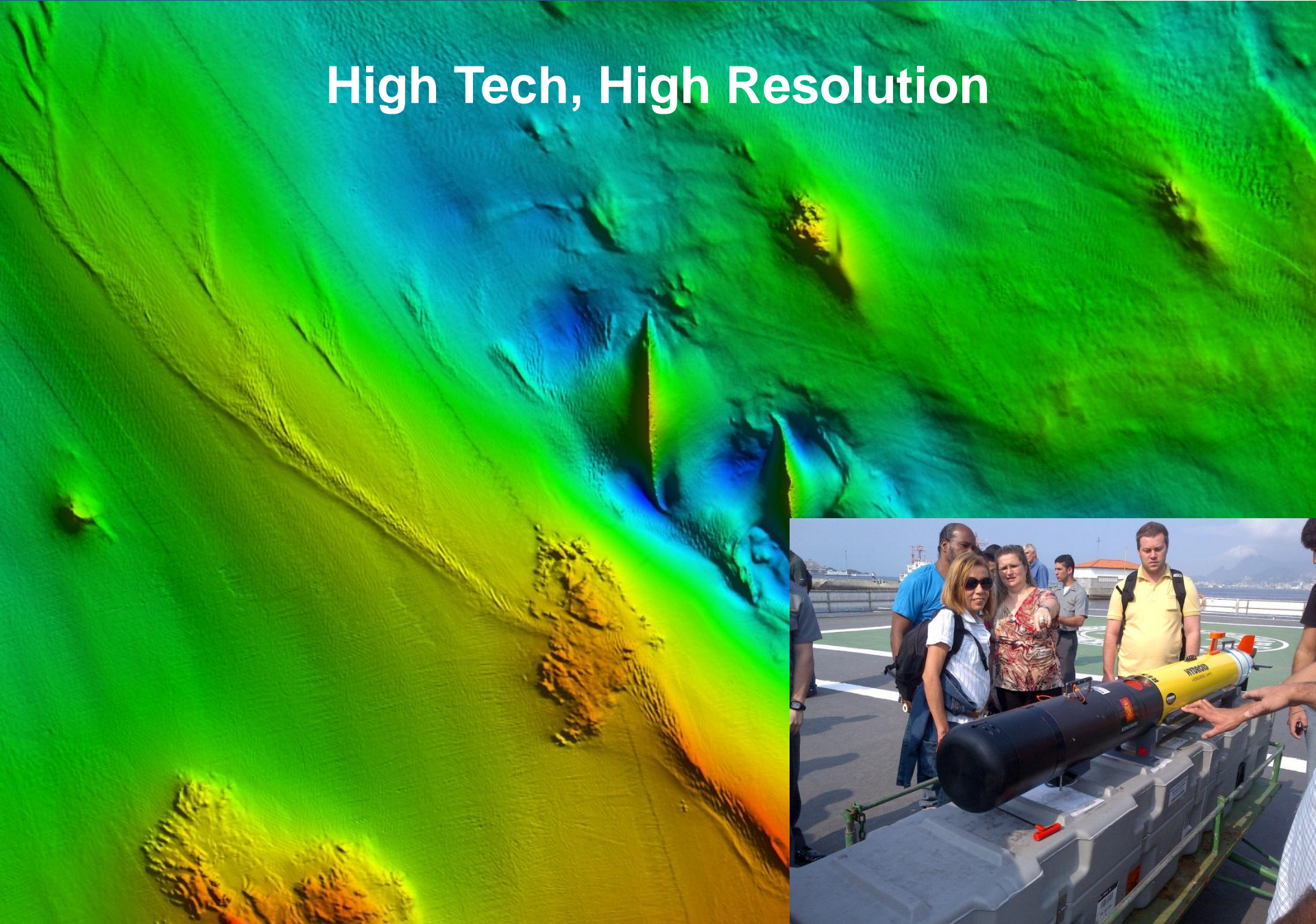
**Peter Schwarzberg**

## Low Tech Mapping





# High Tech, High Resolution





## CARIS Ping-to-Chart Workflow

### PROCESSING

**HIPS & SIPS**

**Notebook**

### ANALYSIS

**Bathy DataBASE**

**BASE Editor**

**Engineering  
Analysis Module**

**LOTS**

### PRODUCTION

**HPD**

**S-57 Composer**

**Paper Chart  
Composer**

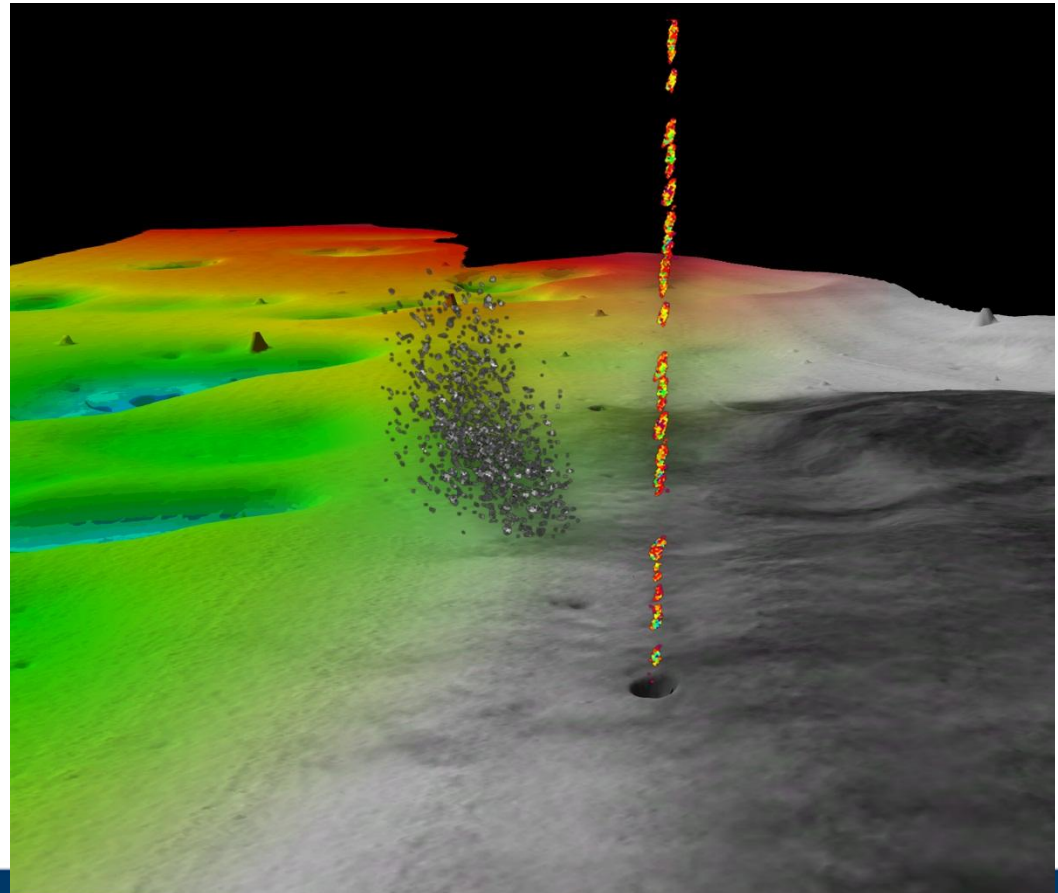
### DISCOVERY

**Spatial Fusion  
Enterprise**

WORKFLOW MANAGEMENT

## Multiple data types from Multibeam Sonar

- In a single, integrated software package
  - for Bathymetry, Seafloor Imagery and Water Column data
- Multi purpose
  - safety of navigation
  - offshore energy
  - security and defense
  - scientific research
  - fisheries
  - environmental
  - ...



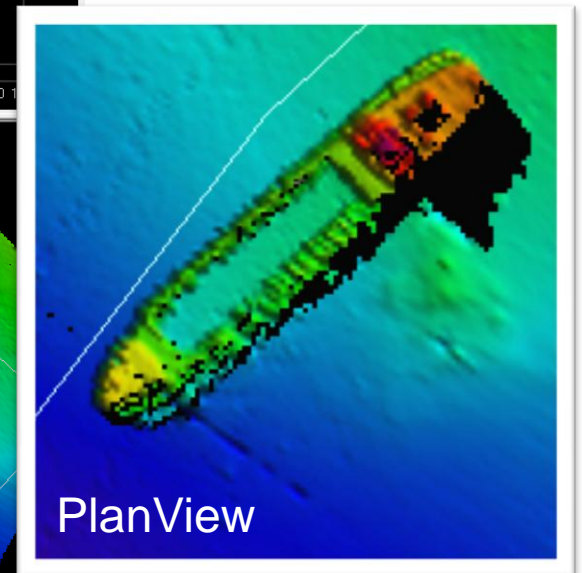
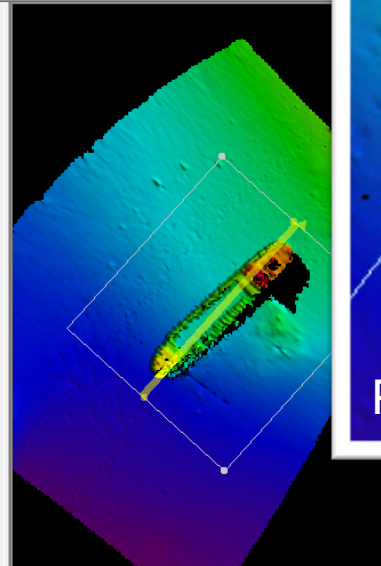
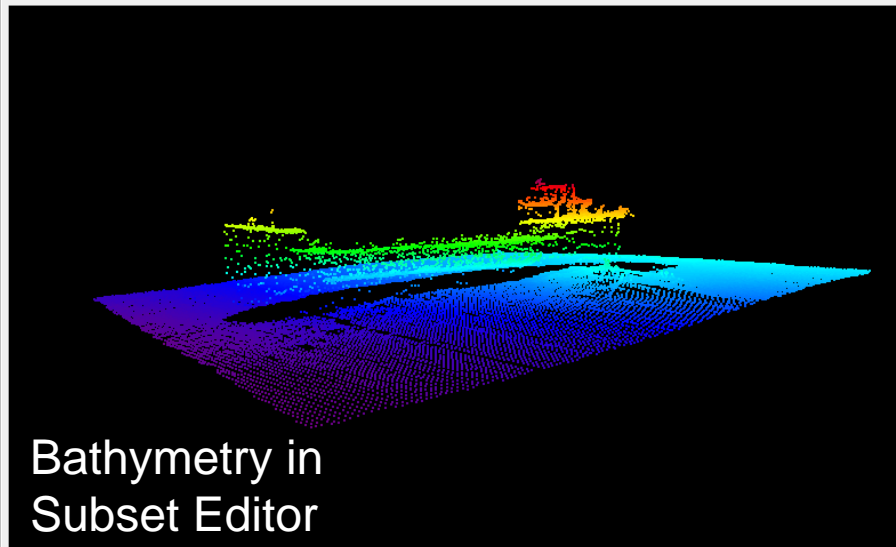
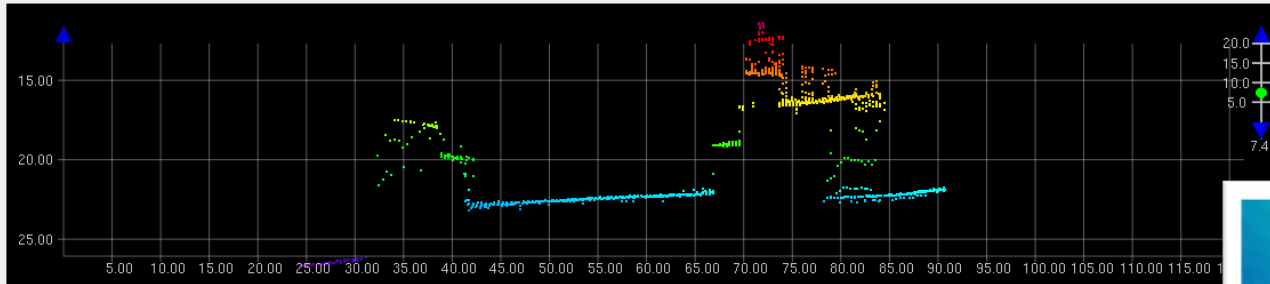
## New for HIPS and SIPS 8.0

- Water Column continuation
  - Water column data becomes bathymetry
- Project Database
  - Centralized metadata
  - Efficient retrieval and display
  - Multi User access
- Next Generation Calibration Editor



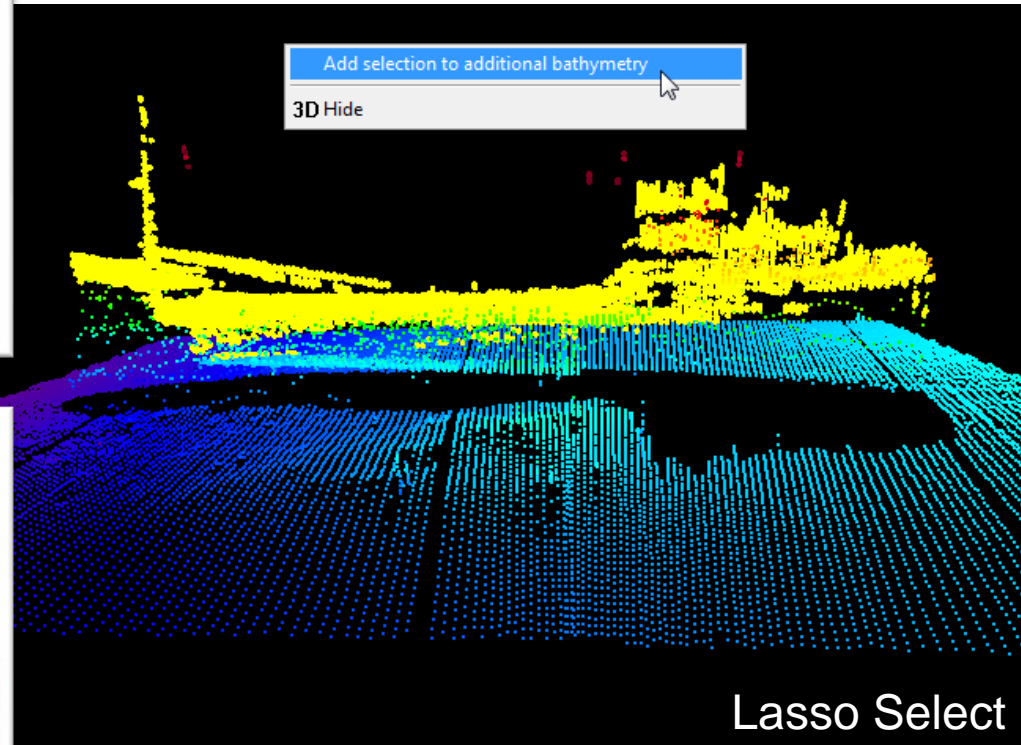
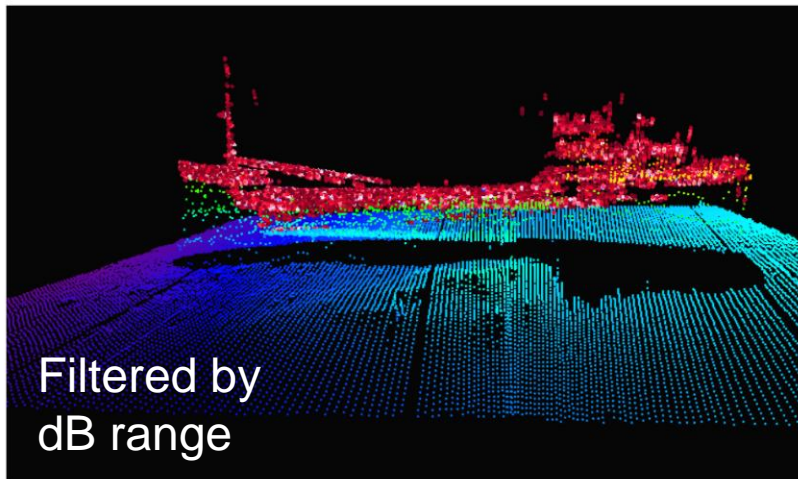
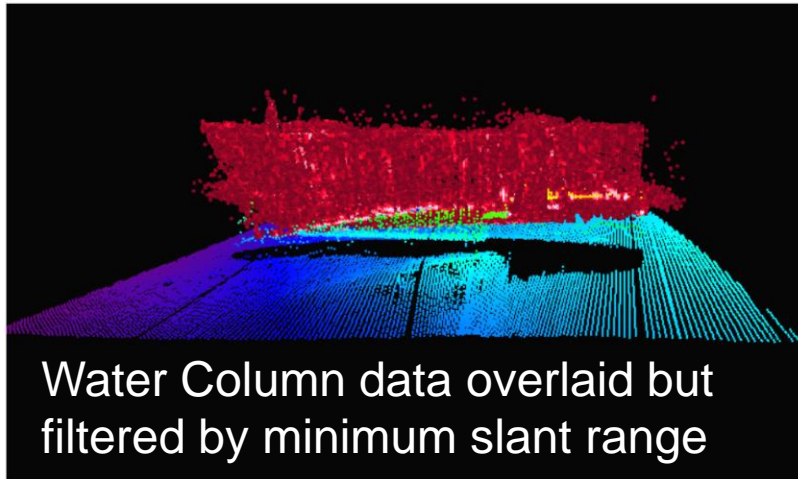
# Water Column data in HIPS 8.0

- GB Church Shipwreck, Vancouver Island,



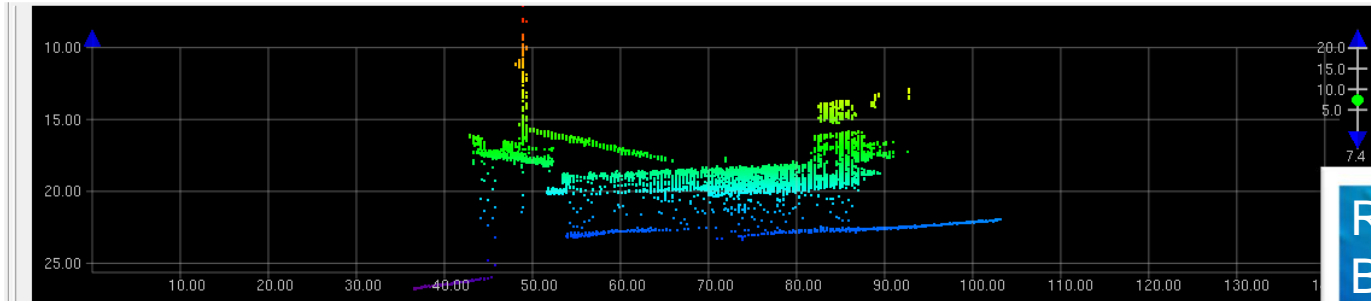


# Isolating the Missing Data

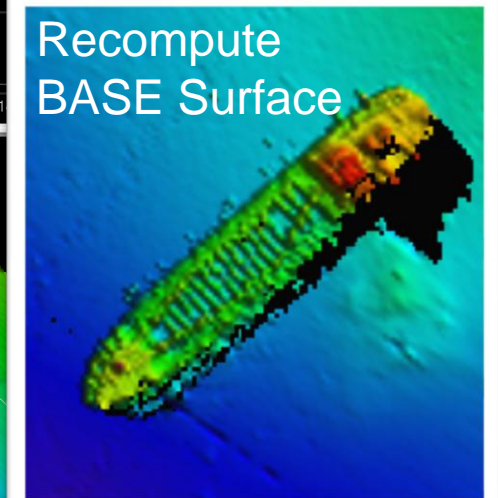
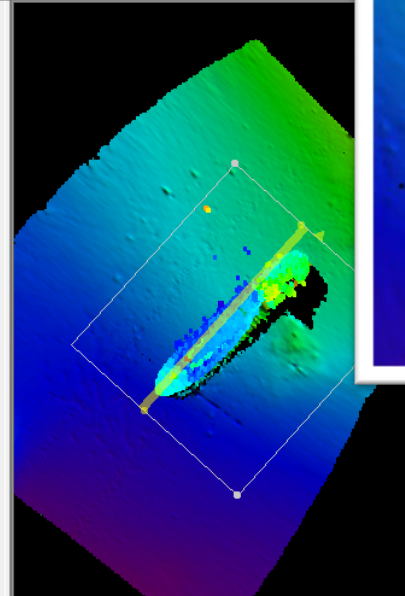
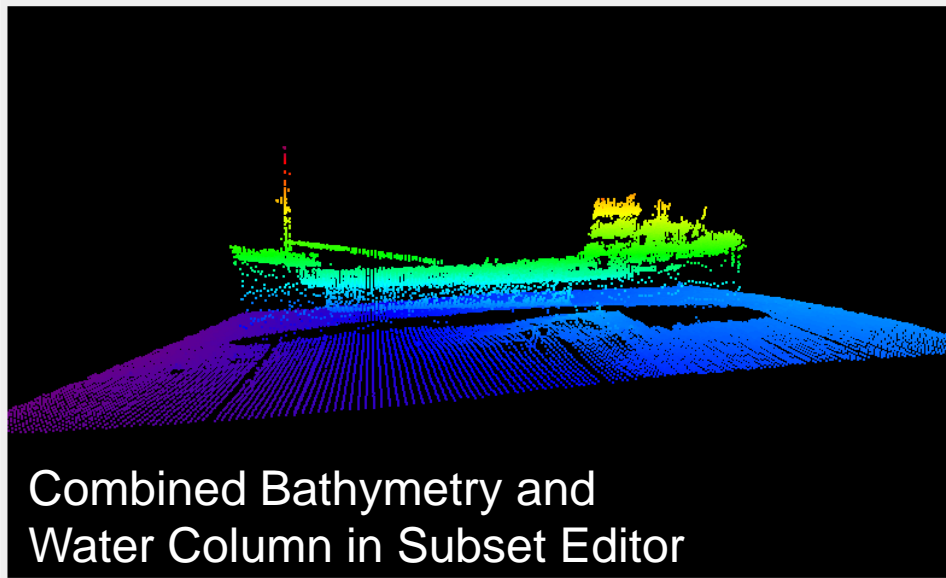




# Combining the Datasets

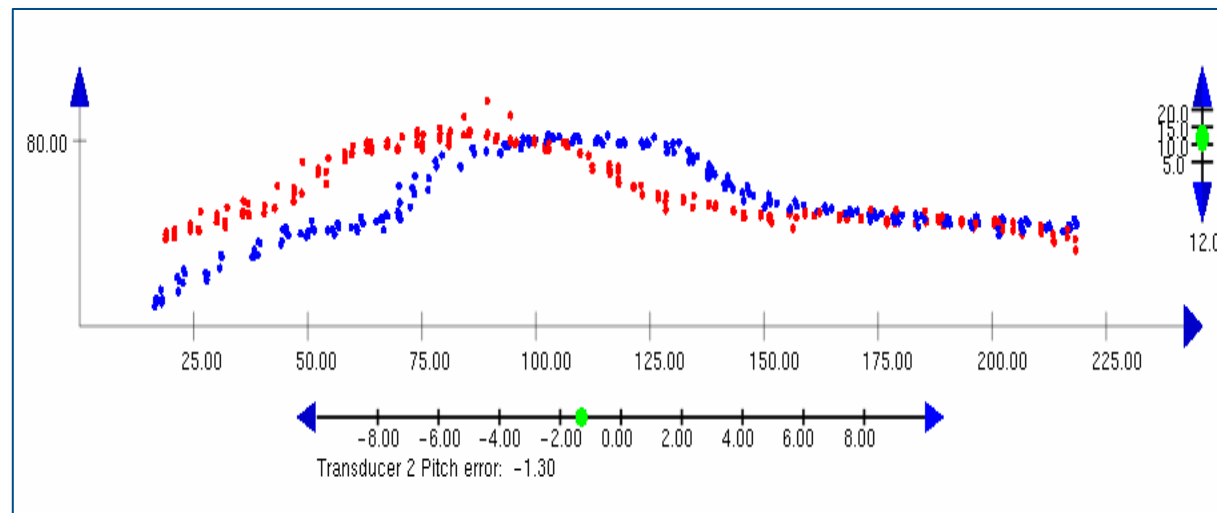


Recompute  
BASE Surface



## Next Generation Calibration Editor

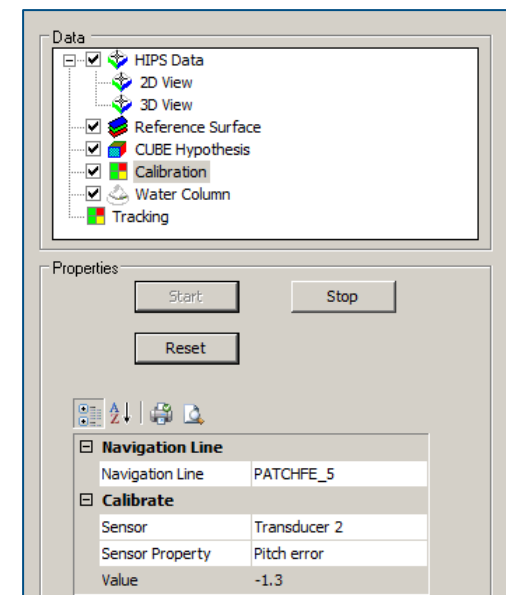
- Fully integrated in Subset Editor
- Improved interface and usability





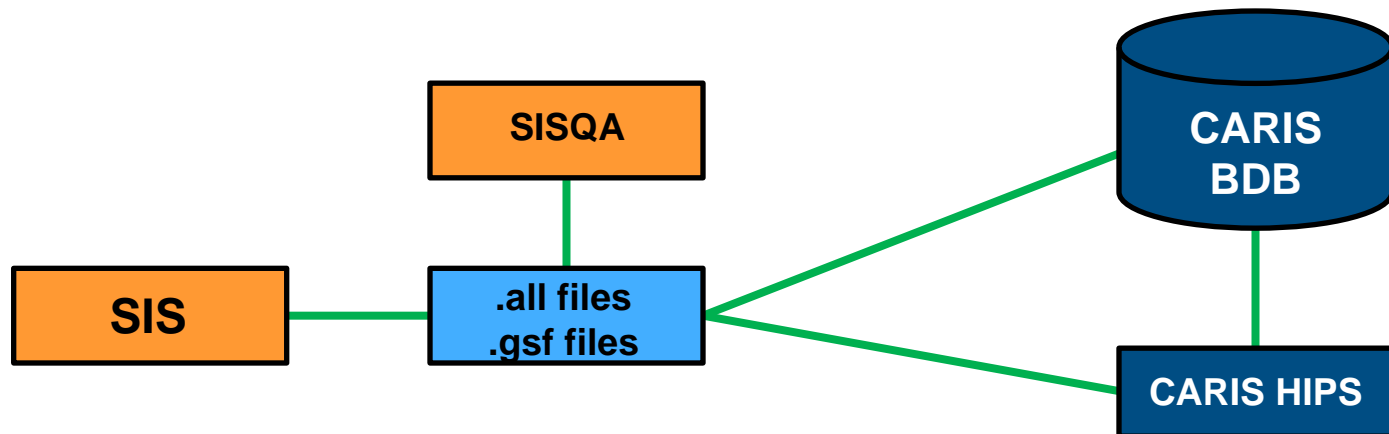
## Project Database

- Centralized and customizable metadata
- Multi-user access
- Increase scalability for large projects
- Dramatic increase in performance to open large projects
  - Number of Lines: *1318*
  - Time to open HIPS 7.1.2 Project: *40min*
  - One time upgrade to HIPS 8.0 Project : *3min 32 sec*
  - Time to open HIPS 8.0 Project : *4.27 seconds*



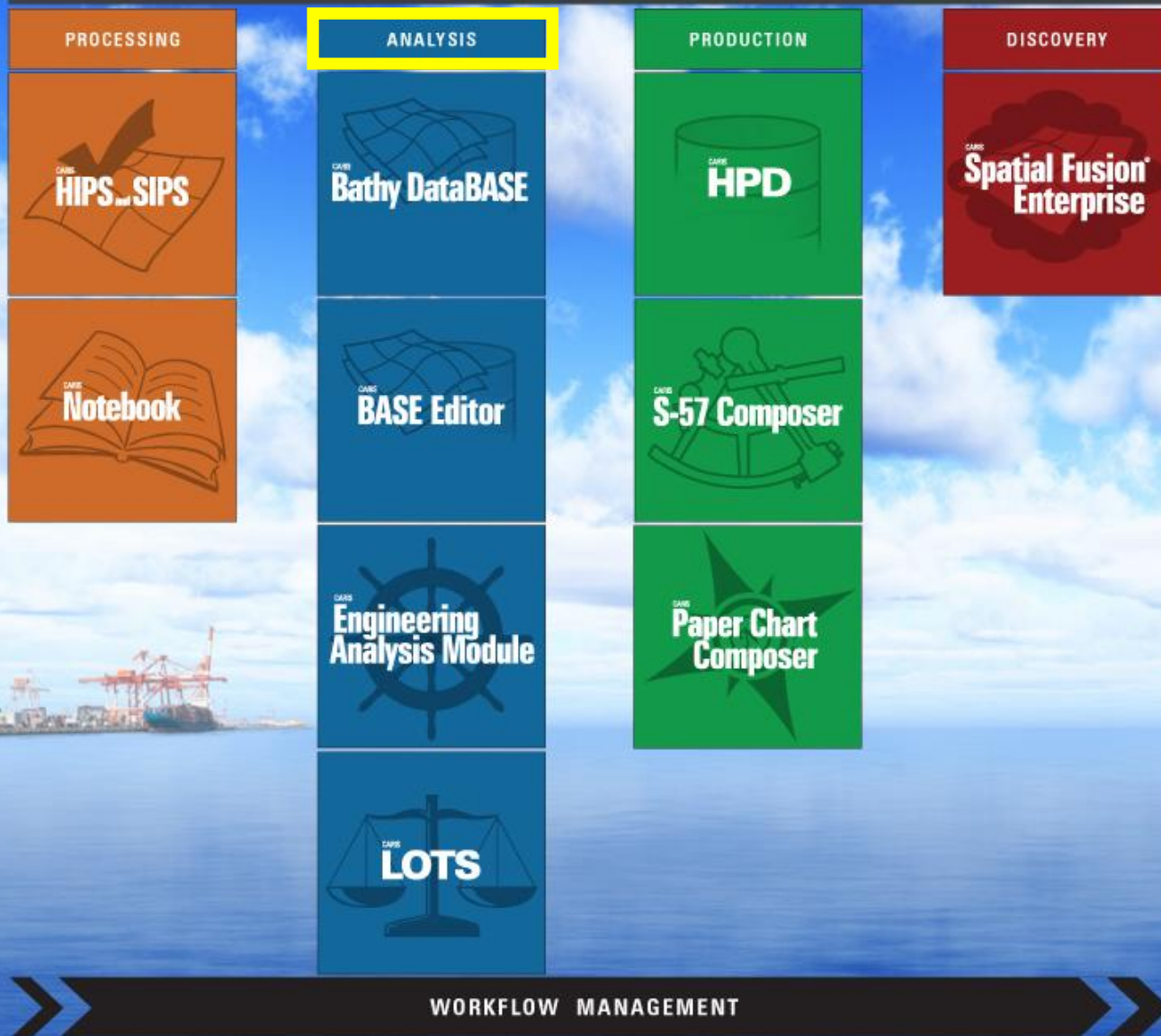
## Kongsberg and CARIS Initiative

- Kongsberg SIS (SISQA) and CARIS integration
- HIPS/SIPS used to process erroneous data
- More efficient workflow for clean data



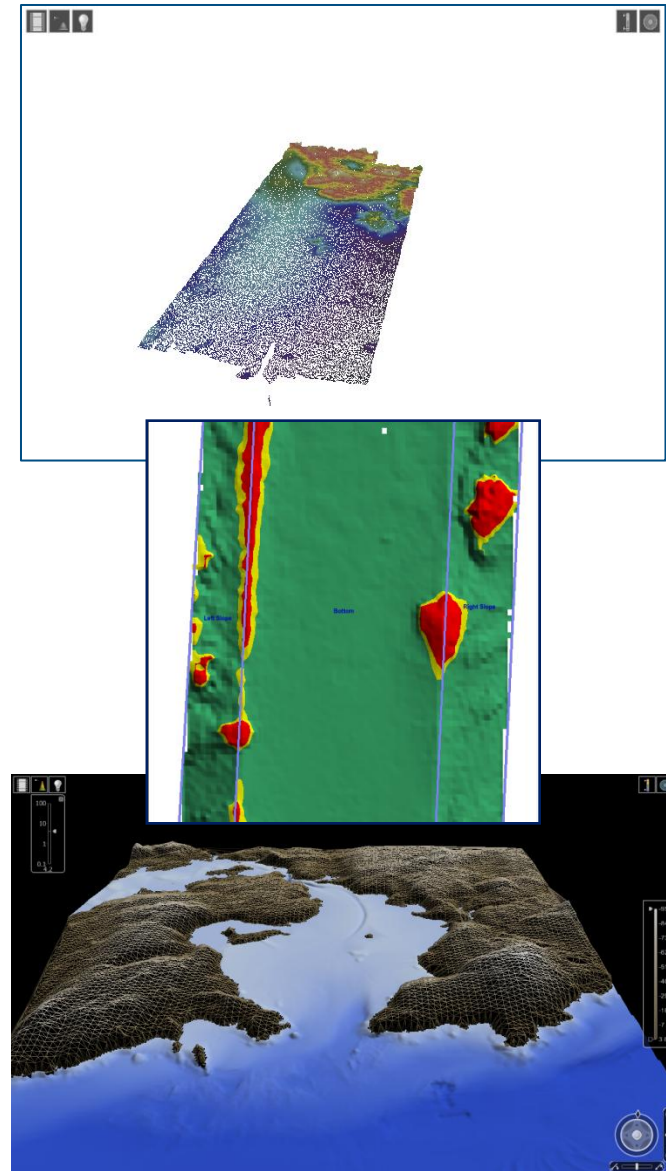


## CARIS Ping-to-Chart Workflow



# Bathy DataBASE

- **Store, manage and analyze elevation data**
  - Integrate data from many possible sources
    - E.g. from CARIS HIPS and 3<sup>rd</sup> party data sources e.g. Hypack
- **Seamlessly model land and sea**
  - Fuse together land and sea
  - DEMs for seamless analysis of the coastal zone
- **Automatic depth area feature creation**
  - As well as depth contours and soundings
  - Created as S-57/S-10x Objects
  - Pass to Production Software
- **Export S-102 bathy datasets**





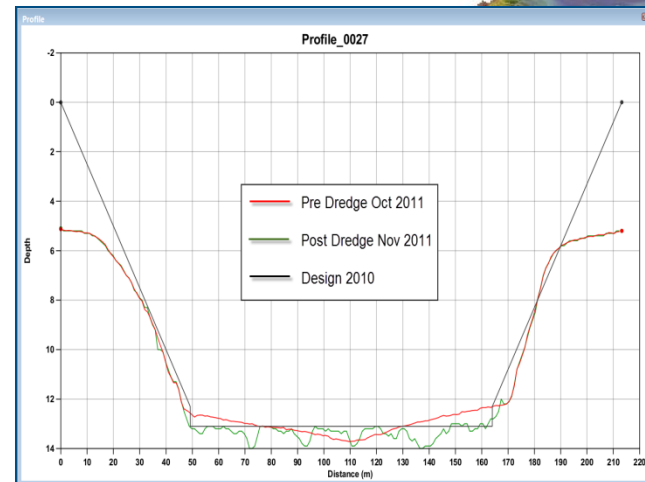
# Bathy DataBASE

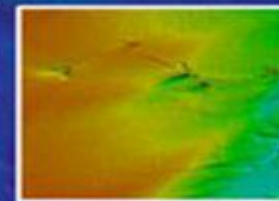
- Client / server database environment
  - Oracle or open source PostgreSQL
- 64 bit version available
  - Allows optimal user of RAM
- Combine thousands of datasets into seamless representation
- Scalable solution for high volume / density
  - 3-D Point Clouds and DEMs
  - Billions of points or grid nodes in one dataset



# Bathy DataBASE Optional Modules

- **Engineering Analysis Module**
  - For Port and Waterway management
  - Channel maintenance, dredging algorithms
- **Bathy DataBASE 4.1**
  - LOTS Article 76 Module
  - Profile tool improvements
- **Variable resolution surface under development**





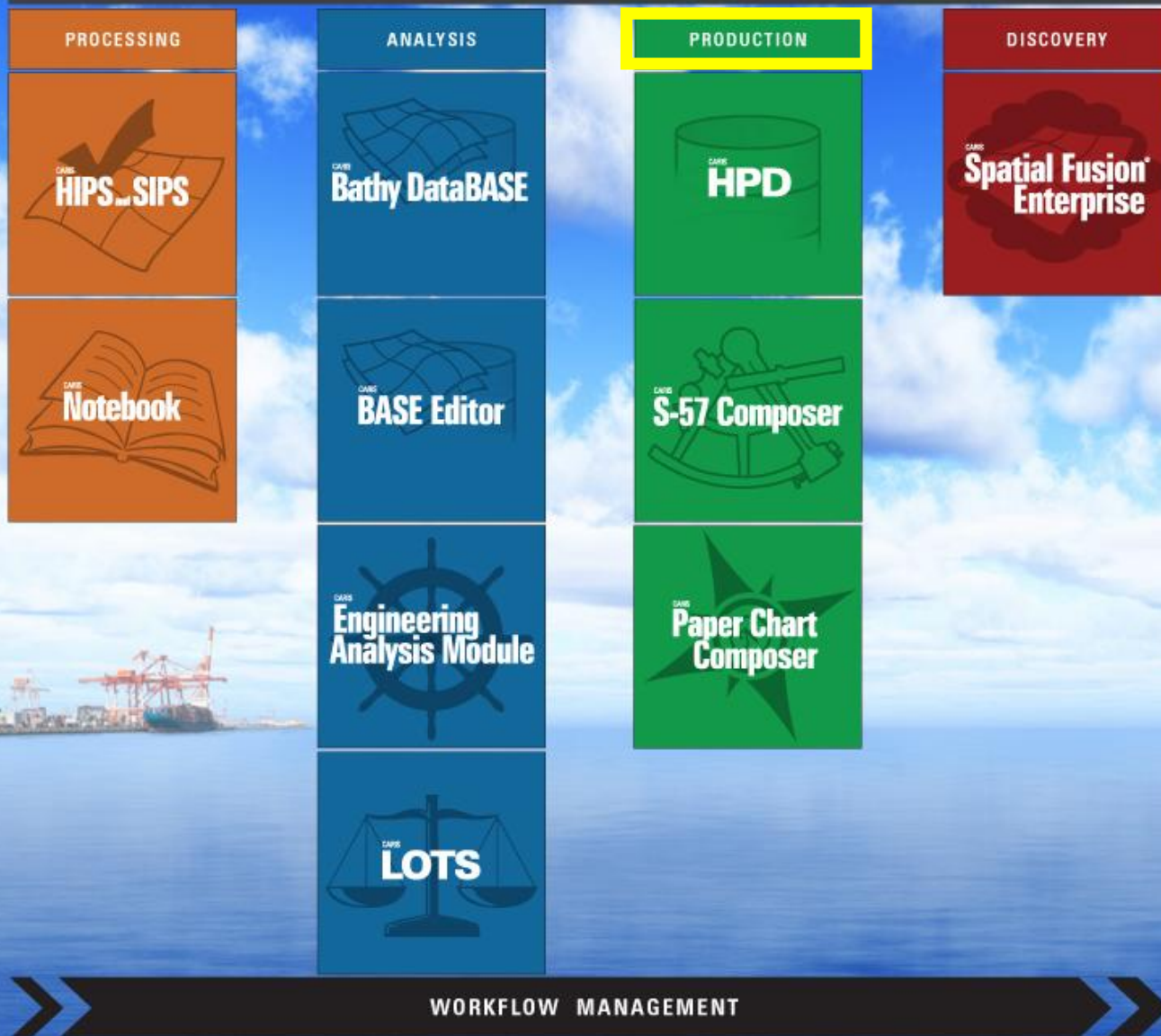
- CARIS Bathymetric Data Management Solution
- March 12<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> in 3 time zones
- Covering topics such as
  - Workflows
  - New S-102 standard support
  - Automation capabilities
  - Seamless fusing of land and sea
  - Interoperability through OGC®
  - Future developments

- **Registration Deadline: Friday March 8<sup>th</sup>, 2013**

[www.caris.com](http://www.caris.com)

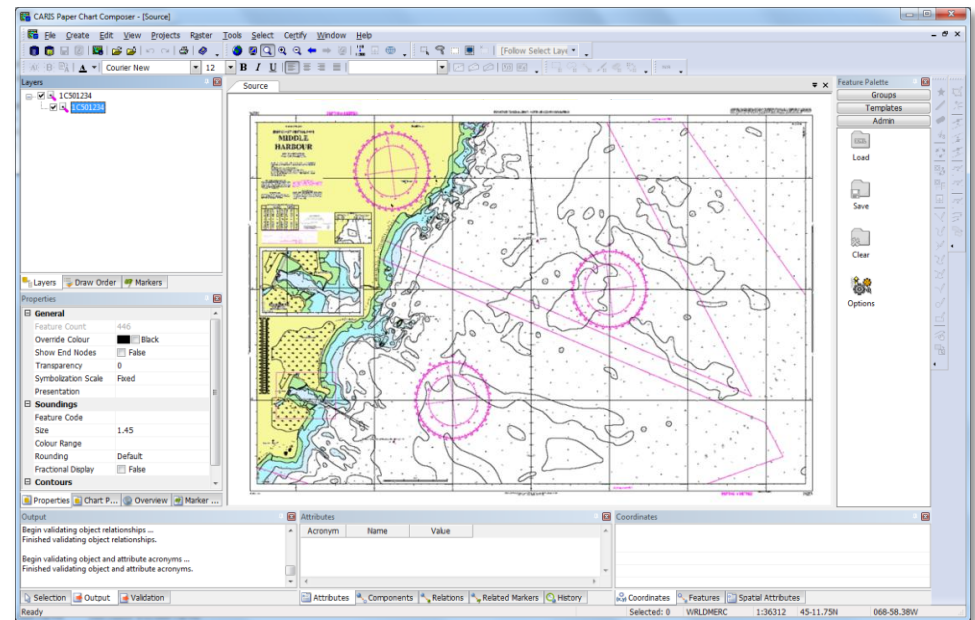


## CARIS Ping-to-Chart Workflow



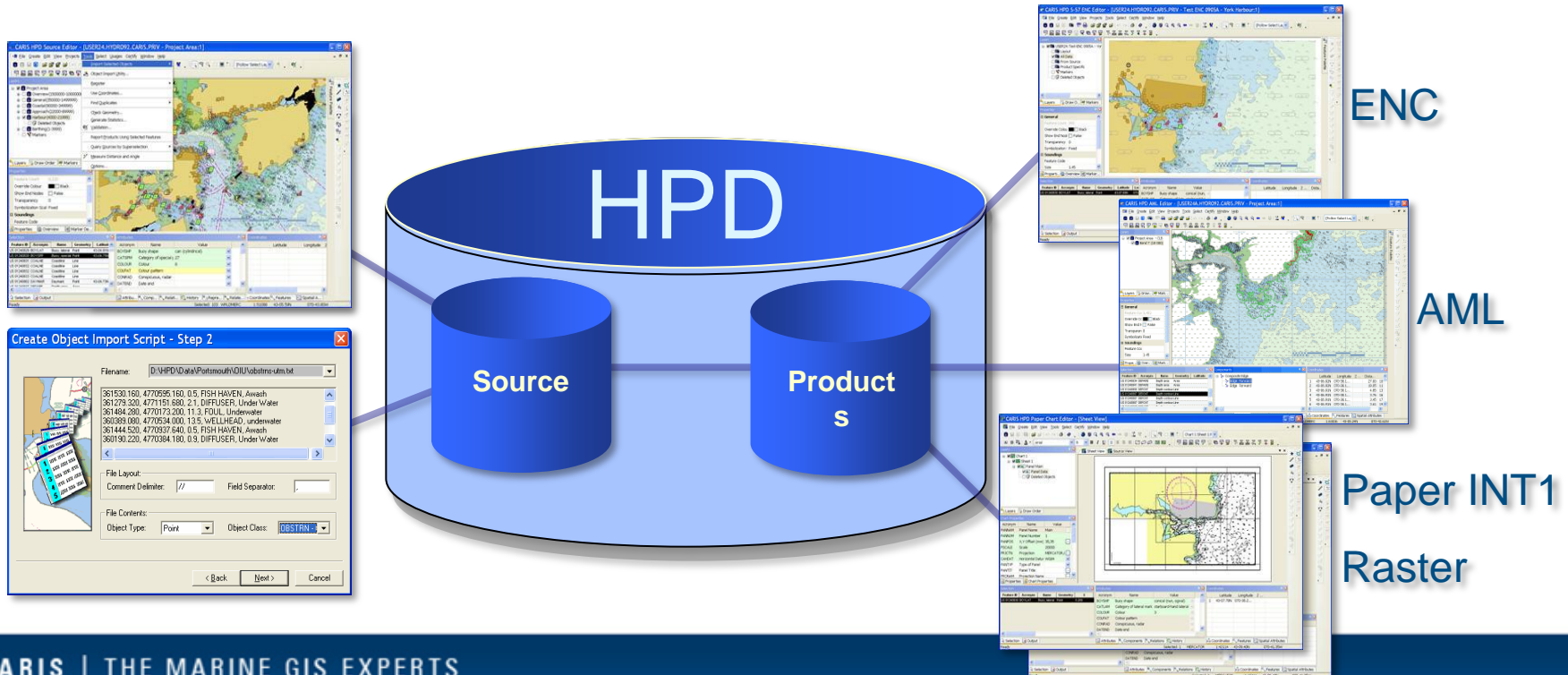
# CARIS Paper Chart Composer v1.1

- Migrate from existing CARIS GIS maps
  - Automatic convert GIS data to new data model
  - Continue chart maintenance in Composer
- Same interface as HPD and S-57 Composer



# Eliminate redundancy in Data Management

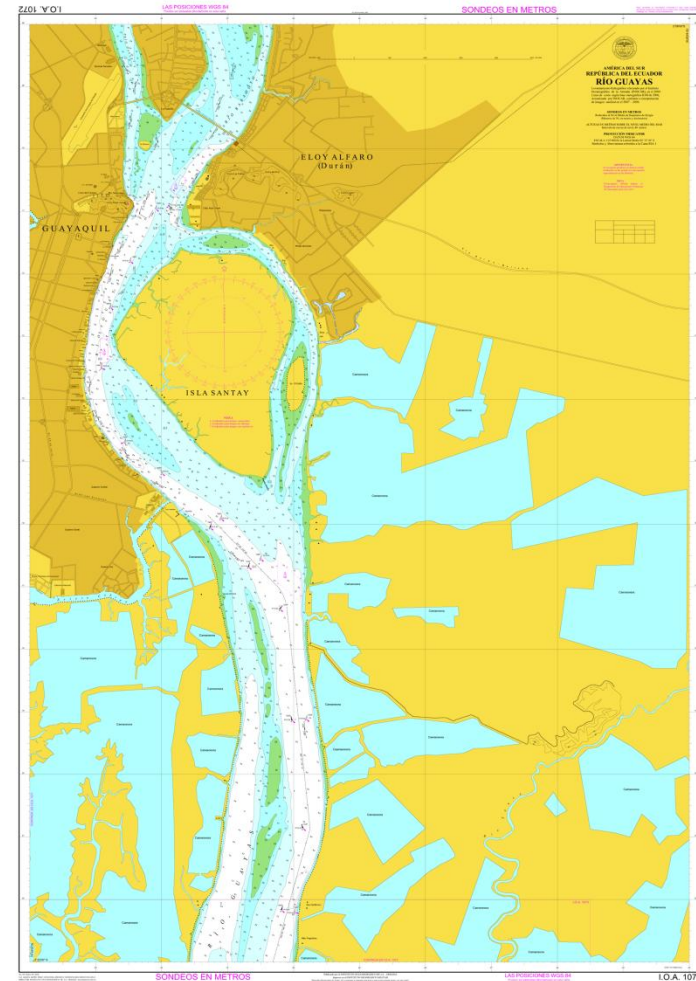
- Source & Product information in one integrated database
- Automatically update products after changes are made to source





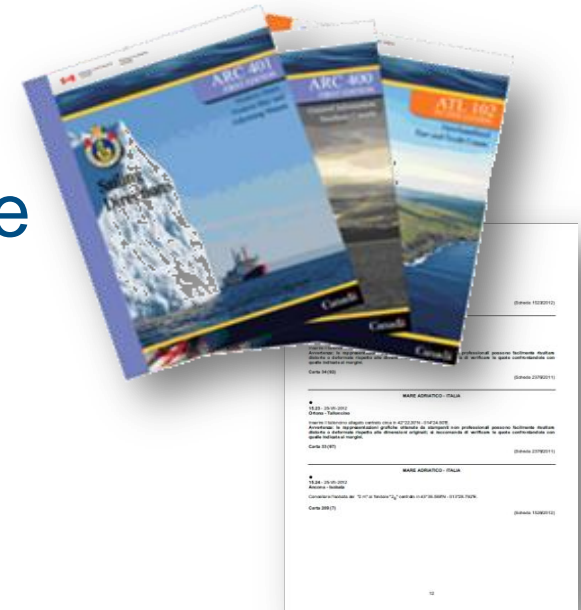
# Chart Production with CARIS HPD

- Data centric solution
  - Supports Marine Spatial Data Infrastructure
- Multiple products from same source
  - E.g. paper charts, ENCs, AML, publications
- Workflow driven production
- Comprehensive Quality Control
  - Multiple levels of data certification and verification
  - IHO S-58 specifications and user definable checks
  - Advanced error identification and repair tools
  - Complete history tracking of all changes



# Publications

- New Integrated Publications Module
- Create Nautical Publications
  - Notices to Mariners
  - List of Lights / List of Buoys and Fog Signals
  - List of Radio Signals / Radio Aids
  - List of Wrecks
  - Sailing Directions
  - ...
- Customizable
  - Define Publication documents, Sections, Notices, Records, Instructions, Attributes







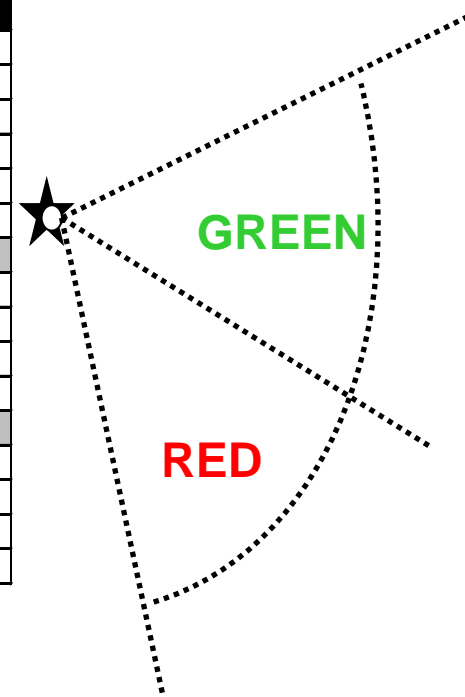
# IHO S-100 Universal Hydrographic Data Model

- The S-100 standard documents
  - Feature Concept Dictionary Registers
  - Metadata
  - Coordinate Reference Systems
  - Spatial Schema
  - Portrayal
  - And much more...
- However the content/use of these are defined in product specifications
  - E.g. S-100 doesn't define feature classes, but S-101, S-102, S-10x do

## Complex Attributes

- Complex attribute example
  - S-100 allows S-101 to combine sector lights

Characteristic	Value					
Name	Light sector					
Definition						
Remarks	n/a					
CamelCase	lightSector					
AlphaCode	LITSEC					
DataType	Complex					
	CamelCode	cardinality	c1	c2	ordered	unique
SubAttribute	sectorLimit1	number	1	n/a	n/a	n/a
SubAttribute	sectorLimit2	number	1	n/a	n/a	n/a
SubAttribute	colour	number	1	n/a	n/a	n/a
SubAttribute	valueOfNominalRange	range	0	1	n/a	n/a
	CamelCode	cardinality	c1	c2	ordered	unique
SubAttribute	sectorLimit1	number	1	n/a	n/a	n/a
SubAttribute	sectorLimit2	number	1	n/a	n/a	n/a
SubAttribute	colour	number	1	n/a	n/a	n/a
SubAttribute	valueOfNominalRange	range	0	1	n/a	n/a



- S-57 requires one feature for each light sector

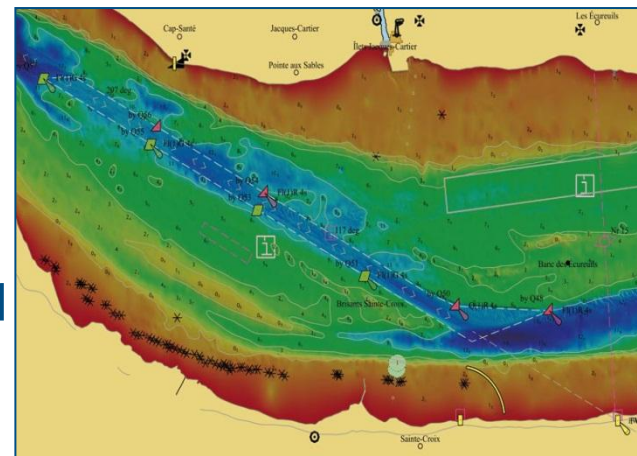
## **S-103 Geospatial standard for Marine Protected Areas**

- Currently under development
  - By IHO's Standardization of Nautical Publications Working Group (SNPWG)
- Data carrier format expected to be GML
- Other publications expected to follow
  - E.g. Radio Signals product specification



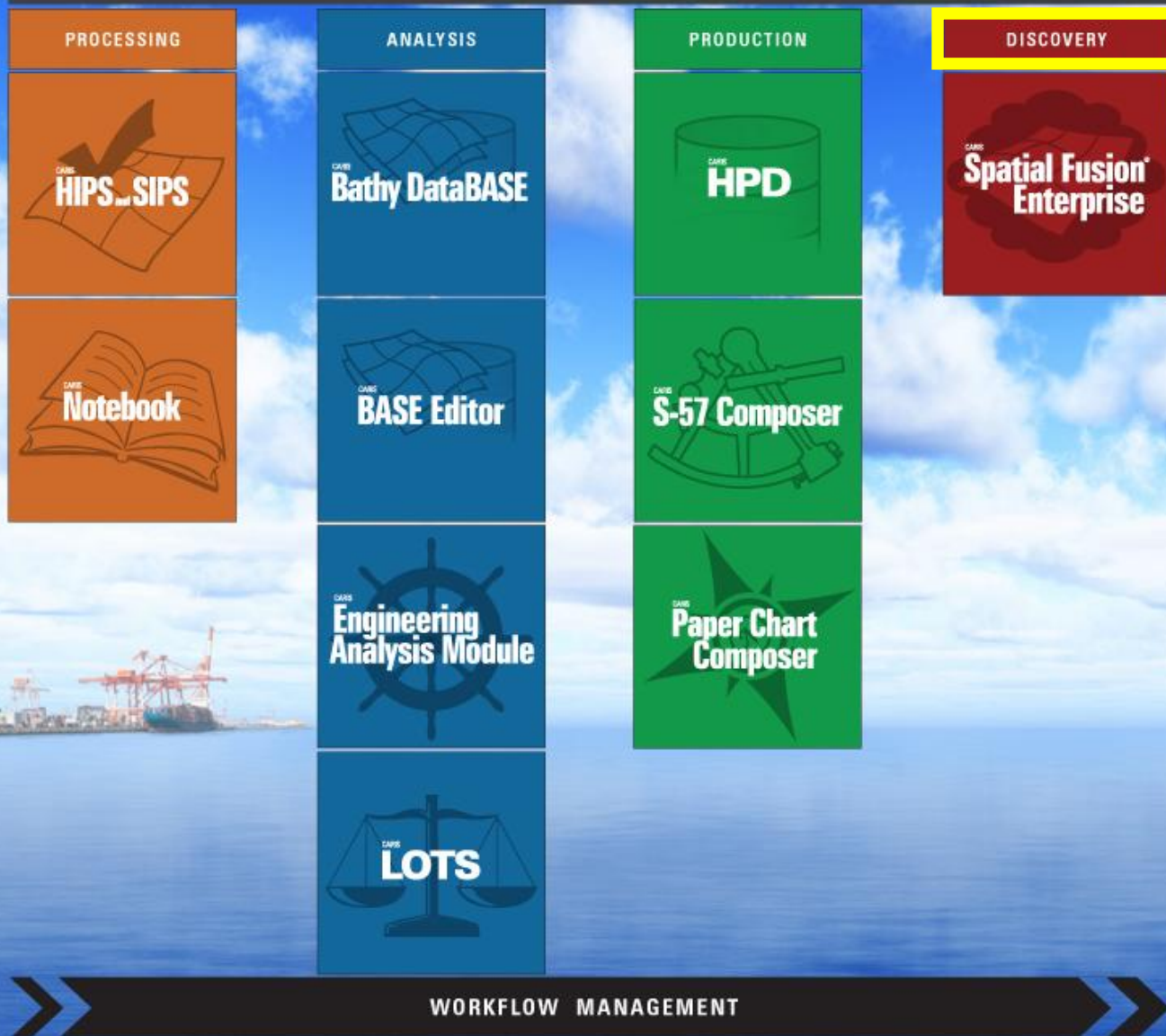
# S-100 implementation in CARIS

- New products types being defined under S-100
  - CARIS actively participating
  - Support being implemented in CARIS solutions
- S-101 in HPD and Composers
  - New S-101 attribute in data model
    - First implemented in CARIS HPD
  - S-57 Composer upgrade path to S-100/S-101
  - S-57 to S-101 Conversion tools
- S-102 in Bathy DataBase and BASE Editor
- Other S-100 product specifications to come



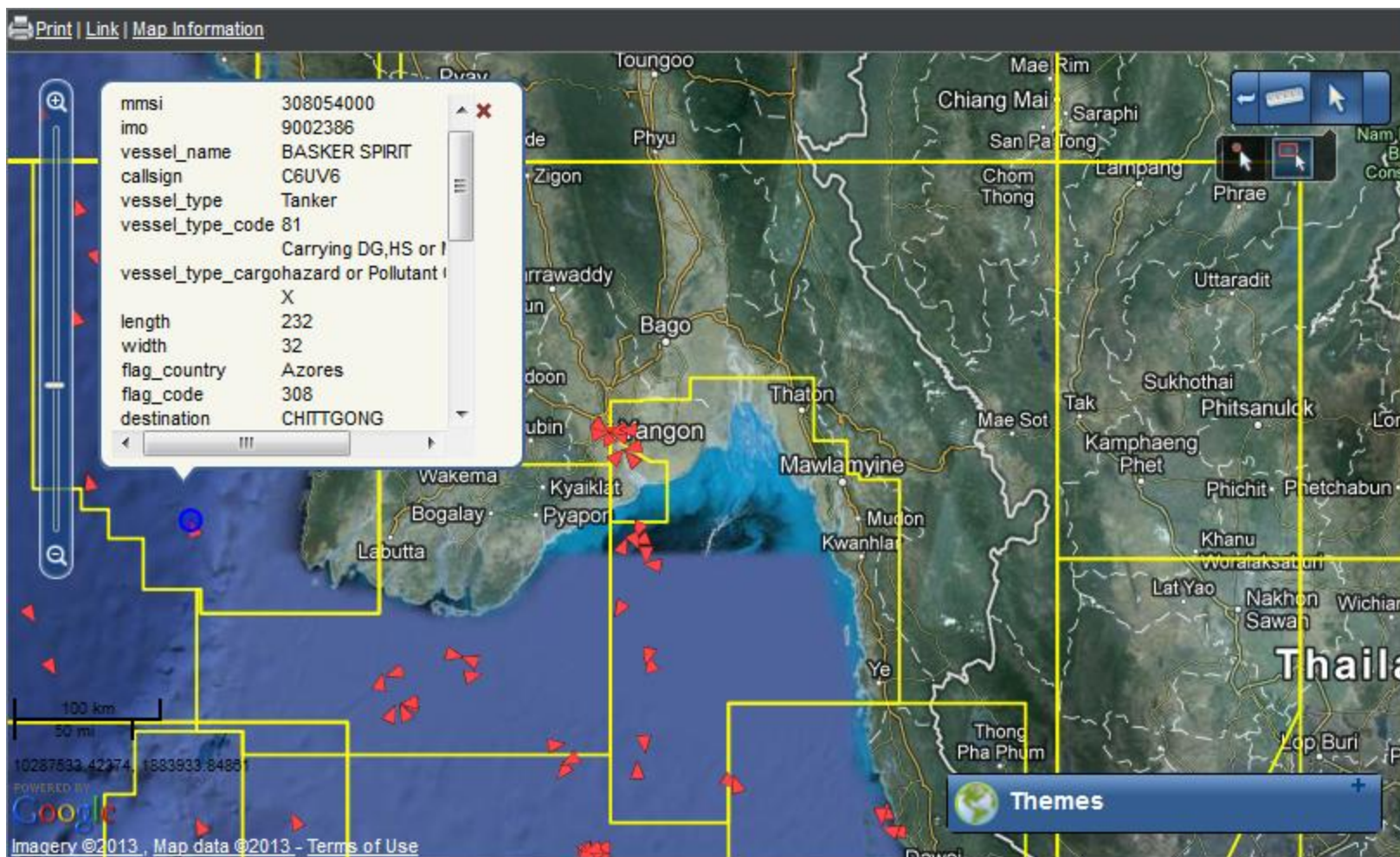
ENC with S-102 in Background

## CARIS Ping-to-Chart Workflow






# Web discovery



## Education and Capacity Building

- OceanWise leads the theoretical content 
- CARIS leads the “hands-on” practical content
- Topics include:
  - SDI Policy, Technical Standards and Geographic Content
  - Data Modeling, Data Organization and Infrastructure
  - Data Management, Production and Interoperability
  - Human Aspects, Change Management and Sustainability
- 63 hydrographic personnel trained in SDI so far



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