

# CARIS Solutions for Inland ENC and Inland Paper Chart Production

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10<sup>th</sup> IEHG Meeting  
Iquitos, Peru  
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# Summary

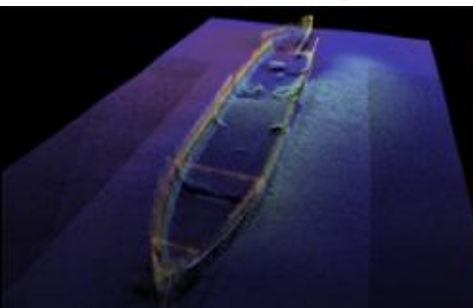
- Over 30 Years in the GIS Software Development Business
- Successful CARIS installations in over 85 countries
- 170 employees in total between Canada, Netherlands, USA, Australia and the UK
  - Developers (85), Project Management (5), Sales (10), Marketing (5), Tech Support (35), QA testers (10), General (20)
- Industry leading team of Technical Support professionals with industry experience and academic backing
- 20+ Alliance Companies in other countries
- ISO 9001:2008 certified
- Focused on the use and development of GIS standards
  - OGC, ISO/TC 211, IHO, ONSWG, MSDIWG



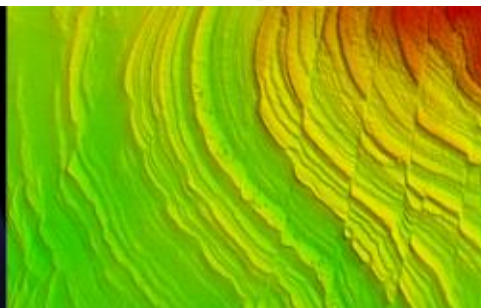
# ***Ping-to-Chart™ Solution***

- CARIS is the only organization able to offer the marine community a complete and streamlined GIS solution from Ping-to-Chart
  - i.e. data processing through to chart production and subsequent distribution of the marine information and chart products
  - Seamless data transfer and interoperability

**Processing**



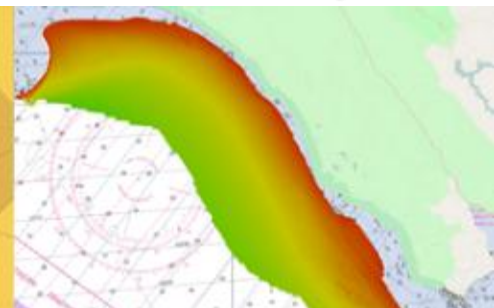
**Analysis**



**Production**



**Discovery**



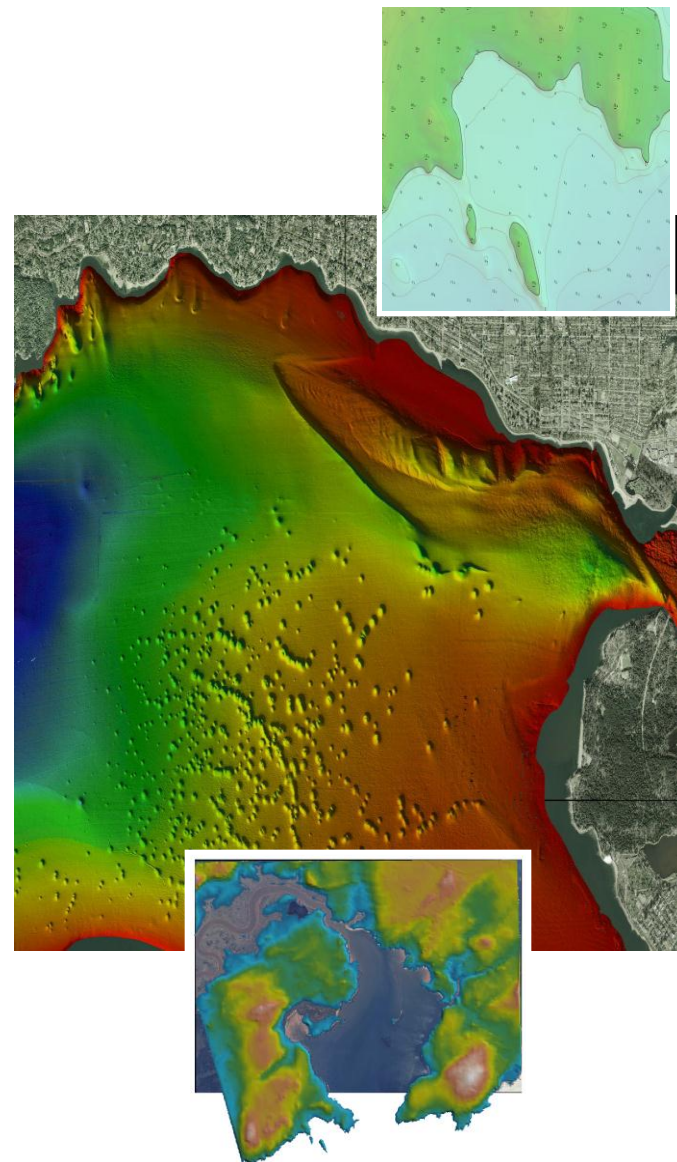


## CARIS Ping-to-Chart Workflow



# Analysis

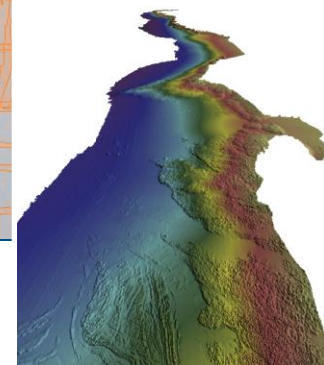
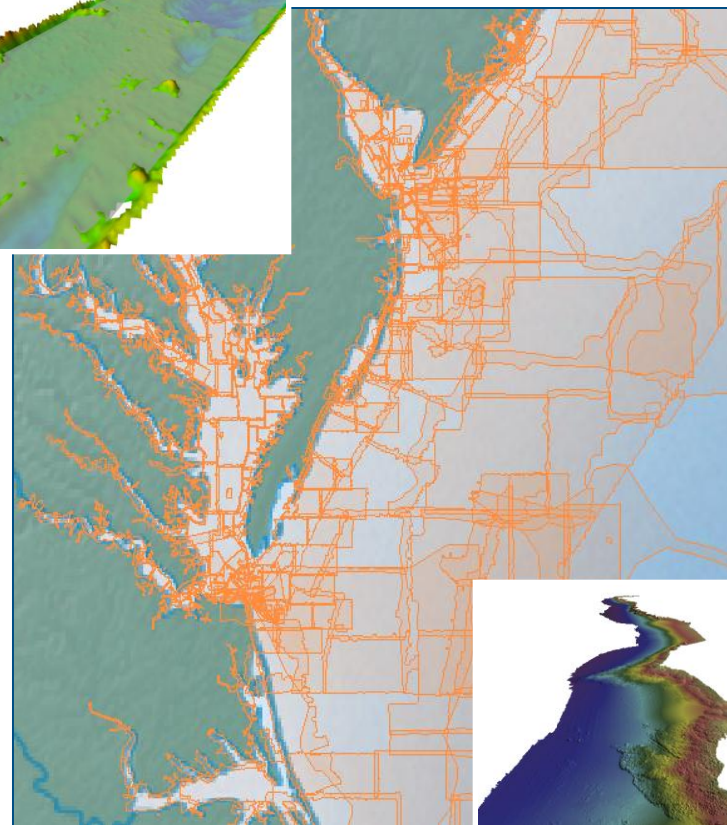
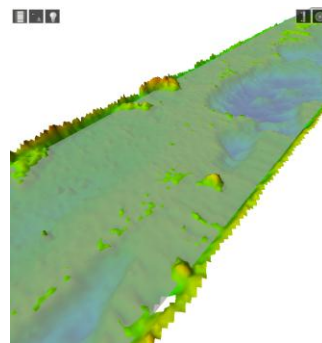
- **Powerful DEM Creation and Analysis**
  - Support for numerous elevation data formats
    - CARIS as well as many other 3rd party formats
      - USGS Grids, ESRI ASCII Grids, BAG, GSF, XYZ, etc.
  - 3D Visualization for DEMs and Point Clouds
  - Perform analysis and computations
    - Differencing, profile creation, slope/aspect computations, etc.
  - Seamlessly model land and sea
    - Fuse together land and sea DEMs for seamless analysis of the coastal zone
  - Easily derive vector representations
    - High precision contours, depth area polygons and sounding sets
    - Meet a wide range of charting requirements
      - Paper Chart, ENC, IENC, bathy ENC, etc.



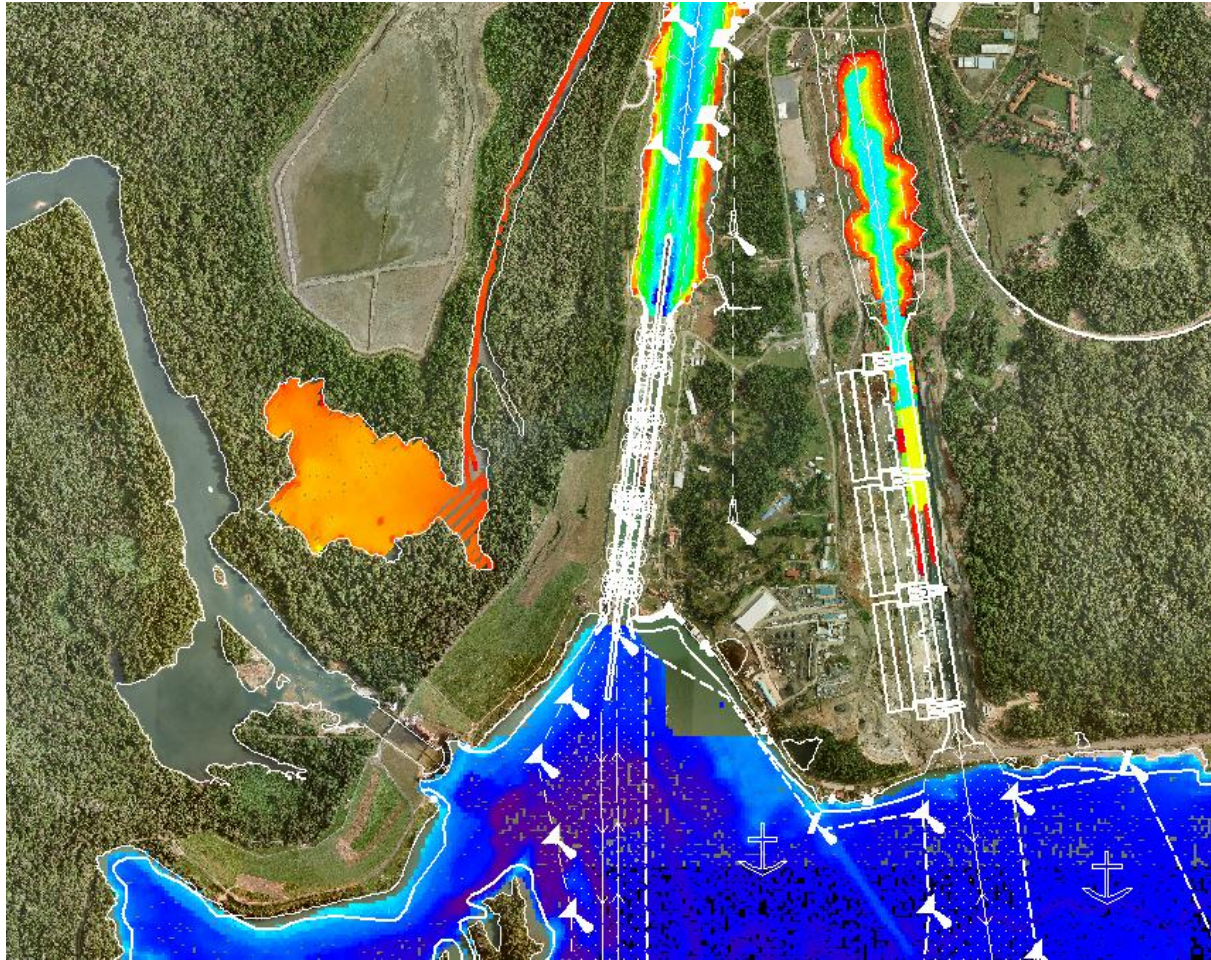


# Analysis

- **Ports and Waterway Analysis**
  - Build / import theoretical models of waterways
  - Perform sophisticated analysis between seafloor and theoretical models
    - Volume computations and dredge analysis
    - Shoal detection, management and conformance analysis
- **Elevation Data Management for Today and the Future**
  - Manage all elevation assets together, regardless of file size or data source
    - Sparse and huge high-resolution datasets
  - Scalable client / server environment with relational database
    - Options for Oracle Spatial 11g or PostgreSQL
  - Capture and store critical metadata for search and discovery of database content
  - Enhances data security, integrity and usability



# Bathy DataBASE



Panama Canal – New third set of locks



# Bathy DataBASE Users

- Brazil (DHN)
- Chile (SHOA)
- Panama (ACP)
- Ecuador (INOCAR)
- Mexico
- Argentina (SHN)
- Mexico
- Peru (DHN)
- Surinam (MAS)
- Australia (GSA)
- Belgium
- Canada (CHS)
- China (MSA)
- France (SHOM)
- Germany (BSH)
- India (NHO)
- Netherlands (RNLN)
- US (NAVO)
- US (NOAA)
- US (NGA)
- UKHO
- Vietnam



## 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**

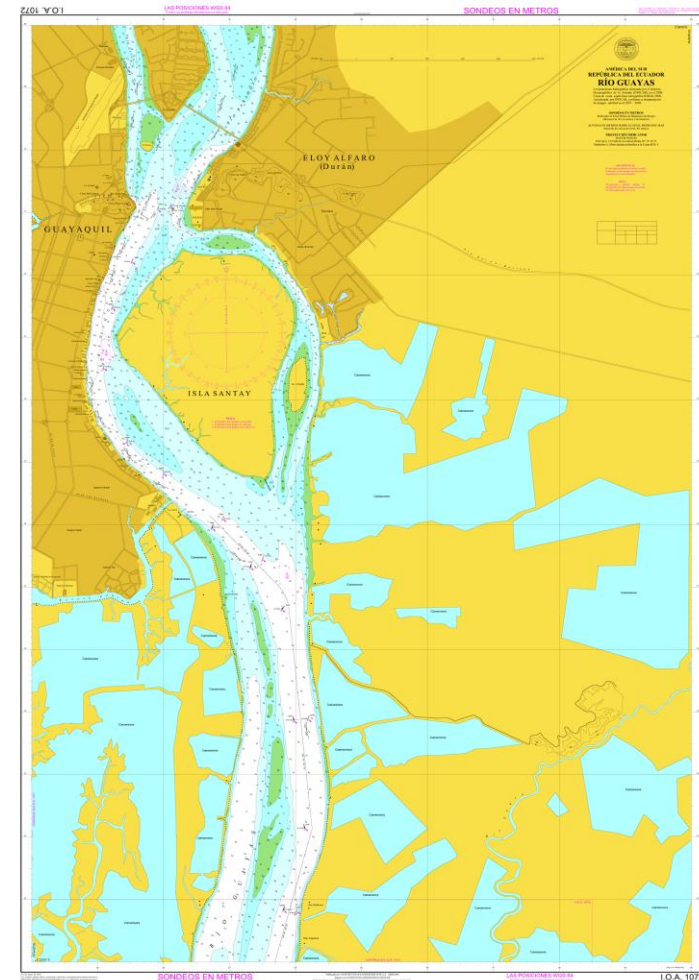
### DISCOVERY

**Spatial Fusion  
Enterprise**

WORKFLOW MANAGEMENT

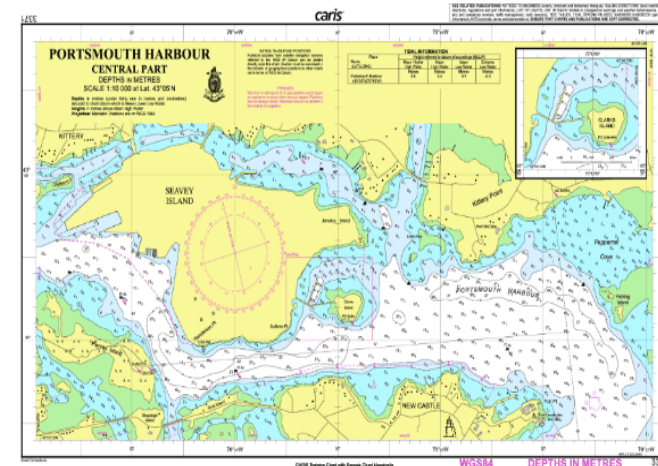
# Production

- **Next-Generation Chart Production**
  - Create, manage and update multiple chart products (i.e. Paper and Electronic products)
    - Paper Charts, Raster Charts, NtMs and others
    - S-57 ENC, IENC, MIO and others
  - Solutions positioned to adopt S-100 product specifications as they are finalized by IHO
  - Integrate data from wide range of GIS sources
  - Workflow driven production with sophisticated digitizing and object creation tools
  - Comprehensive Quality Control
    - IHO S-58 specifications
    - Supports user definable checks
    - Advanced error identification and repair tools



# Production

- **Eliminate Redundancy in Data Management**
  - Manage complex spatial and attribute data in a seamless relational database
    - Features stored and updated only once but simultaneously accessed by multiple users
  - Derive multiple paper and electronic chart products at various scales from the seamless source
  - Achieve a 51% reduction in time to create and update Paper charts and ENCs\*
- **Both Desktop and Database Chart Production Environment**
  - Upgrades and evolution from Desktop to Database



\* Reference:  
Lynn Patterson (Canadian Hydrographic Service), 2008, CHS & HPD: The New Hydrographic Production Environment (Paper Presentation), CHC and National Surveys Conference 2008

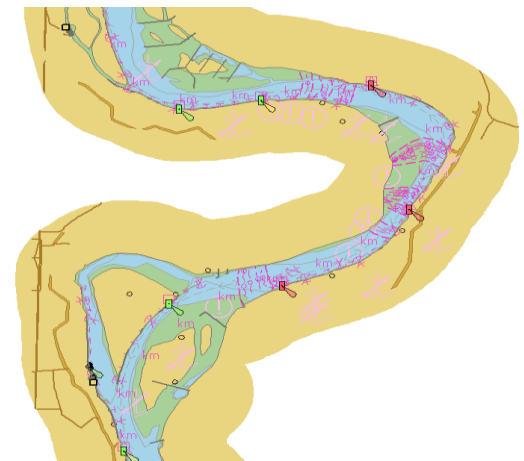
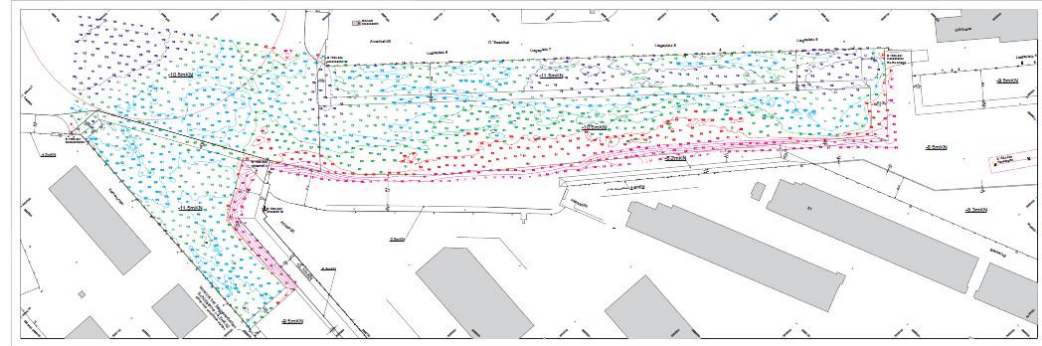


# HPD User Community

- NAVO
- US NGA
- United Kingdom Hydrographic Office
- Canadian Hydrographic Service
- Royal Australian Navy (evaluation)
- IIC Technologies
- Belgium Hydrographic Office
- Chilean Hydrographic Office
- Brazilian Hydrographic Office
- Ecuador Hydrographic Office
- Land Information New Zealand
- Taiwan Hydrographic Office
- BSH Germany
- Venezuelan Navy
- Argentinean Navy
- Royal Netherlands Navy
- Portuguese Hydrographic Office
- Mexican Navy
- Peruvian Navy
- Maritime Safety Admin. China
- SHOM France
- Port of Hamburg Germany
- KHOA, Korea
- NHO India
- Panama Canal Authority

# CARIS in Waterway Environments

- Port of Hamburg, Germany
  - Port of Hamburg Authority
- US Inland Waterways
  - USACE and IIC Technologies

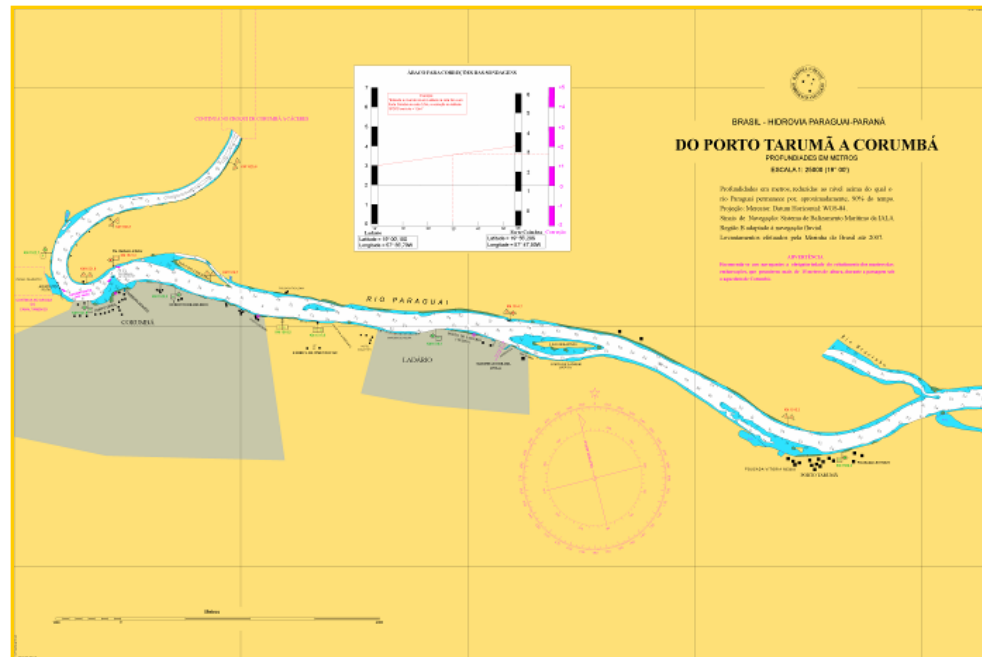
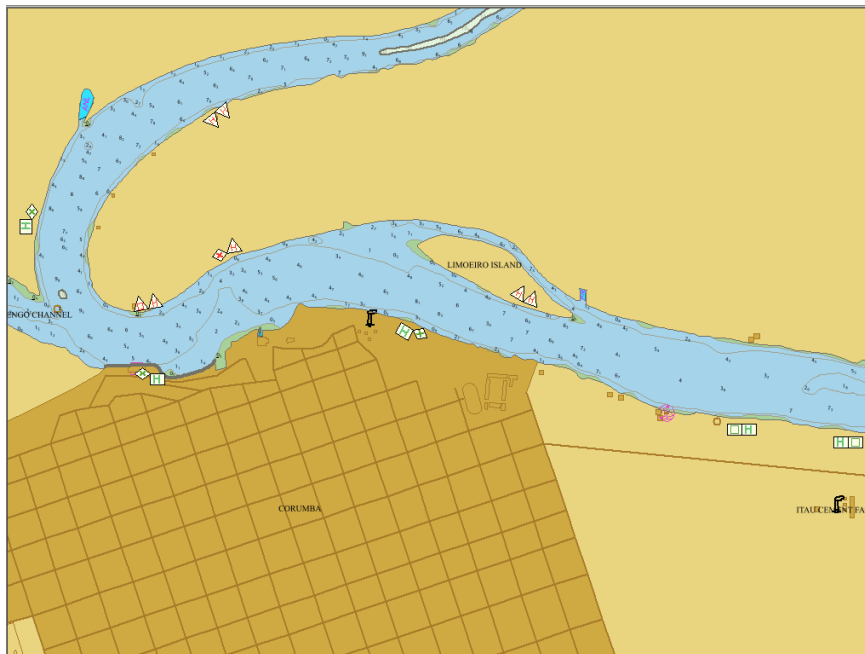


# CARIS In Waterway Environments

- Saint Lawrence Seaway,  
Canada
  - Canadian Hydrographic Service (CHS)
- Dutch Inland Waterways,  
The Netherlands
  - Rijkswaterstaat (RWS):  
The Dutch Ministry  
of Transport, Public  
Works, and Water  
Management

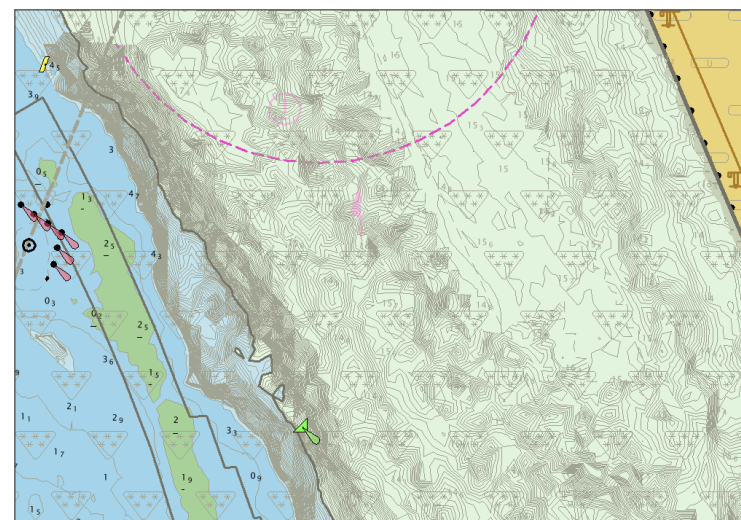


# Brazil: Project Brazilian Waterways

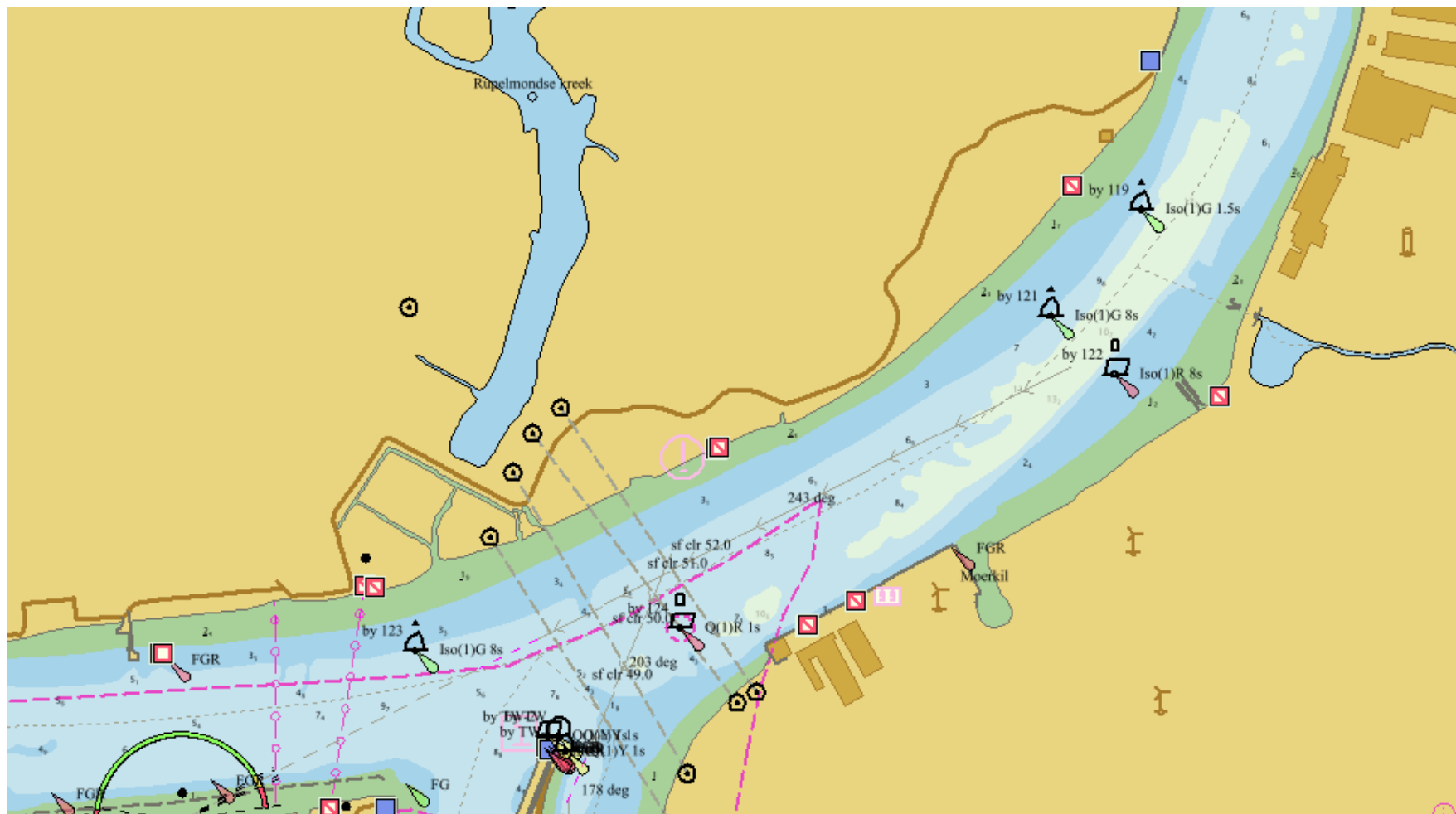


# Flemish Hydrography (Belgium)

- ENC's
- Inland ENC's
  - IENC 2.3
  - IENC Specific Validation tests
- Paper Charts
- High Density Bathymetric Electronic Charts
- Paper Survey Plans



# Flemish Hydrography (Belguim)

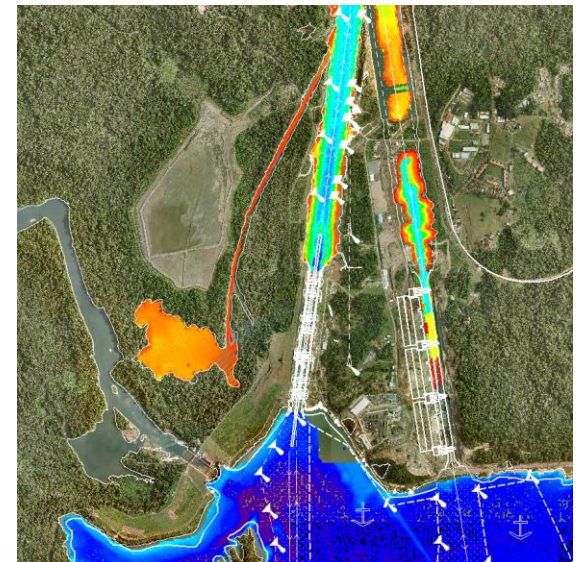
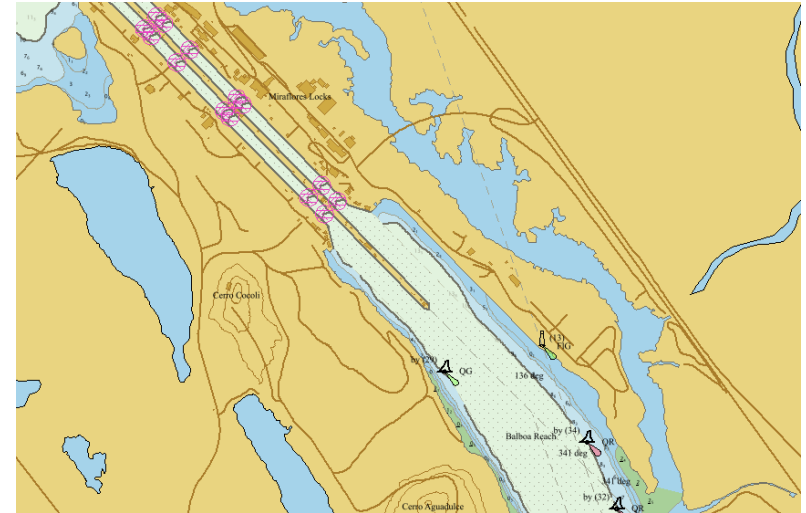


Antwerp area, Belgium, IENC 2.3



# Panama Canal

- IENCs and ENCs
- Paper Charts
- Customized Products
  - Pilot Handbooks
  - Hydrographic charts





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