

CARIS ***Ping-to-Chart Solution™*** **for the Caribbean**

Addressing the Caribbean Charting Requirements

**12th Meso American & Caribbean Sea
Hydrographic Commission Meeting**

**December 2011
Basseterre, St. Kitts**

Summary

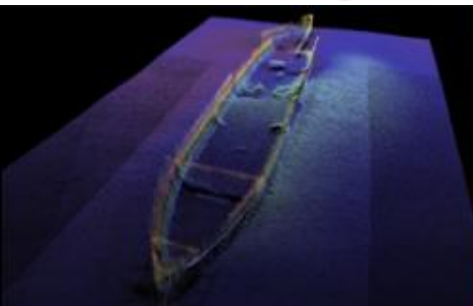
- Over 30 Years in the GIS Software Development Business
- Successful CARIS installations in over 85 countries
- 170 employees in total between Canada, Netherlands, USA, Australia and the UK
 - Developers (85), Project Management (5), Sales (10), Marketing (5), Tech Support (35), QA testers (10), General (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



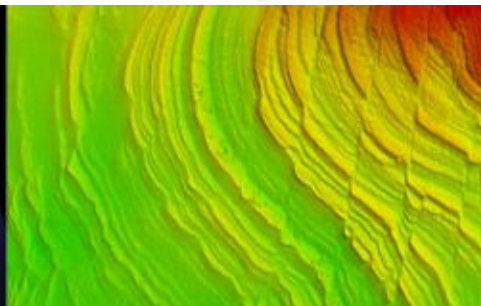
Ping-to-Chart™ Solution

- 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



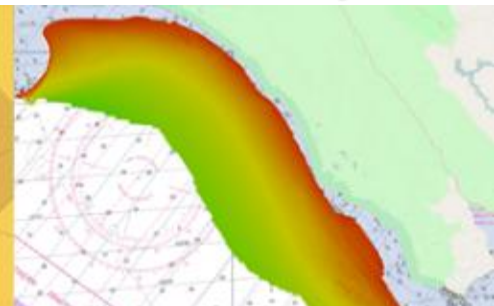
Analysis



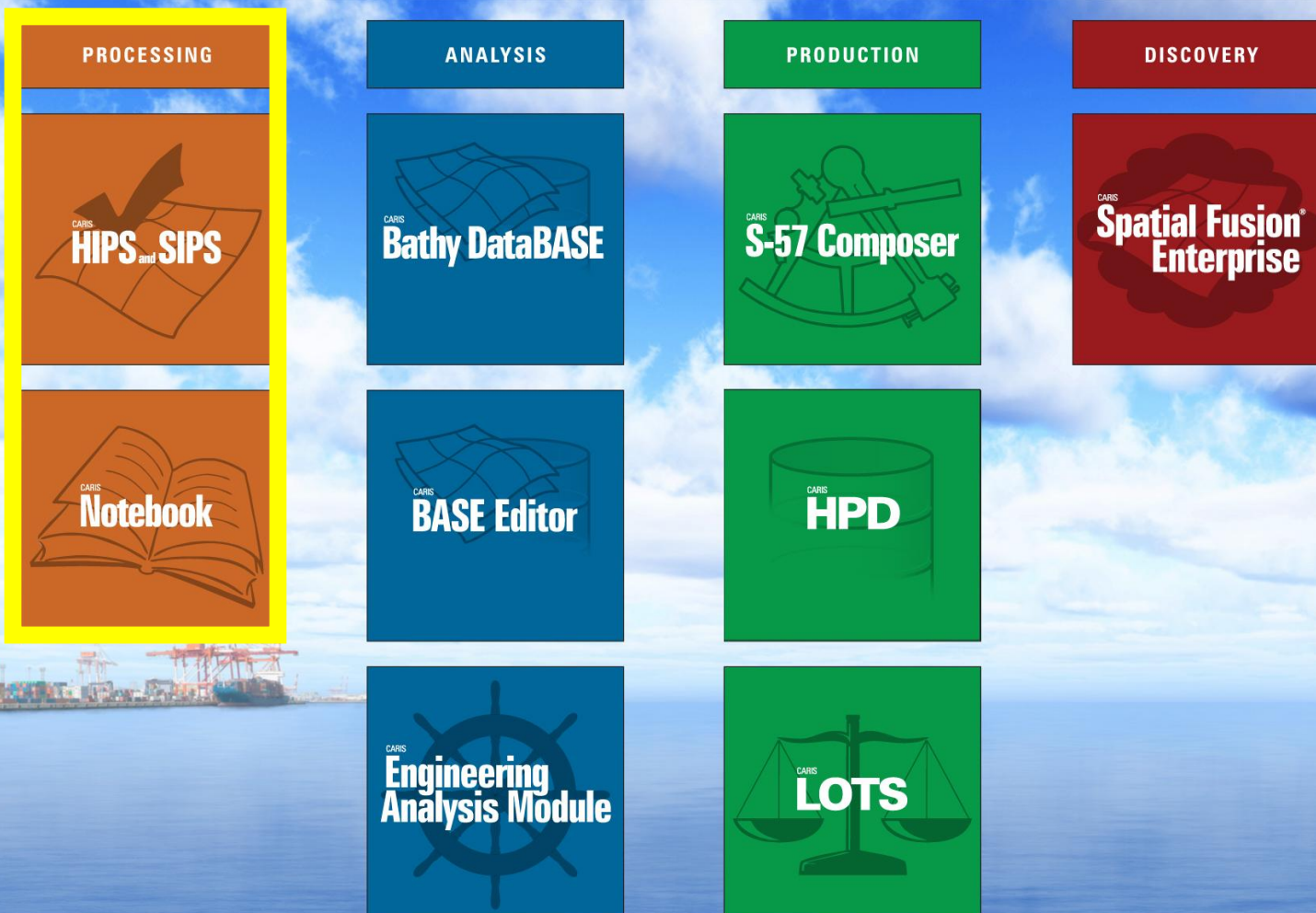
Production



Discovery



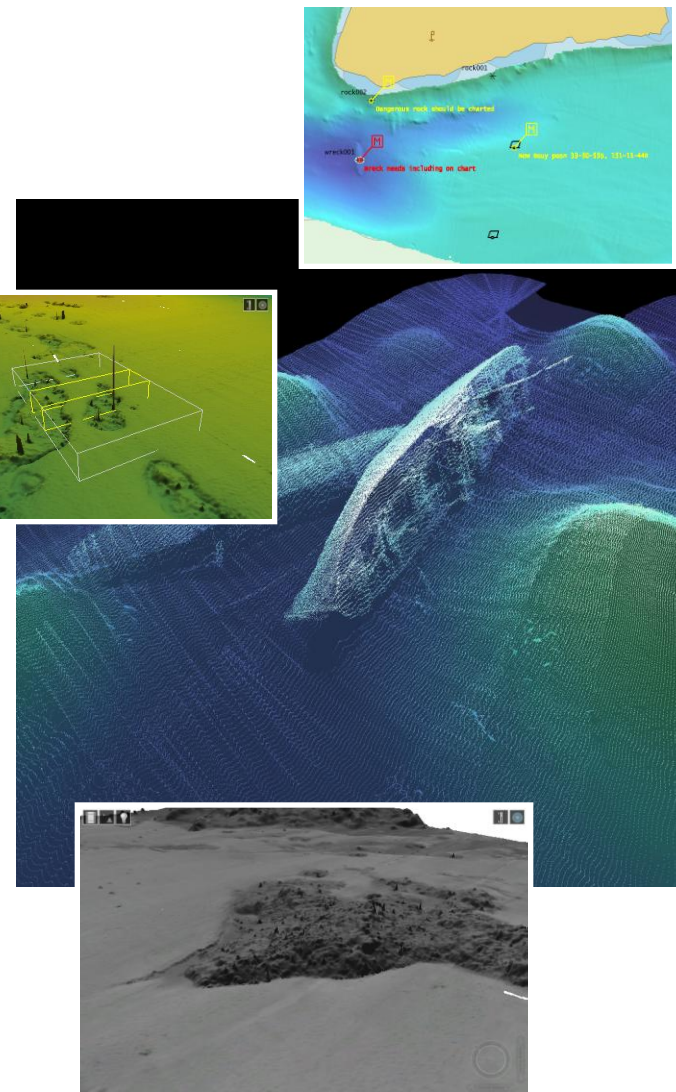
CARIS Ping-to-Chart Workflow



WORKFLOW MANAGEMENT

Processing

- **Capture Survey / Field Observations as S-57 Objects**
 - Wrecks, Buoys, Coastlines, etc. captured as S-57 data from live GPS data logging or digitizing tools
- **Improve Acquisition to Processing Ratios**
 - Achieve 1:1 data acquisition to processing ratio, or better
 - Efficiently process bathymetry and imagery
 - MBES, SBES and LiDAR bathymetry
 - SSS and MBES Backscatter and Time Series Imagery
 - Utilize proven algorithms and corrections (e.g. SVC)
 - Optimize efficiencies through statistical modeling, automated corrections and seamless 3D visualization
 - Scalable technology provides 64-bit OS support, multithreaded processes and DEM / Mosaic technology for tens of billions of grid nodes



CARIS Ping-to-Chart Workflow

PROCESSING

CARIS
HIPS and SIPS

CARIS
Notebook

ANALYSIS

CARIS
Bathy DataBASE

CARIS
BASE Editor

CARIS
**Engineering
Analysis Module**

PRODUCTION

CARIS
S-57 Composer

CARIS
HPD

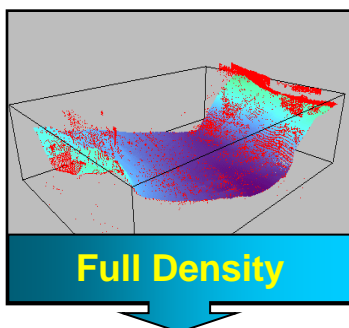
CARIS
LOTS

DISCOVERY

CARIS
**Spatial Fusion[®]
Enterprise**

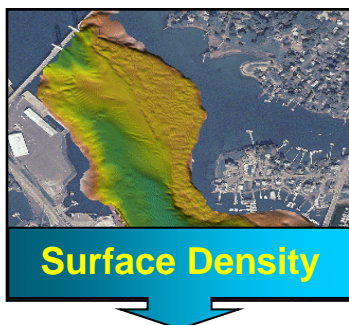
WORKFLOW MANAGEMENT

Bathymetric Densities



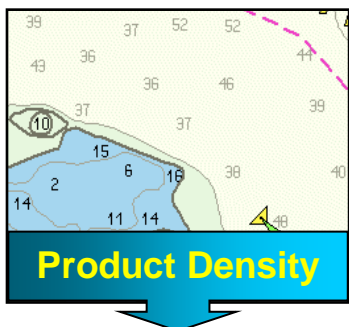
Full Density

- Complete set of raw and processed data from all sensors. Data cleaning. Data processing (e.g. tides, svp corrections, ...). And value-added data (e.g. TPE generated for every sounding)



Surface Density

- Nodes (points), with attributes. Density needs to reflect spatial resolution of the sonar... too high, unnecessary nodes... too low, seafloor detail is lost

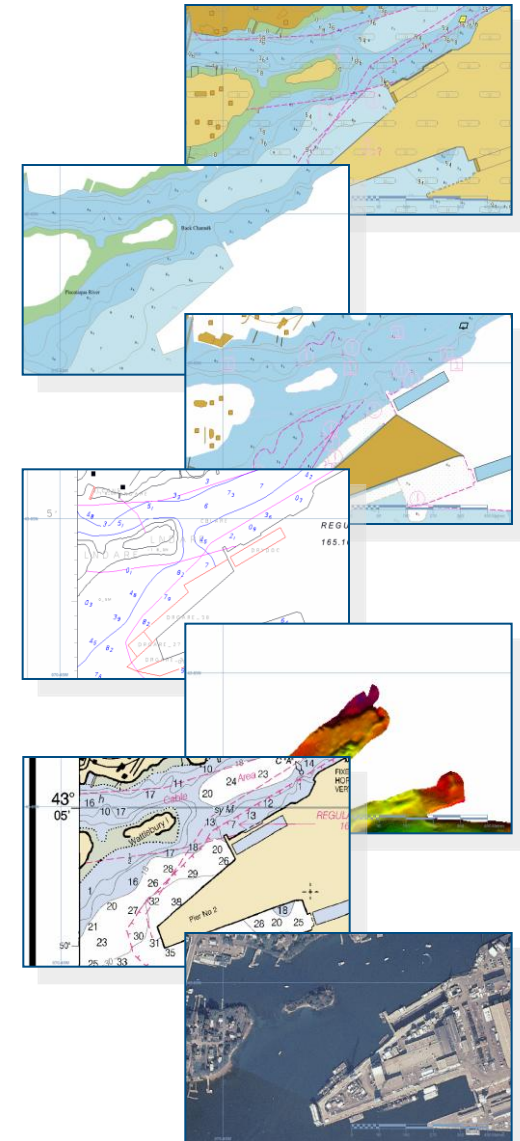


Product Density

- Soundings, optionally with attributes. Density adjusted to needs of the product.

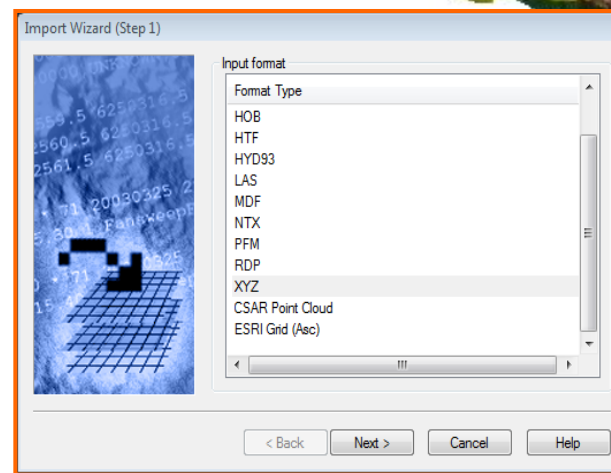
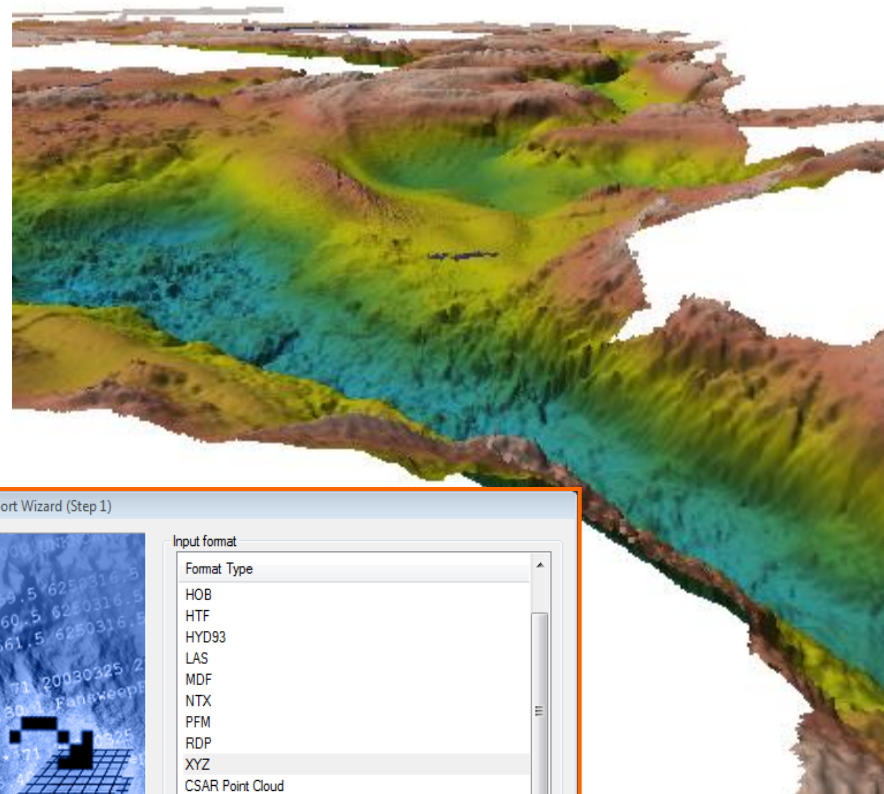
Data Sources

- Geo-referenced Background
 - Raster
 - GeoTiff, TFW, IGA, BSB, HCRF, ECW, CRL, MrSID, JPEG2000 and others....
 - Vector
 - S-57, CARIS Map, SHP, DXF, DWG, SAF, DGN, HOB, and others...
 - URL
 - Web Mapping Service (WMS), ECW / JPG2000



Data Sources

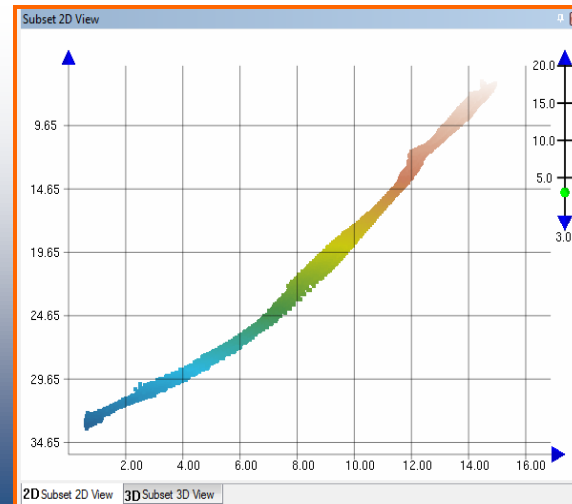
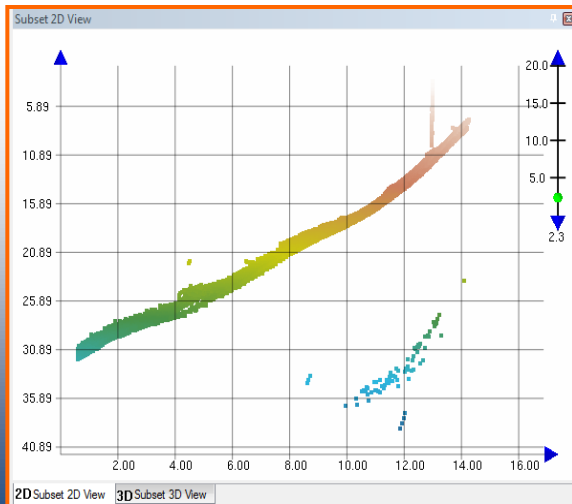
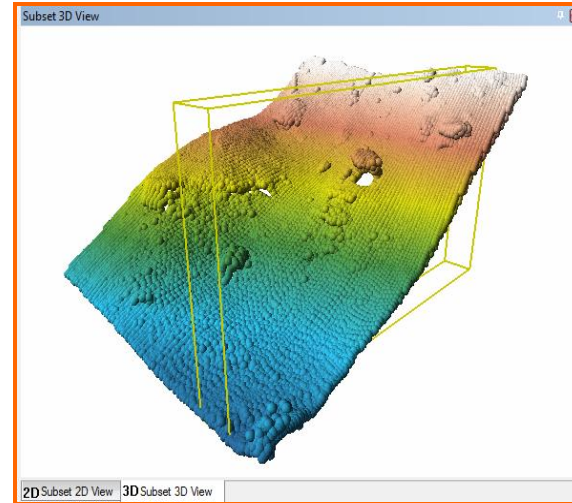
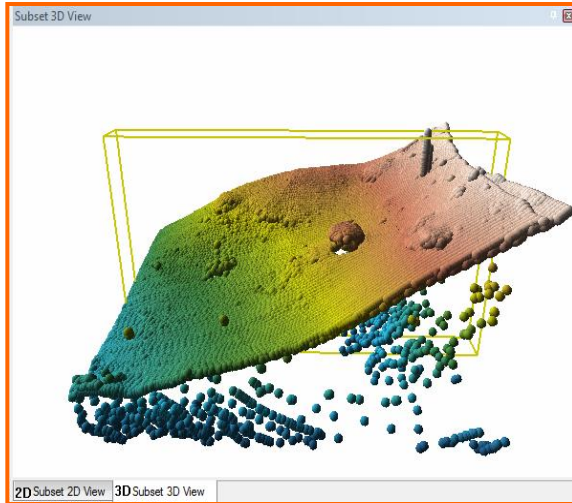
- Natively open:
 - CARIS BASE Surfaces (e.g. produced with CARIS HIPS and SIPS)
 - BAG Surfaces (produced by CARIS or other software vendors)
 - USGS DEM
- Import bathymetry data sources from:
 - CRS, GSF, HOB, HTF, HYD93, LAS, MDF, NTX, PFM, RDP, XYZ, CSAR Point Cloud, ESRI ASCII Grid



Sounding Sources...and More Sources

- **Not Validated**

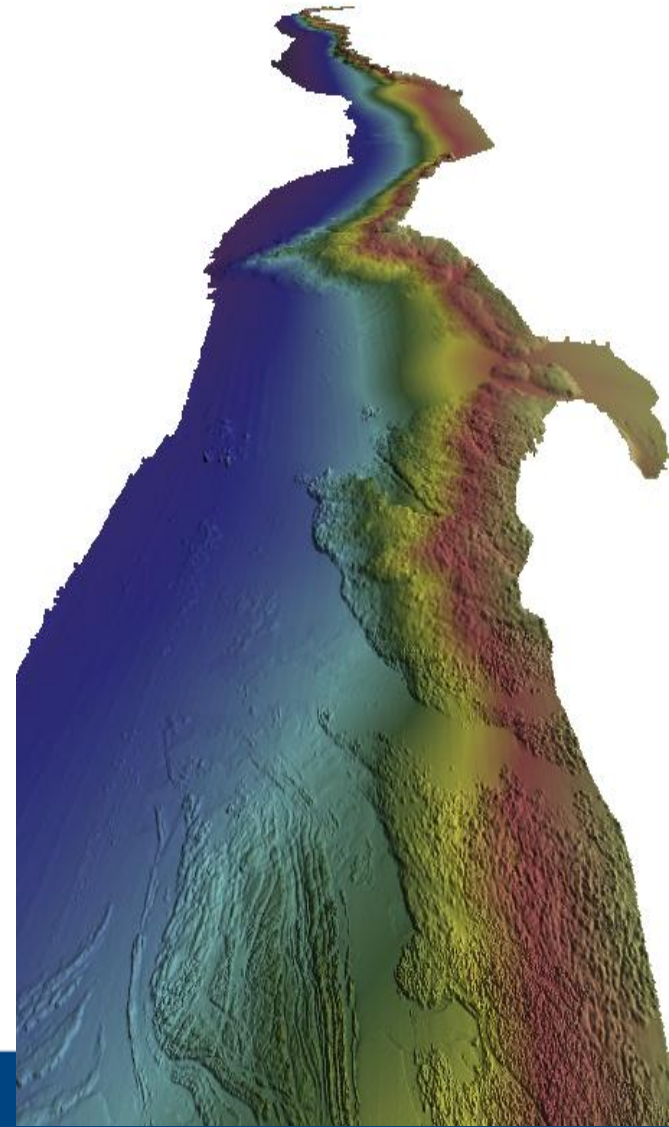
- **Validated**



CSAR Framework

- **CARIS Spatial ARchive (CSAR*)** Framework
 - CARIS technology framework
 - Provides substantial benefits to CARIS products for efficient storage, handling and rapid visualization of ‘large’ volumes of bathymetry data

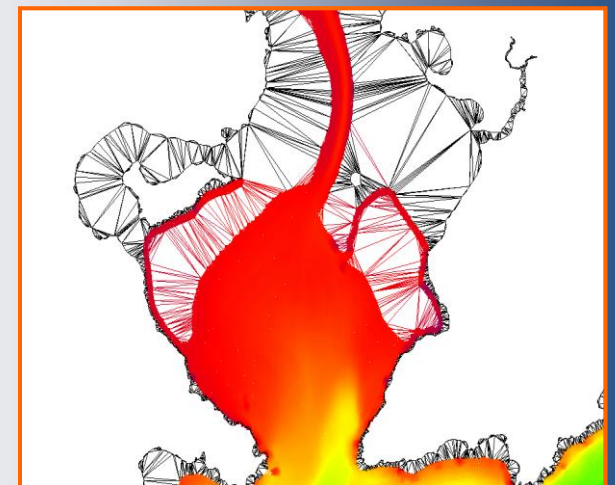
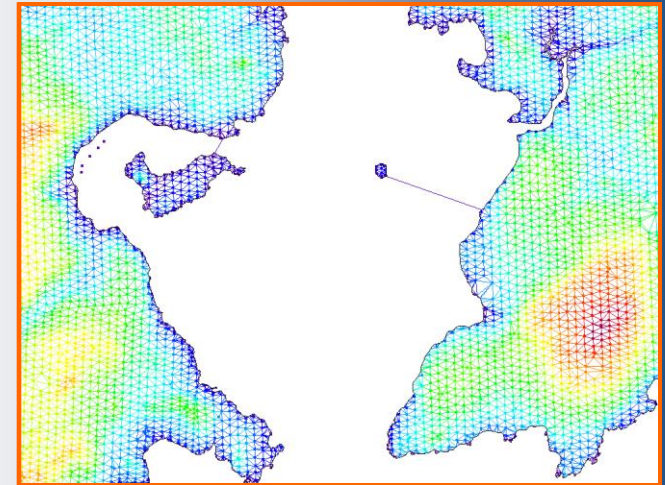
**Pronounced “Cesar”*



BASE Manager / Editor

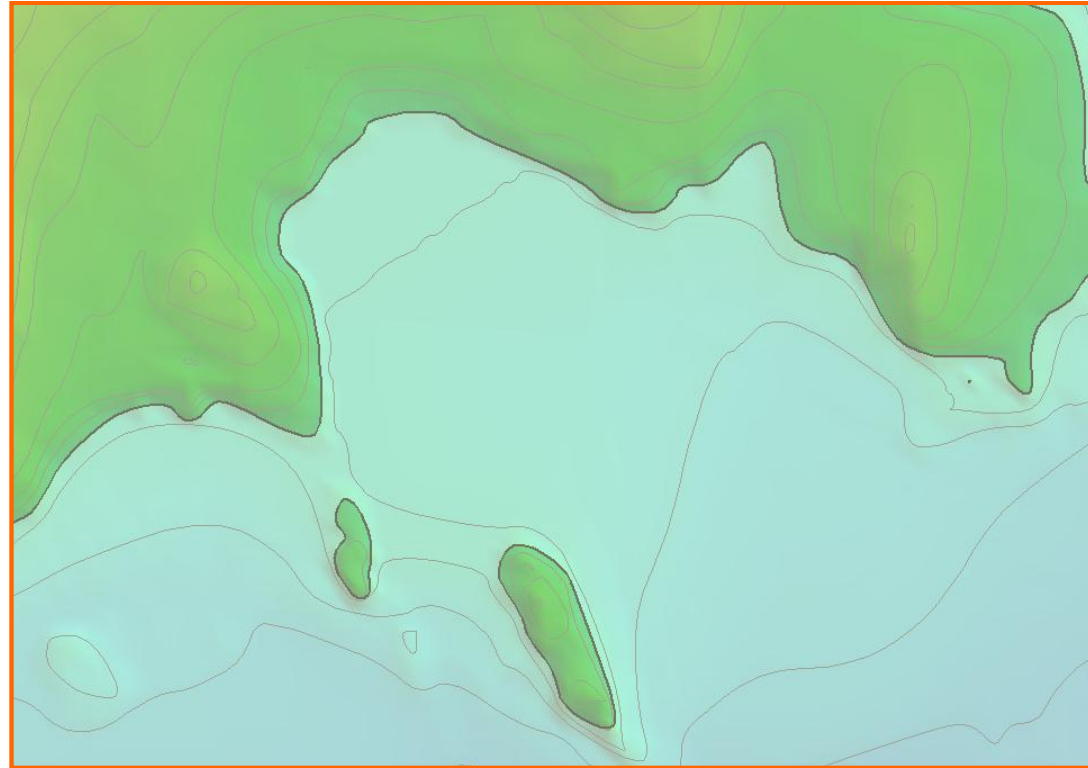
TIN Creation and Manipulation

- Create TIN from Sounding Set
- Prepare and manipulate TIN model
 - Remove Long / Hull Edges
 - Auto Generated TIN Editor layer
 - Apply Vector objects to TIN from Feature Layer or TIN Editor Layer
 - Breaklines or points to insert known depths (e.g. low water line)
 - Coverage polygons to control TIN extents (boundary or holes)
- Interpolate Surface from TIN
 - Options for Linear or Natural Neighbor Interpolation



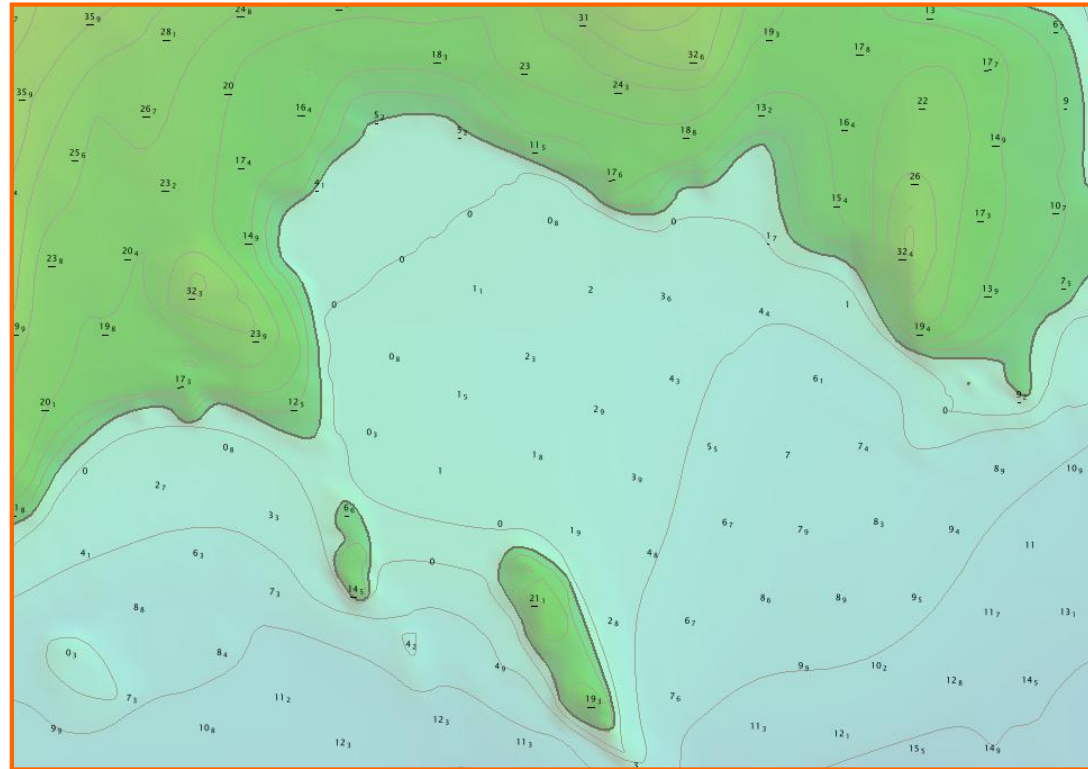
Bathymetry Products

- Depth Contours and Depth Areas
 - Created from BASE Surface or TIN
 - Created as properly attributed, S-57 objects
 - Produce smooth contours
 - Contour Smoothing tool
 - Produce from Generalized Surface (detail appropriate for particular chart scale)
 - Topology on-the fly
- Meet requirements for various nautical products:
 - Paper Chart, ENC, IENC, bENC, AML, etc.



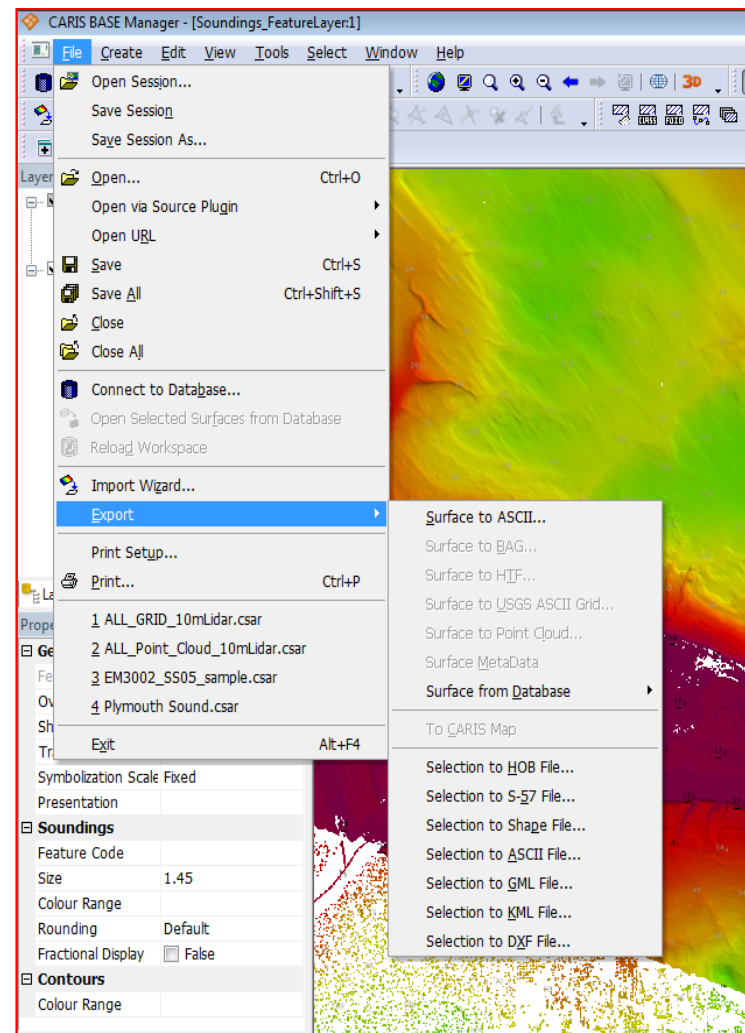
Bathymetry Products

- Soundings
 - Created from Sounding Set or BASE Surface
 - Created as properly attributed, S-57 objects
 - Filter sounding selection by attributes
 - Map source data attributes to Sounding object attributes
 - e.g. Uncertainty to SOUACC
- Meet requirements for various nautical products:
 - Paper Chart, ENC, IENC, bENC, AML, etc.

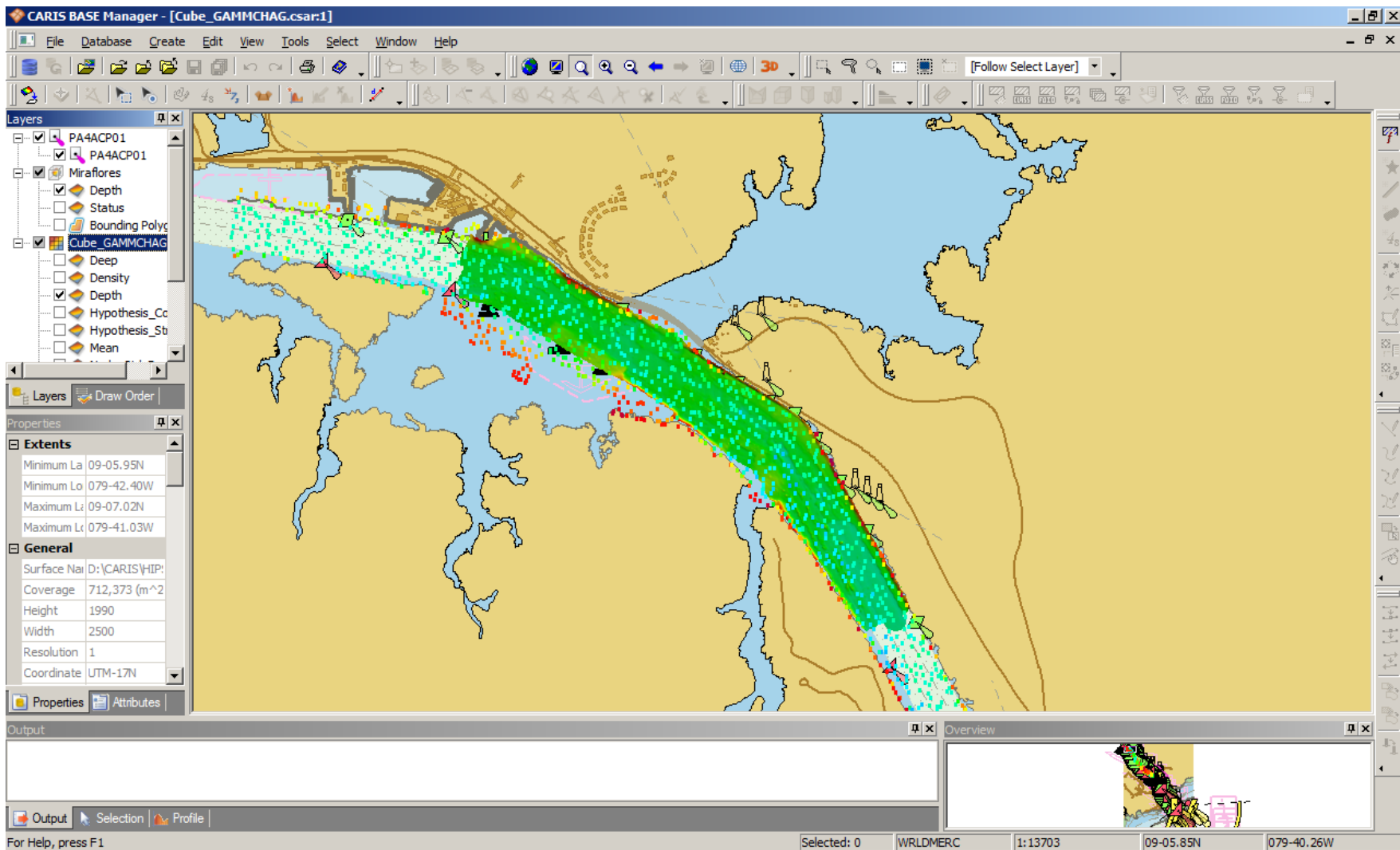


Data Exports

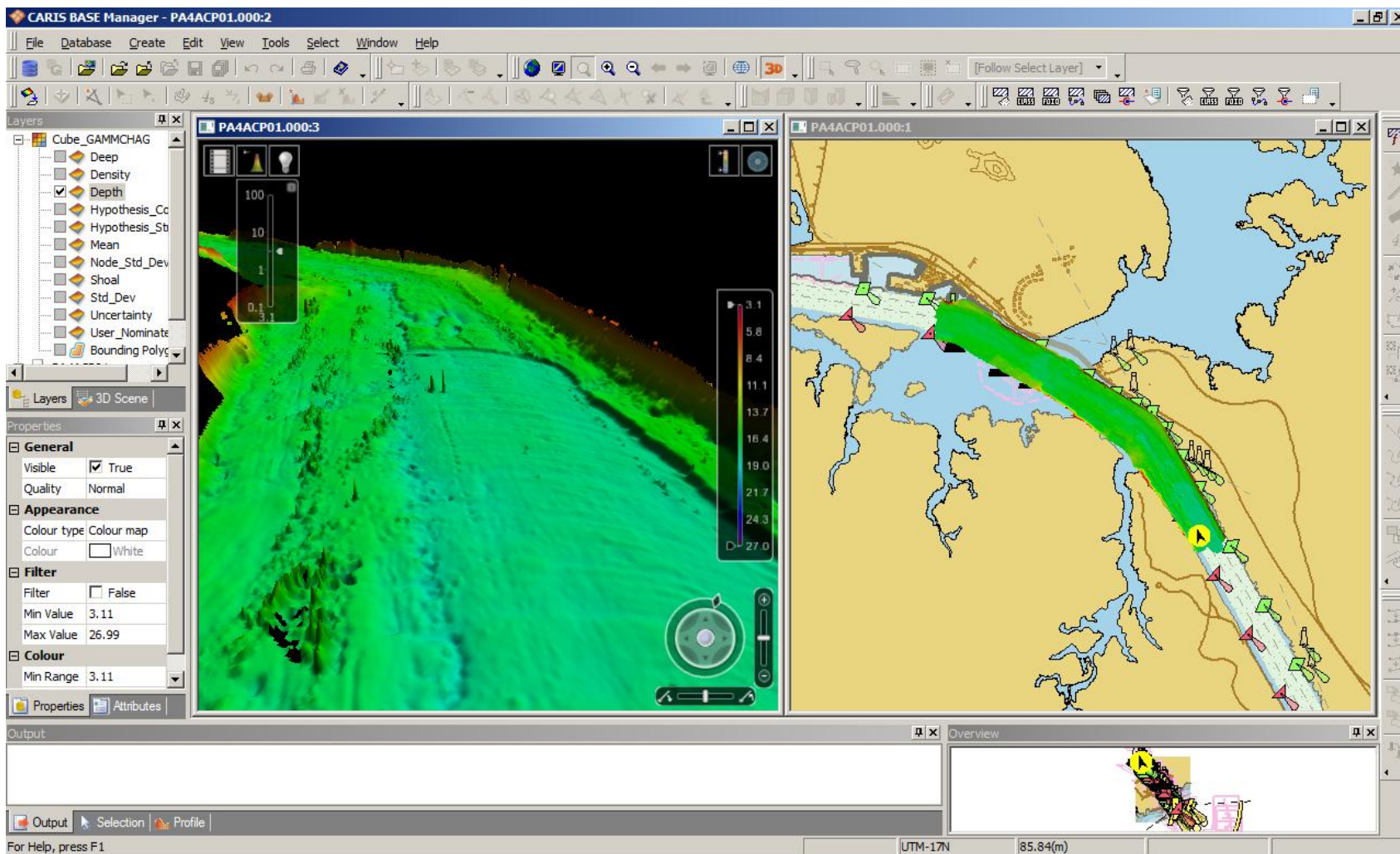
- Export BASE Surfaces and/or Sounding Sets to:
 - ASCII, BAG, HTF, KMZ
- Export BASE Surface and Sounding Set Metadata
- Export Vector objects to:
 - CARIS Map, S-57, Shape, GML, KML
 - ASCII with accompanying ISO 19115 metadata



Panama Canal



Panama Canal



CARIS Ping-to-Chart Workflow

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**Spatial Fusion[®]
Enterprise**

WORKFLOW MANAGEMENT

Production

- **Next-Generation Chart Production**
 - Create, manage and update multiple electronic chart products
 - 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



Key Features

- Uses the latest CARIS technologies for Importing, Mapping, Editing, Quality Assurance and Export
 - Shared with EasyView, BDB, HPD
- Easily create multiple electronic dataset formats
 - ENC (3.1, 3.1.1 and 3.1.2)
 - AML (1.0, 2.1 and 3.0)
 - IENC (International 2.0, 2.1 and USACE 4.0)
 - Marine Information Overlays (MIO)
 - Bathymetric MIO (bMIO)
 - Users can easily modify, create and add new dataset formats
 - DNCs with S-57 Composer DNC Module

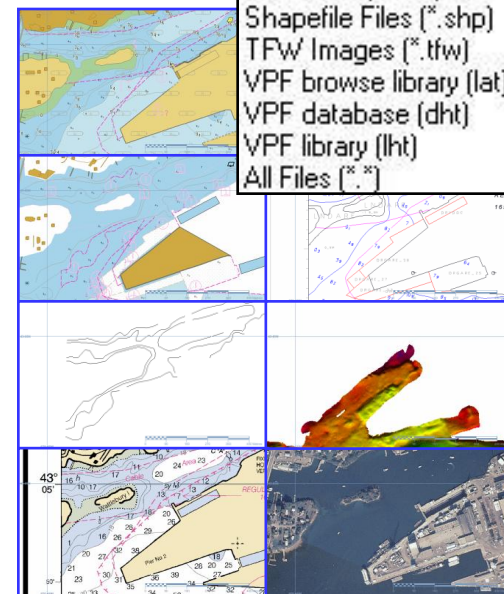
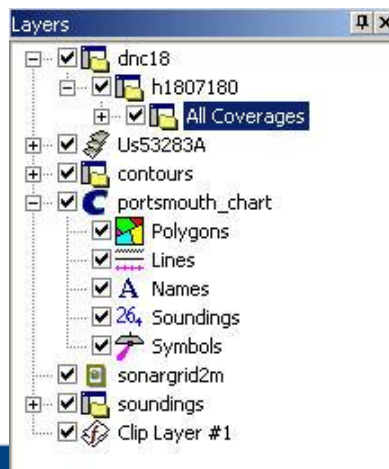
More Features

- Topological relationships automatically maintained
- Full suite of spatial and object editing tools
- Rapid product creation & update with project workflows
 - Easy updating of existing data
 - Simple creation of S-57 Exchange Sets
- Ready for the IHO S-100 standard, the future of S-57

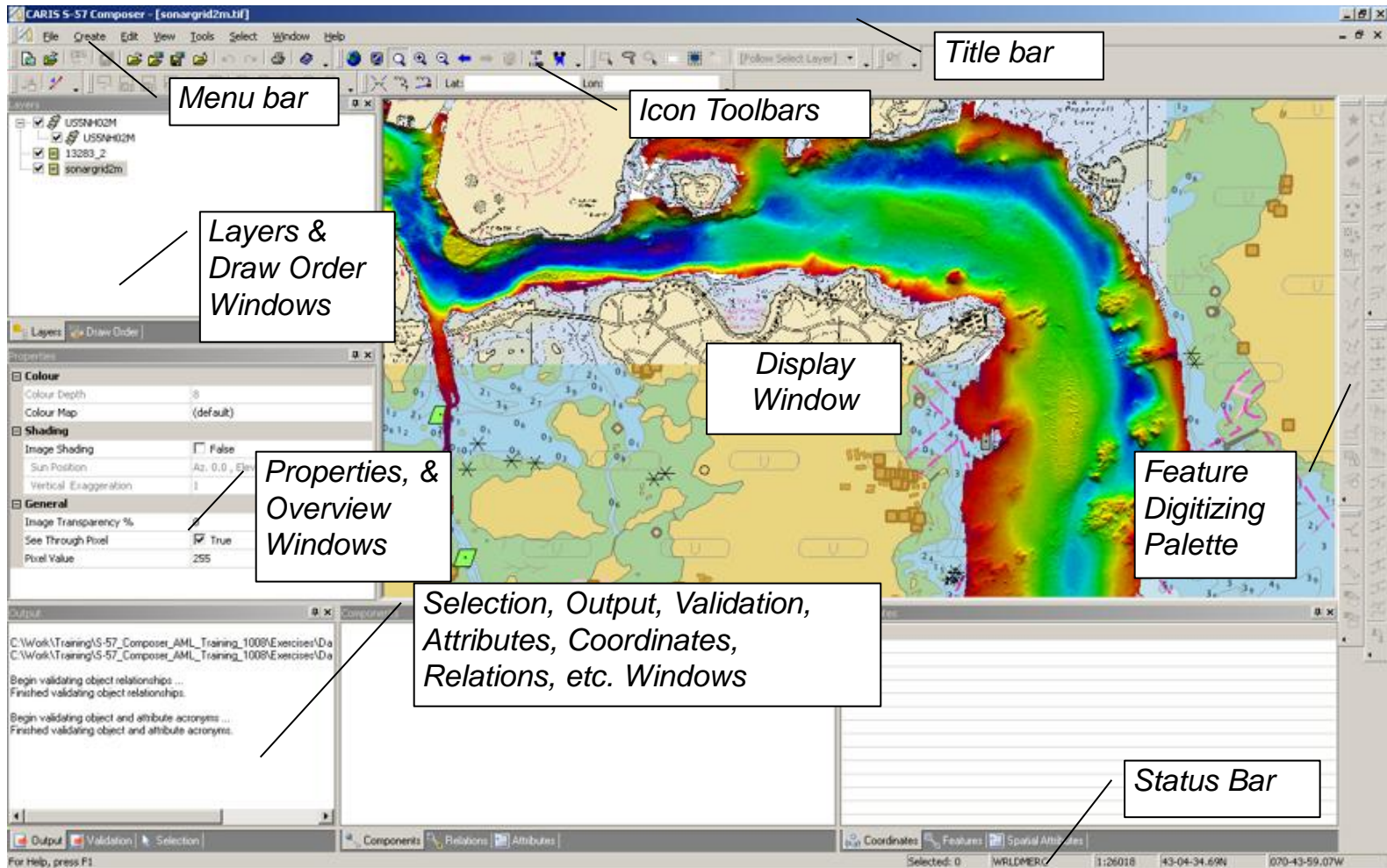
Support For Many Data Formats

- Open a wide range of file types
 - Vector
 - S-57, VPF, CARIS, HOB, DXF, DGN, SHP ...
 - Raster
 - BSB, HCRF, CRL, ECW, GeoTIFF, TFW, JPEG2000, MrSID ...
- Grab background geometry or digitise from raster
- Re-project data on-the-fly
- Apply transparency levels

AutoCAD File (*.dwg; *.dxf)
 BSB Images (*.kap; *.cap)
 CARIS Files (*.des)
 CARIS SAF Files (*.saf)
 CRL Images (*.crl)
 CRLW Images (*.crlw)
 DGN Files (*.dgn)
 ECW Image (*.ecw)
 GeoTIFF Images (*.tif)
 HCRF Images (*.chr)
 HOB Files (*.hob)
 IFF Files (*.iff)
 IGA Images (*.iga)
 Jpeg 2000 Image (*.jp2)
 S-57 Files (*.000)
 Shapefile Files (*.shp)
 TFW Images (*.tfw)
 VPF browse library (lat)
 VPF database (dht)
 VPF library (lht)
 All Files (*.*)

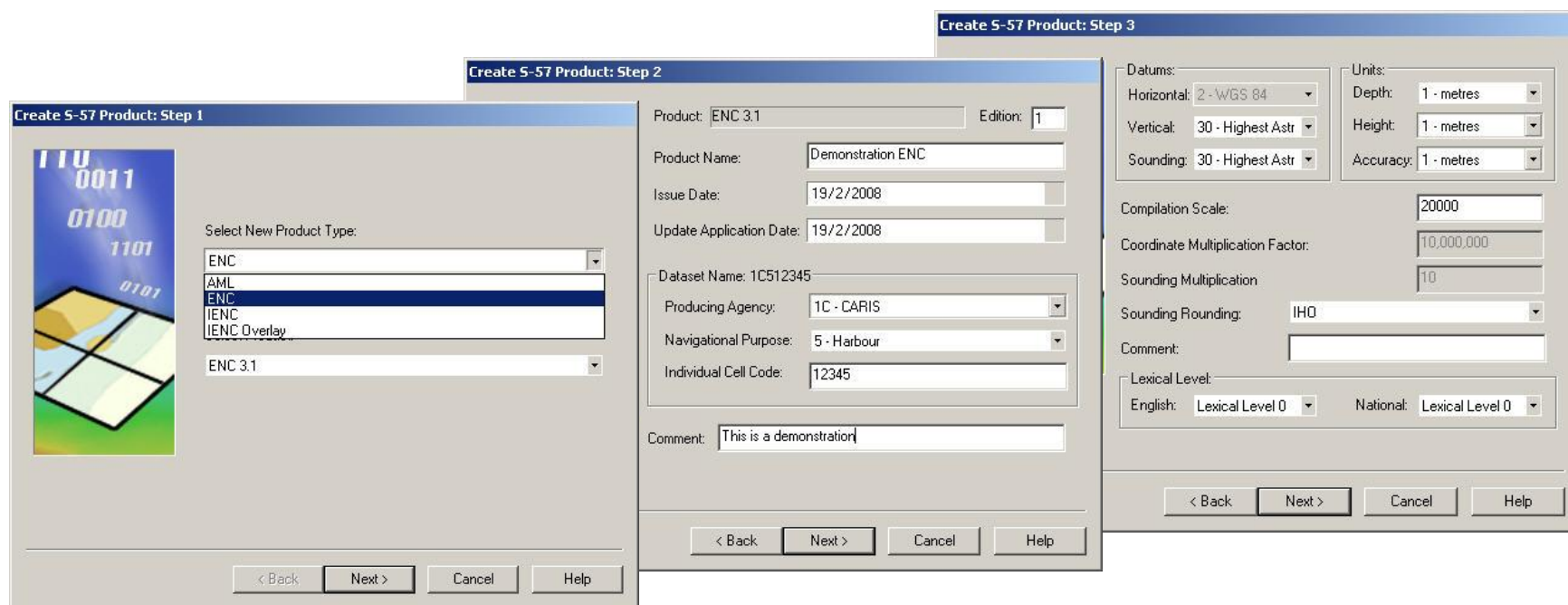


CARIS S-57 Composer User Interface



Product Based

- Easily create new Product datasets using a wizard
- Default file storage simplifies dataset management
- Export directly to S-57 Exchange Set or update existing



The image displays three overlapping screenshots of the 'Create S-57 Product' wizard, showing the progression from Step 1 to Step 3.

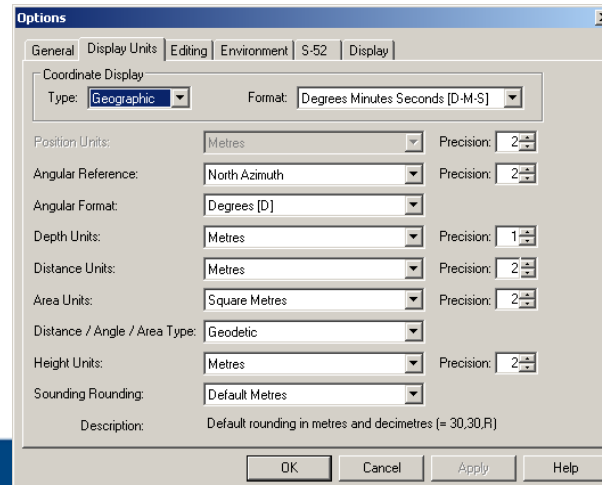
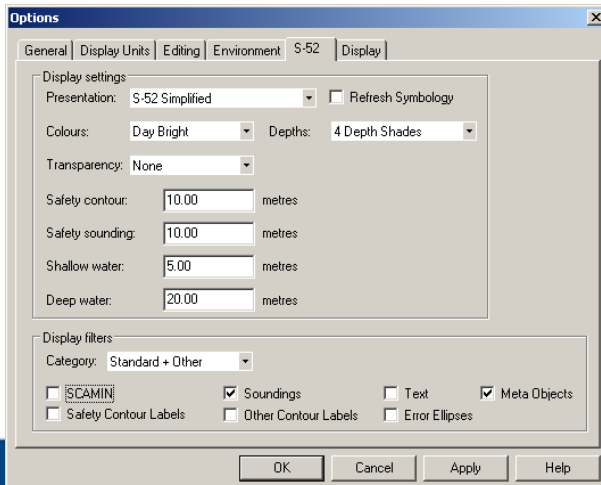
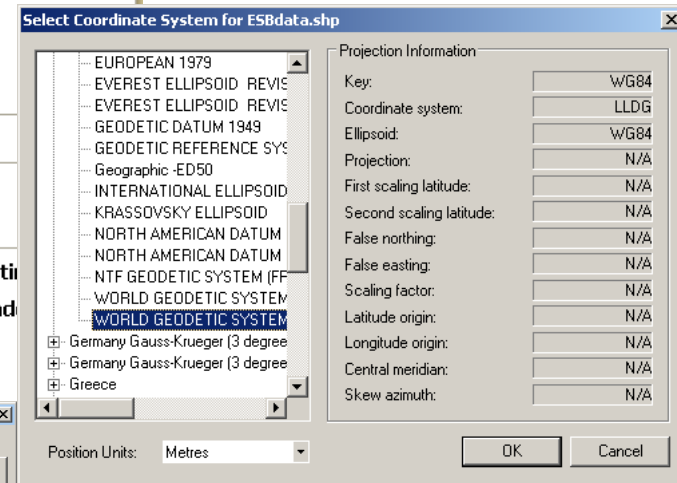
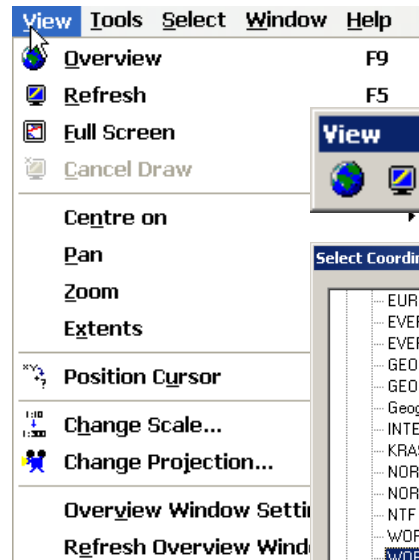
Step 1: 'Create S-57 Product: Step 1'. The interface shows a graphic on the left with binary code (110, 0011, 0100, 1101, 0101) and a map. The main area is titled 'Select New Product Type:' and contains a list box with the following options: ENC, AML, ENC (highlighted), IENC, IENC Overlay, and ENC 3.1. Navigation buttons at the bottom include '< Back', 'Next >', 'Cancel', and 'Help'.

Step 2: 'Create S-57 Product: Step 2'. This screen contains several input fields: 'Product: ENC 3.1', 'Edition: 1', 'Product Name: Demonstration ENC', 'Issue Date: 19/2/2008', 'Update Application Date: 19/2/2008', 'Dataset Name: 1C512345', 'Producing Agency: 1C - CARIS', 'Navigational Purpose: 5 - Harbour', and 'Individual Cell Code: 12345'. A 'Comment:' field contains the text 'This is a demonstration'. Navigation buttons at the bottom include '< Back', 'Next >', 'Cancel', and 'Help'.

Step 3: 'Create S-57 Product: Step 3'. This screen is for configuration and includes: 'Datums: Horizontal: 2 - WGS 84, Vertical: 30 - Highest Astr, Sounding: 30 - Highest Astr'; 'Units: Depth: 1 - metres, Height: 1 - metres, Accuracy: 1 - metres'; 'Compilation Scale: 20000'; 'Coordinate Multiplication Factor: 10,000,000'; 'Sounding Multiplication: 10'; 'Sounding Rounding: IHO'; 'Comment:'; and 'Lexical Level: English: Lexical Level 0, National: Lexical Level 0'. Navigation buttons at the bottom include '< Back', 'Next >', 'Cancel', and 'Help'.

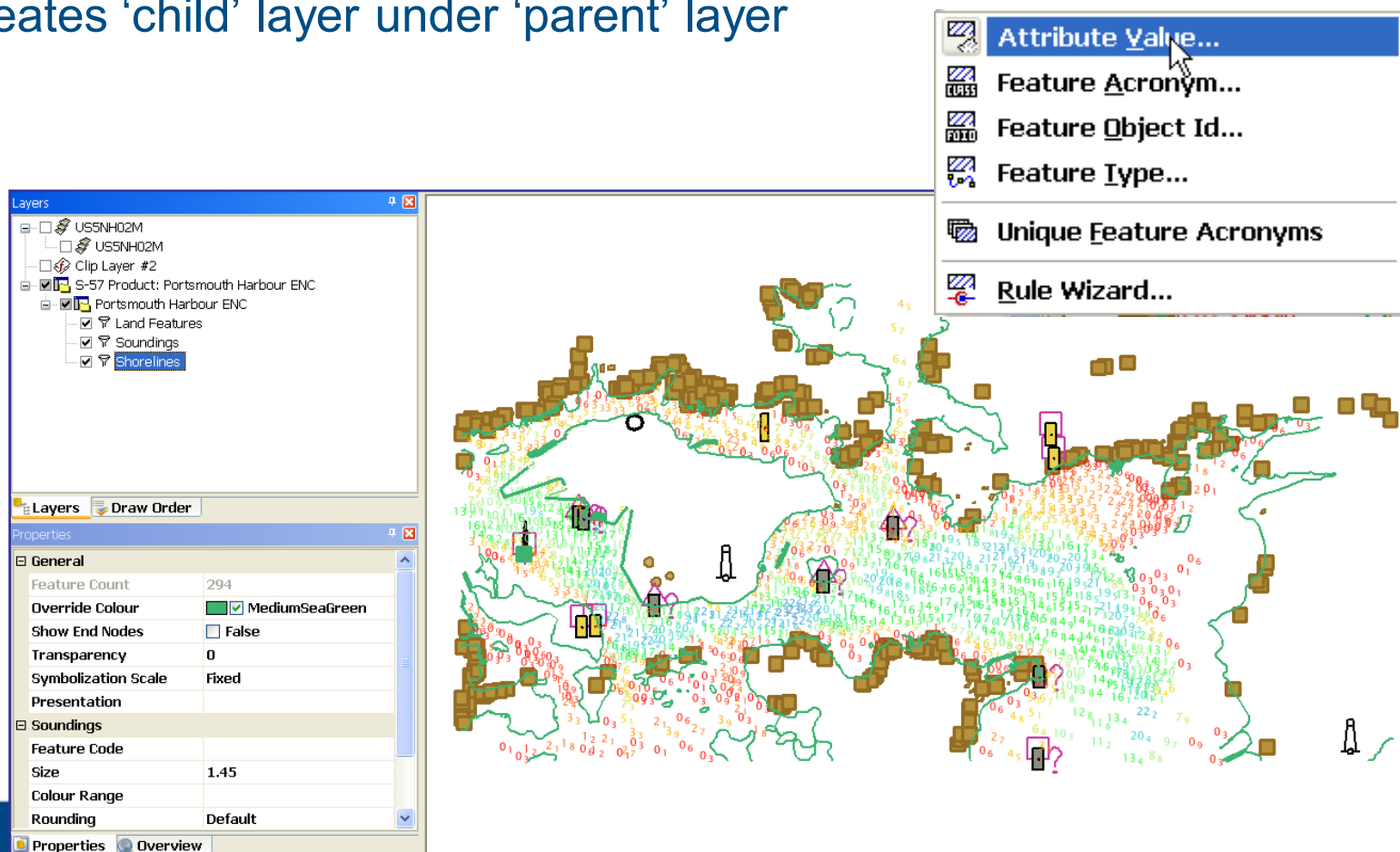
Viewing and Display Tools

- Viewing tools & icons
 - Zoom, pan, change scale
 - Overview, centre on...
 - Re-project data on-the-fly
- Control the display
 - S-52 settings, Display units



Filter the Display Window

- Create filtered layers showing features of interest
 - by Feature Acronym, Type, Attribute Value, 'Rule Wizard'
 - creates 'child' layer under 'parent' layer



The screenshot displays a GIS application window with a map of Portsmouth Harbour ENC. The map shows various features, including land features, soundings, and shorelines. A filtered layer is visible, showing features of interest. The interface includes a Layers panel on the left, a Properties panel at the bottom left, and a context menu on the right.

Layers Panel:

- US5NH02M
 - US5NH02M
 - Clip Layer #2
 - S-57 Product: Portsmouth Harbour ENC
 - Portsmouth Harbour ENC
 - Land Features
 - Soundings
 - Shorelines

Properties Panel:

Layers Draw Order

Properties

General

Feature Count	294
Override Colour	<input checked="" type="checkbox"/> MediumSeaGreen
Show End Nodes	<input type="checkbox"/> False
Transparency	0
Symbolization Scale	Fixed
Presentation	

Soundings

Feature Code	
Size	1.45
Colour Range	
Rounding	Default

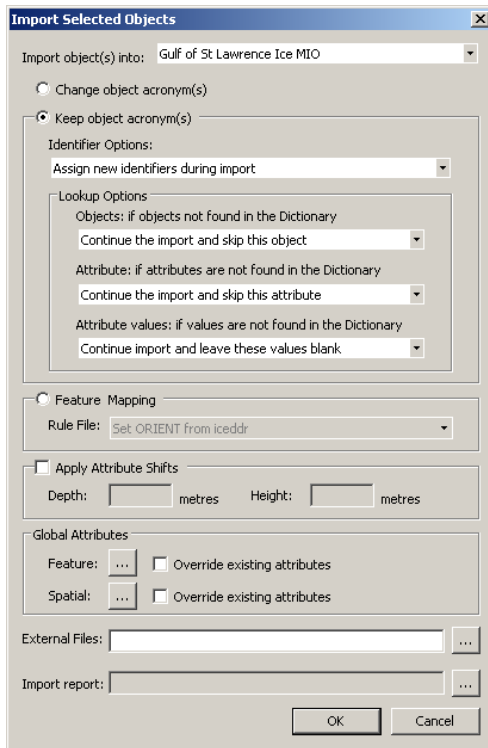
Properties Overview

Context Menu:

- Attribute Value...
- Feature Acronym...
- Feature Object Id...
- Feature Type...
- Unique Feature Acronyms
- Rule Wizard...

Import New Data: From External Files

- Import selected features from backdrop files
 - files in S-57 or vector formats: CARIS, SHP, DGN, DXF...
 - select features, identify layer to import to, optionally select a feature mapping rule, apply filters, etc., then import



Import Selected Objects

Import object(s) into: Gulf of St Lawrence Ice MIO

Change object acronym(s)

Keep object acronym(s)

Identifier Options:

Assign new identifiers during import

Lookup Options:

Objects: if objects not found in the Dictionary
Continue the import and skip this object

Attribute: if attributes are not found in the Dictionary
Continue the import and skip this attribute

Attribute values: if values are not found in the Dictionary
Continue import and leave these values blank

Feature Mapping
Rule File: Set ORIENT from icdedr

Apply Attribute Shifts
Depth: metres Height: metres

Global Attributes

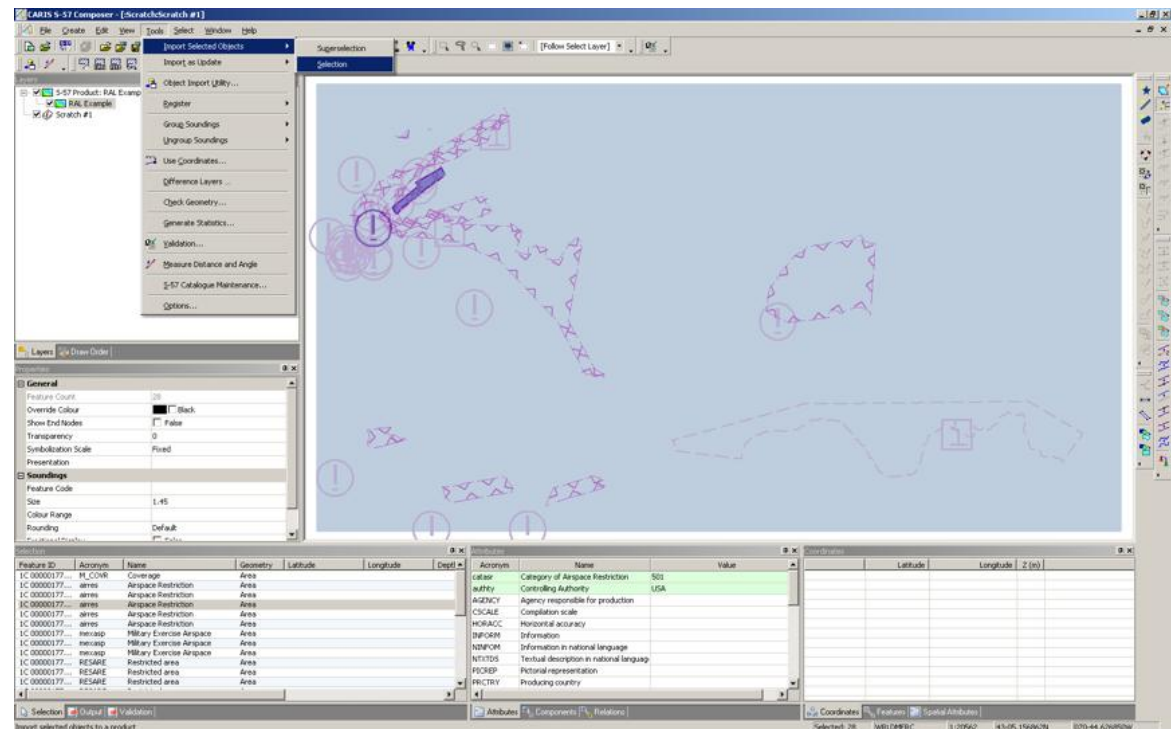
Feature: Override existing attributes

Spatial: Override existing attributes

External Files: ...

Import report: ...

OK Cancel



CARIS 5-57 Computer [Scratch/Scratch #1]

Import Selected Objects

Selection

Layers

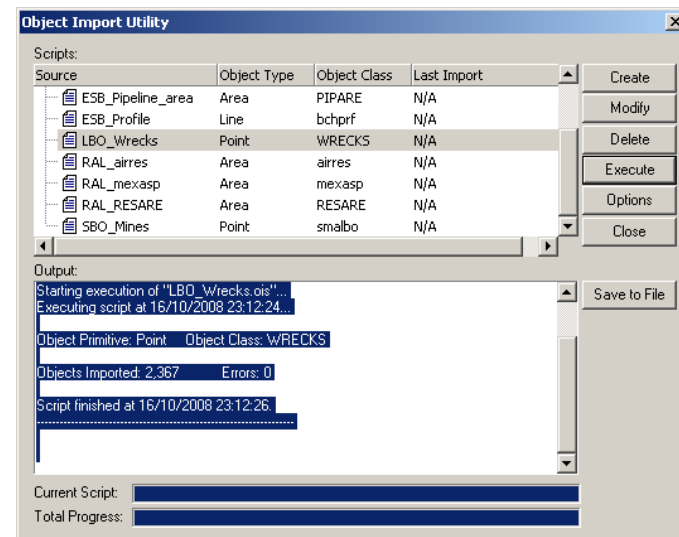
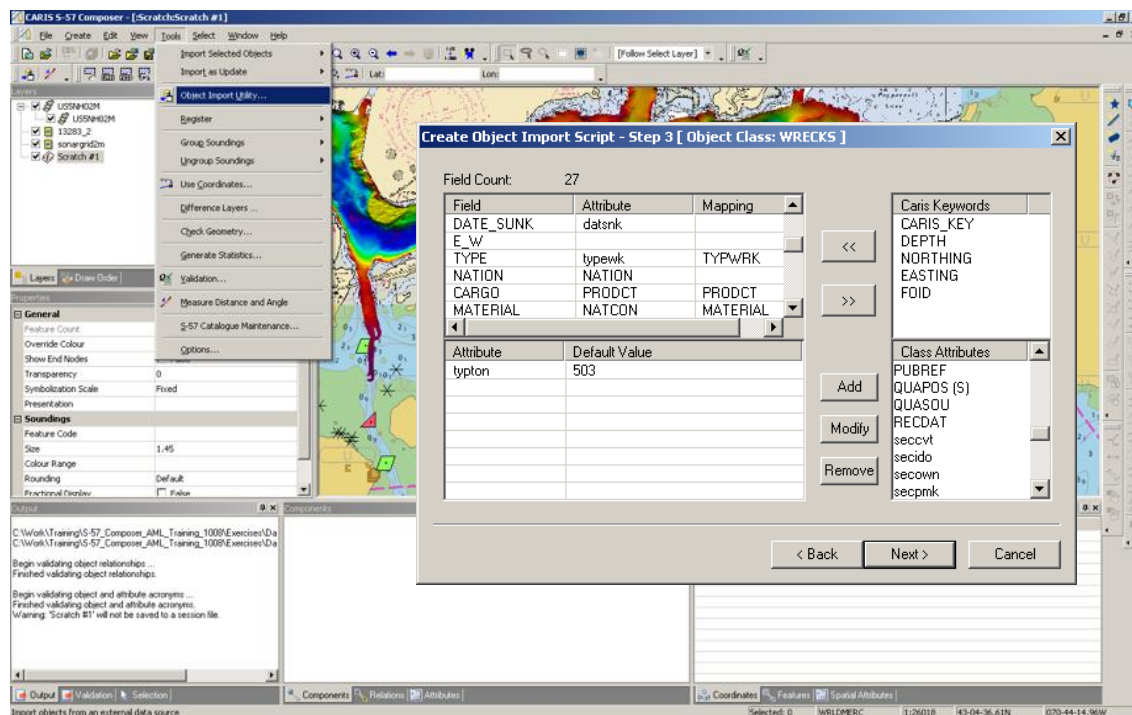
Attributes

Feature ID	Acronym	Name	Geometry	Latitude	Longitude	Depth	Acronym	Name	Value	Latitude	Longitude	Z (m)
IC.0000177...	IN_COVR	Coverage	Area				CLASS	Category of Airspace Restriction	501			
IC.0000177...	aires	Airspace Restriction	Area				authr	Controlling Authority	USA			
IC.0000177...	aires	Airspace Restriction	Area				AGENCY	Agency responsible for production				
IC.0000177...	aires	Airspace Restriction	Area				CSCALE	Compilation scale				
IC.0000177...	aires	Airspace Restriction	Area				HORACC	Horizontal accuracy				
IC.0000177...	measap	Military Exercise Airspace	Area				INFOEN	Information				
IC.0000177...	measap	Military Exercise Airspace	Area				INTFORM	Information in national language				
IC.0000177...	RESARE	Restricted area	Area				INTTDS	Textual description in national language				
IC.0000177...	RESARE	Restricted area	Area				PROSP	Personal representation				
IC.0000177...	RESARE	Restricted area	Area				PRCTRY	Producing country				

Import selected objects to a product

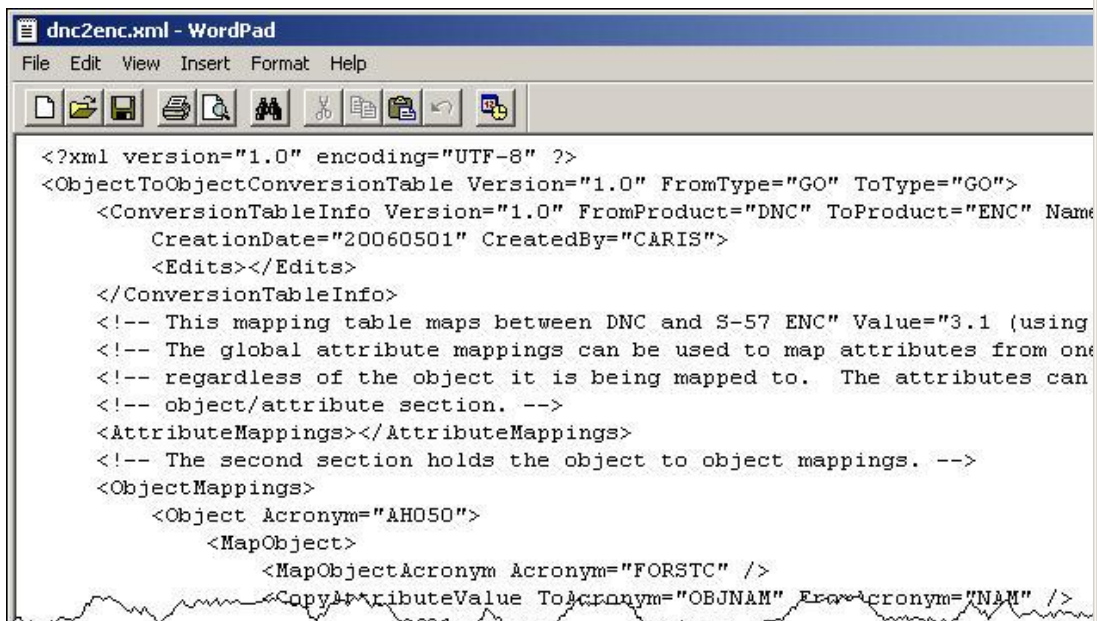
Import New Data: From Text Files/Databases

- Import data from Text files/ODBC/SHP files
 - for lists of lights, nav aids, wrecks, etc...
 - map entries to matching product object/attributes

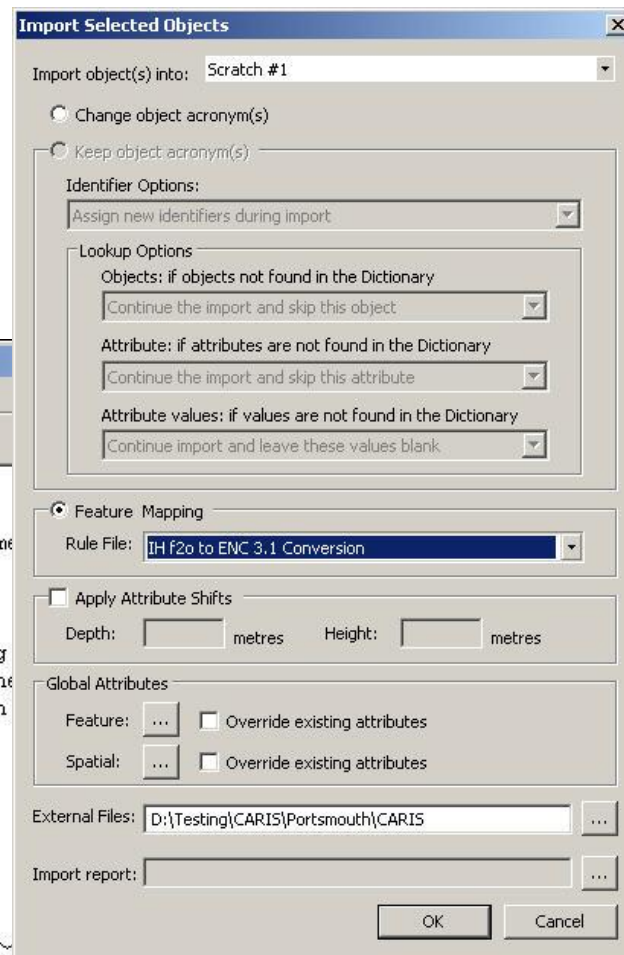


Import and Map to DNC

- User customisable mapping files
 - ENC > DNC and reverse
 - AML 1.0 > 2.1
 - GML to S-57



```
<?xml version="1.0" encoding="UTF-8" ?>
<ObjectToObjectConversionTable Version="1.0" FromType="GO" ToType="GO">
  <ConversionTableInfo Version="1.0" FromProduct="DNC" ToProduct="ENC" Name="
    CreationDate="20060501" CreatedBy="CARIS">
    <Edits></Edits>
  </ConversionTableInfo>
  <!-- This mapping table maps between DNC and S-57 ENC" Value="3.1 (using
  <!-- The global attribute mappings can be used to map attributes from one
  <!-- regardless of the object it is being mapped to. The attributes can
  <!-- object/attribute section. -->
  <AttributeMappings></AttributeMappings>
  <!-- The second section holds the object to object mappings. -->
  <ObjectMappings>
    <Object Acronym="AH050">
      <MapObject>
        <MapObjectAcronym Acronym="FORSTC" />
        <CopyAttributeValue ToAcronym="OBJNAM" FromAcronym="NAM" />
      </MapObject>
    </Object>
  </ObjectMappings>
</ObjectToObjectConversionTable>
```



Import Selected Objects

Import object(s) into: Scratch #1

Change object acronym(s)

Keep object acronym(s)

Identifier Options:

Assign new identifiers during import

Lookup Options

Objects: if objects not found in the Dictionary
Continue the import and skip this object

Attribute: if attributes are not found in the Dictionary
Continue the import and skip this attribute

Attribute values: if values are not found in the Dictionary
Continue import and leave these values blank

Feature Mapping

Rule File: I:\H f2o to ENC 3.1 Conversion

Apply Attribute Shifts

Depth: metres Height: metres

Global Attributes

Feature: Override existing attributes

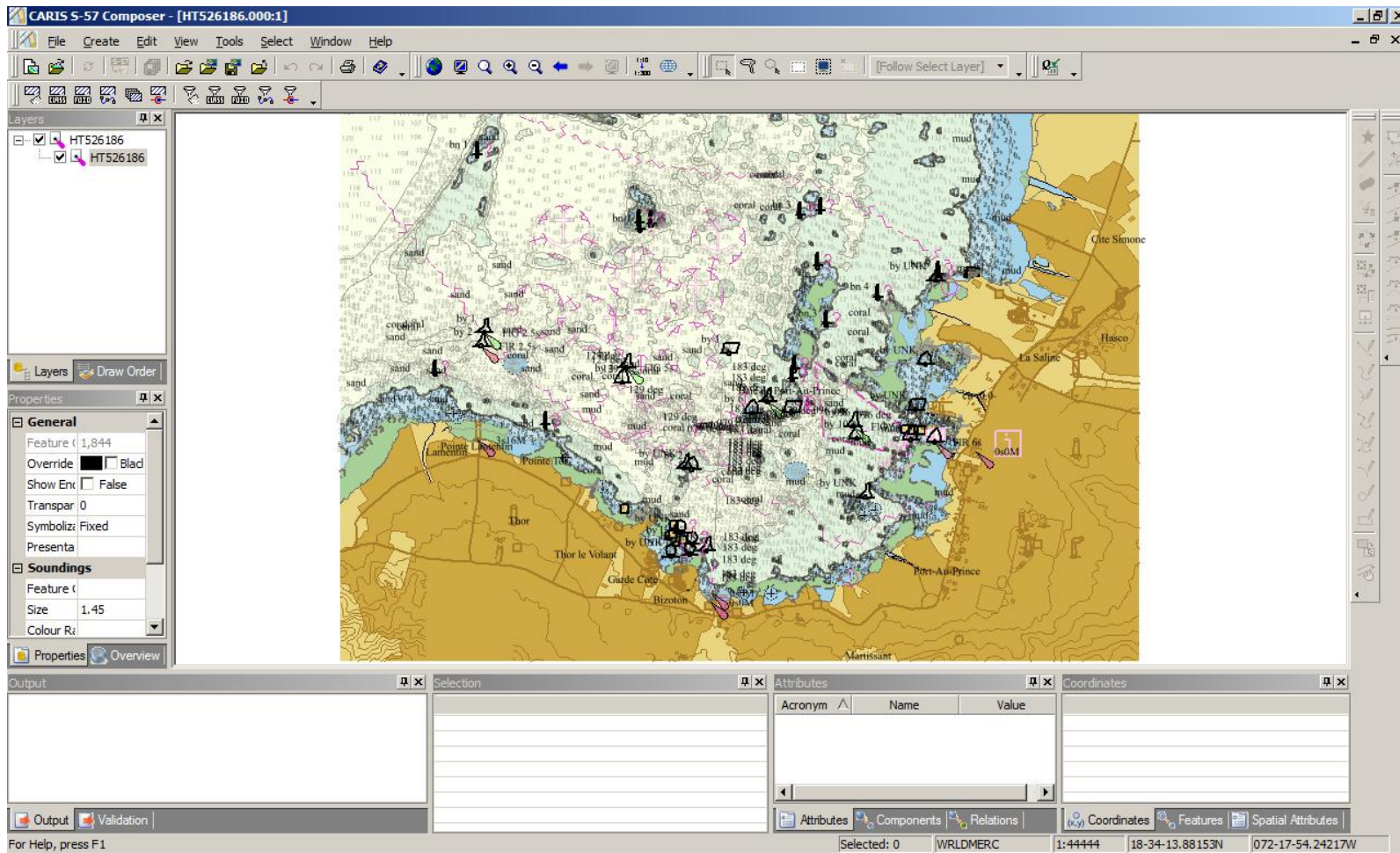
Spatial: Override existing attributes

External Files: D:\Testing\CARIS\Portsmouth\CARIS

Import report:

OK Cancel

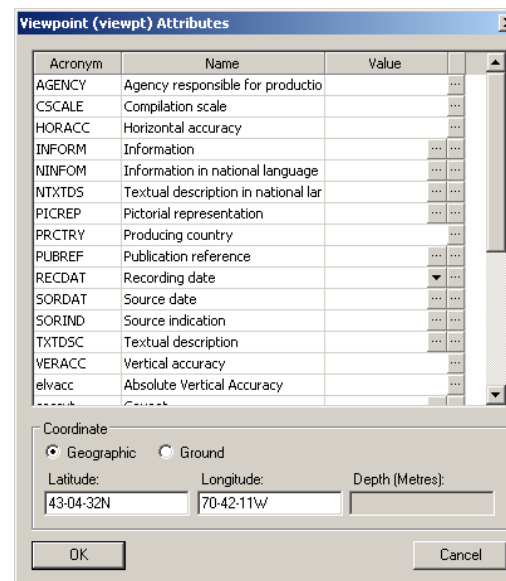
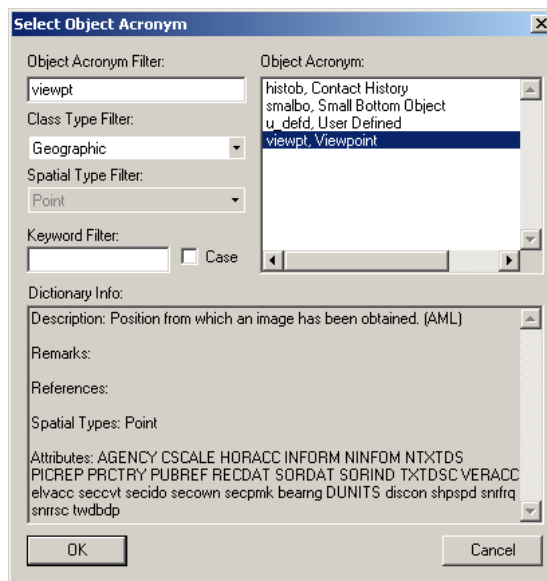
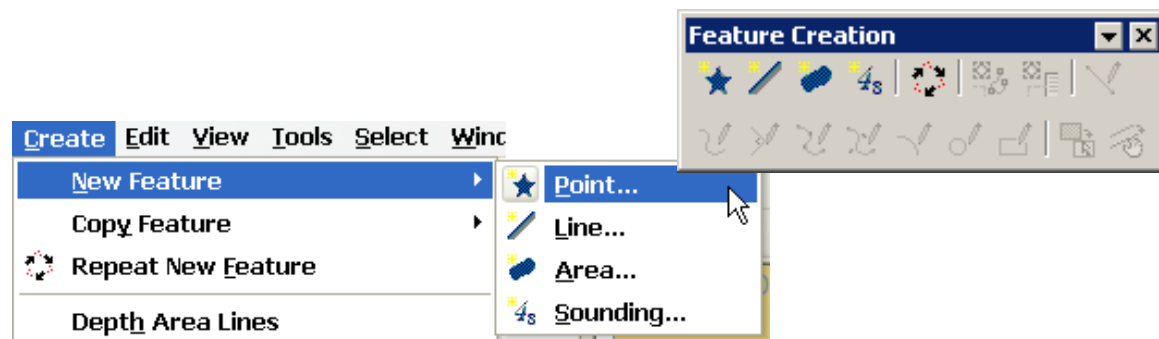
HAITI DNC > ENC



DNC H1610880 Port Au Prince, Haiti Converted to ENC

Digitise New Features: Describe

- Add new features to a S-57 Composer Product
- Select the
 - data type
 - object acronym
 - attribute values



Digitise New Features: Define Location

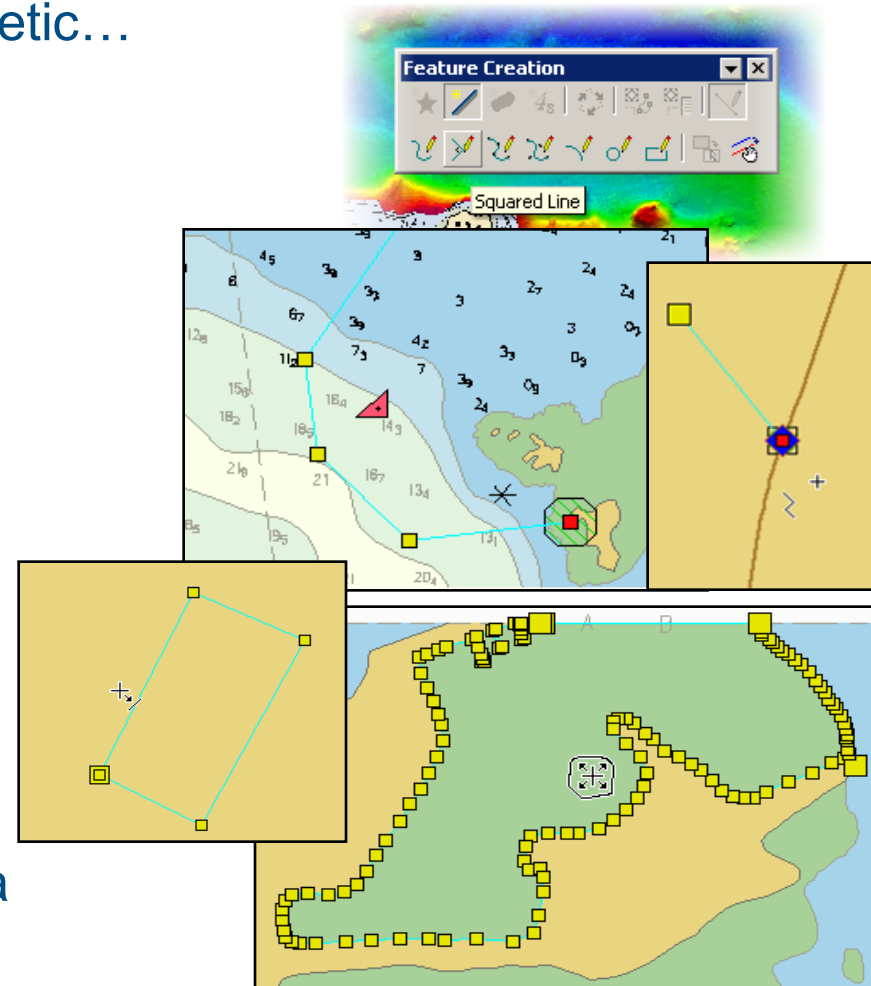
- Position new features in the product – select
 - line type: straight, curved, geodetic...
 - digitize interactively, or
 - snap/intersect to other data, or
 - enter coordinates

Coordinates	Latitude	Longitude	Z (m)	Distan...	Angle
2	43-04-15.90N	070-42-41.48W		8.33	60-26-39.01N
3	43-04-16.03N	070-42-41.16W		31.43	49-10-00.64N
4	43-04-16.70N	070-42-40.10W		9.62	92-38-50.27N
5	43-04-16.68N	070-42-39.68W		7.38	58-12-03.01N

Coordinates | Features | Spatial Attributes

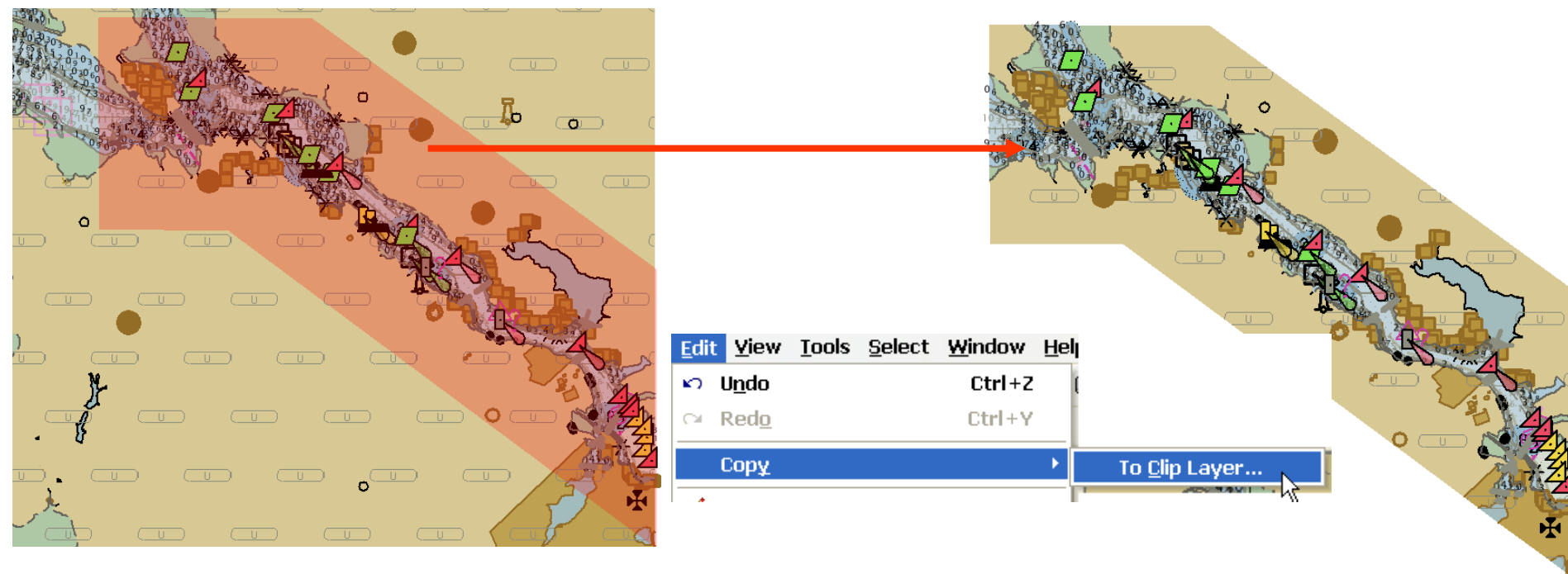
- Other options

- grab existing line, or
- grab existing closed shape/area



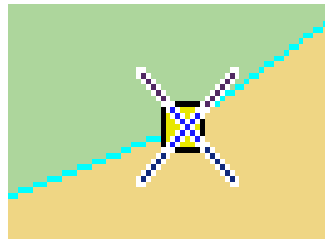
Import New Features: Clip and Copy data

- Import all features in a selected area
 - copy and clip them to a scratch layer for further processing
 - import the required features to the new product



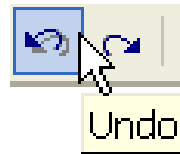
Modify Product Features: Edit Mode

- Select a feature, start Edit Mode
 - spatial: add/move/delete vertex, split...








- attributes: edit values in panel

Acronym	Name	Value
HEIGHT	Height	
MARSYS	Marks navigational - s	
NATCON	Nature of construction	
NOBJNM	Object name in nation	
OBJNAM	Object name	Entrance Beacon
PEREND	Periodic date end	



Editing [X]



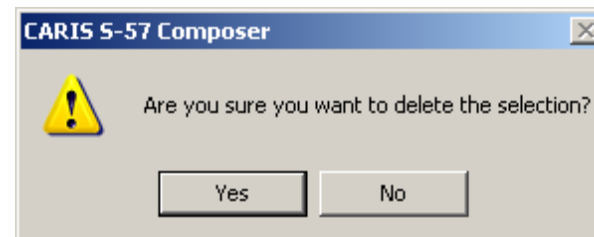
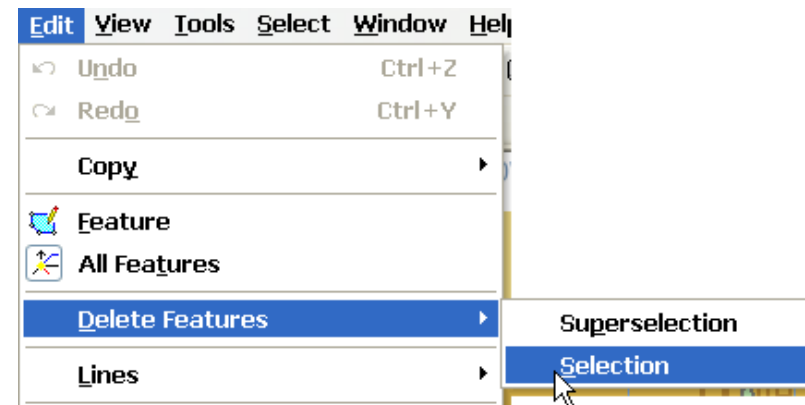
-  Overview
-  Refresh
-  Zoom Out
-  Zoom In
- Center on Cursor
- Edit Line ▶

- Merge
- Split
- Delete
- Filter
- Smooth
- Redigitize
- Trim / Extend

- Undo/Redo edits before saving

Delete Unwanted Features

- Remove any features from products
- Select the features to delete
 - Select interactively, By Filter...
 - Confirm the deletion
 - Use Undo to correct mistakes
- Save the changes
 - Features are removed

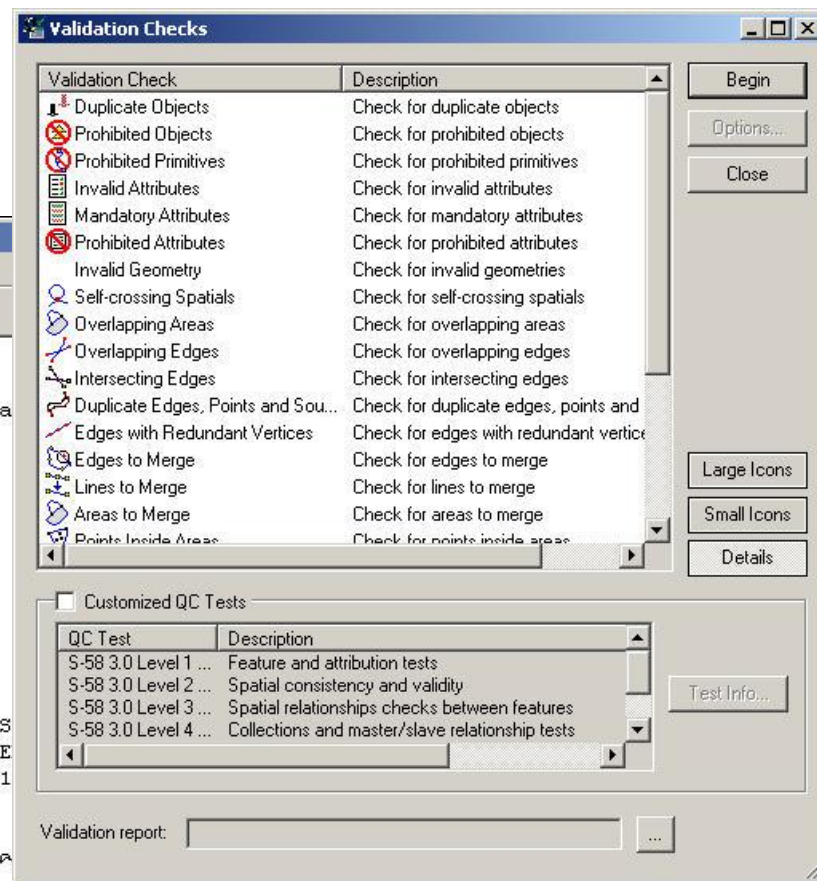


Validation

- Validation Tests
 - S-58 and User customisable XML
 - DNC specific tests

```

558_Level1_Features.xml - WordPad
File Edit View Insert Format Help
|<?xml version="1.0" encoding="UTF-8" ?>
|<QCfile Version="1.0">
|   <QCfileInfo Version="1.2" Name="S-58 3.0 Level 1 æ" Fea
|     CreationDate="20070504" CreatedBy="CARIS">
|       <Products>
|         <Product Name="ENC 3.1" />
|       </Products>
|       <Edits></Edits>
|     </QCfileInfo>
|     <!-- Global tests that are applied to all objects. -->
|     <GlobalTests>
|       <Test Id="S-58 46">
|         <Filter>
|           <And>
|             <AttributeHasValue Acronym="DATS
|             <AttributeHasValue Acronym="DATE
|             <CompareAttributeValues Acronym1
|           </And>
|         </Filter>
|       </Test>
|     </GlobalTests>
|   </QCfile>
| </QCfile>
    
```



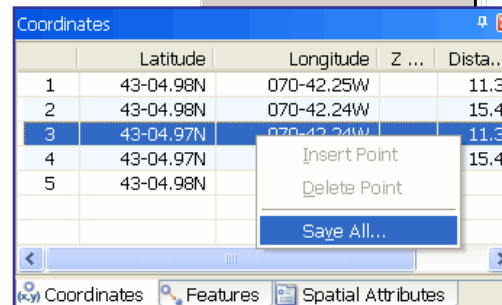
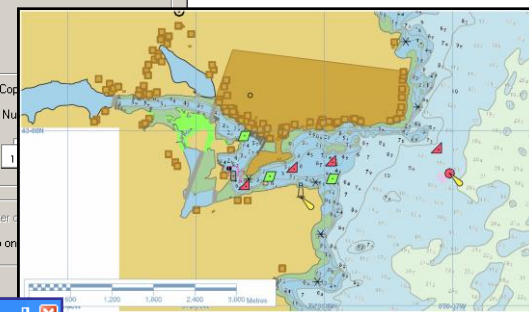
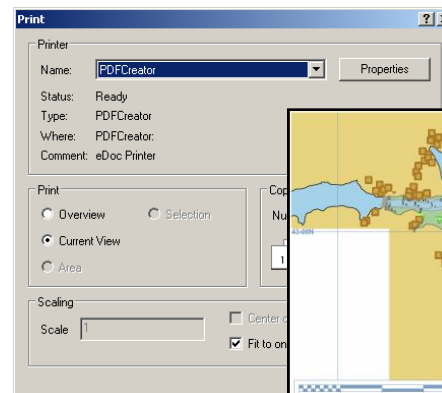
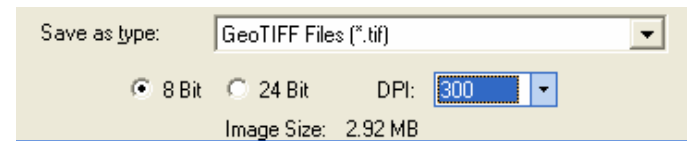
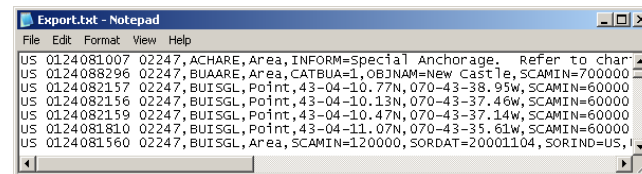
The 'Validation Checks' dialog box contains a table of validation checks and their descriptions. Below the table is a section for 'Customized QC Tests' with a smaller table of user-defined tests.

Validation Check	Description
Duplicate Objects	Check for duplicate objects
Prohibited Objects	Check for prohibited objects
Prohibited Primitives	Check for prohibited primitives
Invalid Attributes	Check for invalid attributes
Mandatory Attributes	Check for mandatory attributes
Prohibited Attributes	Check for prohibited attributes
Invalid Geometry	Check for invalid geometries
Self-crossing Spatial	Check for self-crossing spatial
Overlapping Areas	Check for overlapping areas
Overlapping Edges	Check for overlapping edges
Intersecting Edges	Check for intersecting edges
Duplicate Edges, Points and Sou...	Check for duplicate edges, points and
Edges with Redundant Vertices	Check for edges with redundant vertice
Edges to Merge	Check for edges to merge
Lines to Merge	Check for lines to merge
Areas to Merge	Check for areas to merge
Points Inside Areas	Check for points inside areas

QC Test	Description
S-58 3.0 Level 1 ...	Feature and attribution tests
S-58 3.0 Level 2 ...	Spatial consistency and validity
S-58 3.0 Level 3 ...	Spatial relationships checks between features
S-58 3.0 Level 4 ...	Collections and master/slave relationship tests

Export Selected Features Options

- Export selected features as
 - text: ASCII
 - vector: HOB, SHP, GML, KML
 - raster: GeoTIFF
- Print product contents
 - to any print device
- Save the contents of windows
 - Product properties
 - Output, Selection
 - Attributes & Coordinates
 - Validation & Output

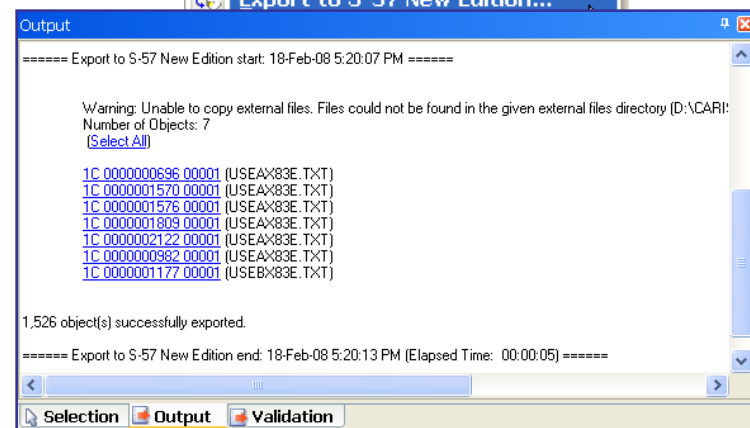
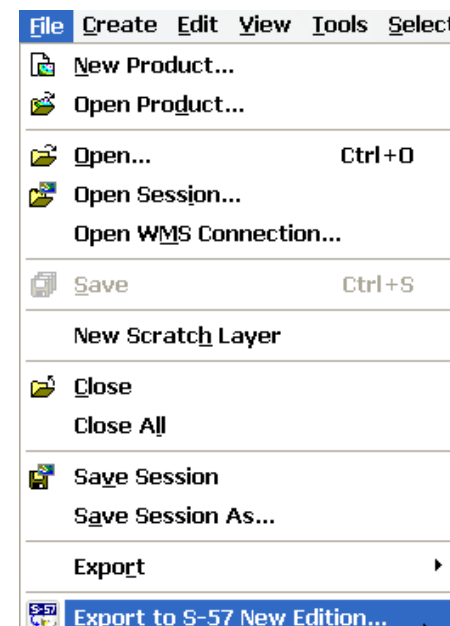


	Latitude	Longitude	Z ...	Dista...
1	43-04.98N	070-42.25W		11.33
2	43-04.98N	070-42.24W		15.45
3	43-04.97N	070-42.24W		11.33
4	43-04.97N			15.45
5	43-04.98N			

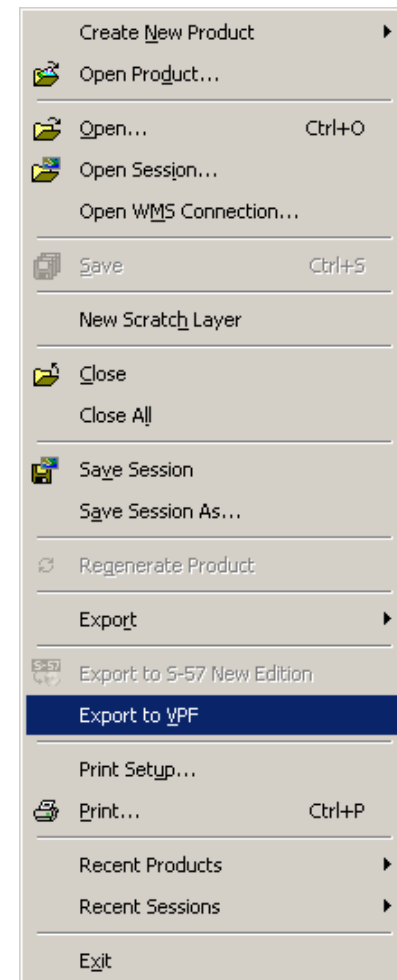
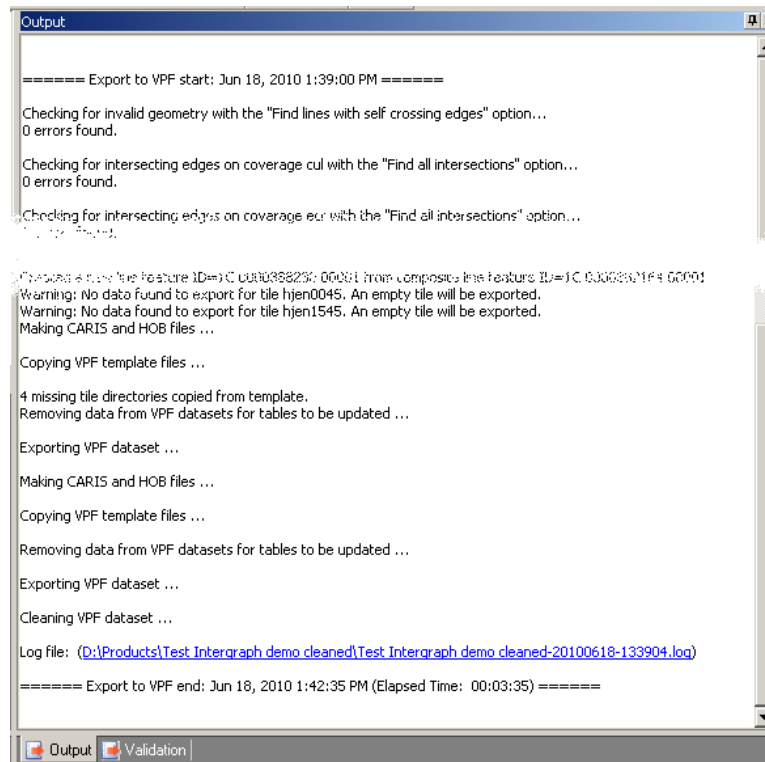
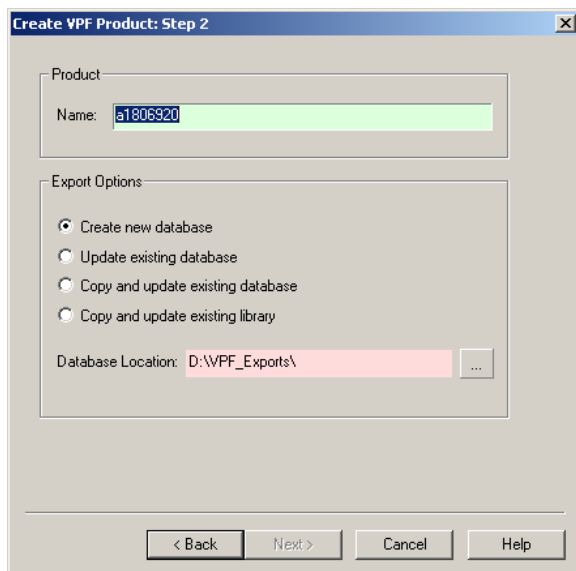
Context menu options: Insert Point, Delete Point, Save All...

Create S-57 Exchange Set

- Export finished product to create an S-57 Exchange Set
 - Information was provided when the product was created – no further details required
 - Review the Output messages
- Optionally open this newly created S-57 file as a new backdrop in S-57 Composer
- The Product (PRD) file records the S-57 file was exported



Create or Update DNC



Panama Canal

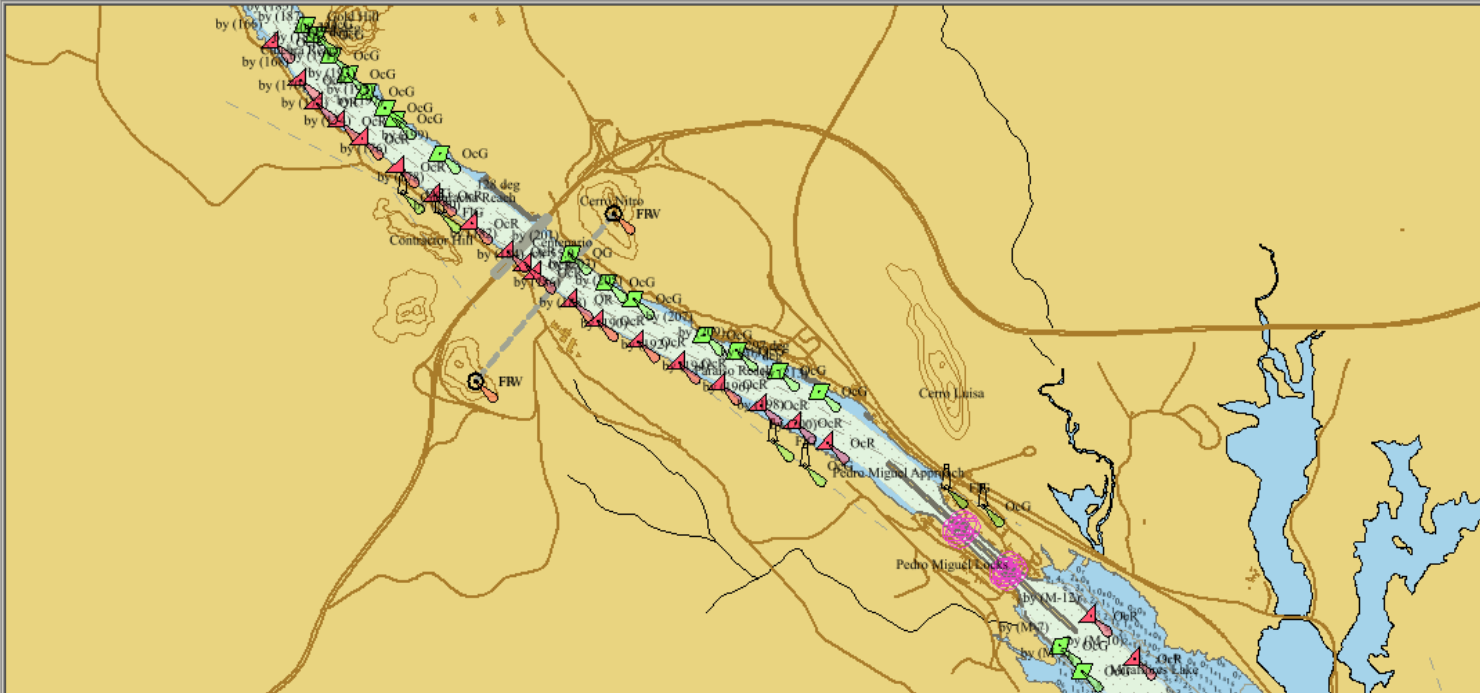
CARIS S-57 Composer - [PA4ACP01.000:1]

File Create Edit View Tools Select Window Help

[Follow Select Layer]

Layers: PA4ACP01, PA4ACP01

Properties: General (Feature: 3,528, Override: Blad, Show Enc: False, Transpar: 0, Symboliz: Fixed, Presenta: Presenta), Soundings (Feature: , Size: 1.45, Colour: R)



Output: Selection, Attributes, Coordinates

Feature ID	Acronym	Name

Acronym	Name	Value

Coordinates: [Empty table]

Selected: 0 | WRLDMERC | 1:21052 | 09-00-38.72236N | 079-37-27.58914W

For Help, press F1

Paper Chart Composer

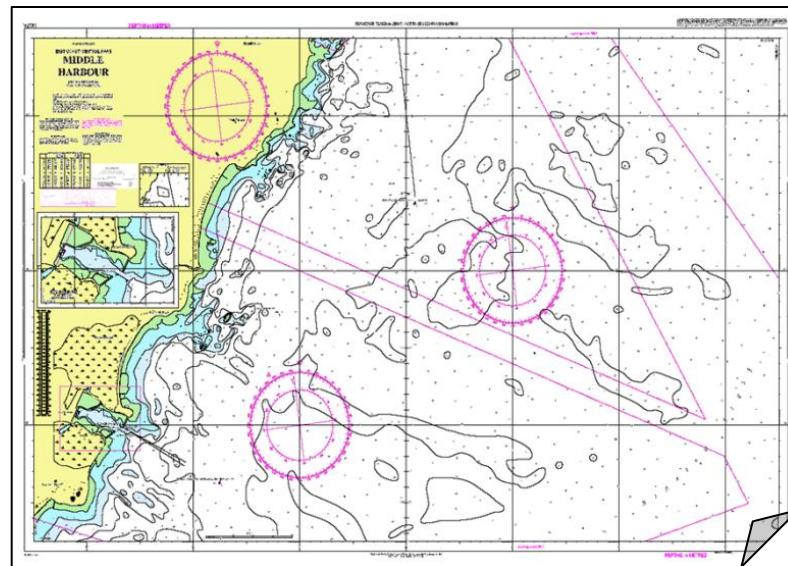
Next Generation Desktop Paper Chart Production

What is CARIS Paper Chart Composer?

- CARIS Paper Chart Composer is a new interactive graphical program for making INT1/INT2 compliant paper charts and other custom chart products.
 - Developed using well established CARIS HPD enterprise solution technology
 - Operates in two modes:
 - Standalone (Desktop): charts are stored in single SQLite file, or
 - Database-connected (Enterprise i.e. HPD): charts are stored in an Oracle database
 - Currently in development and will be:
 - Technology upgrade to CARIS GIS for desktop paper charting
 - Replacement to existing CARIS HPD Paper Chart Editor application

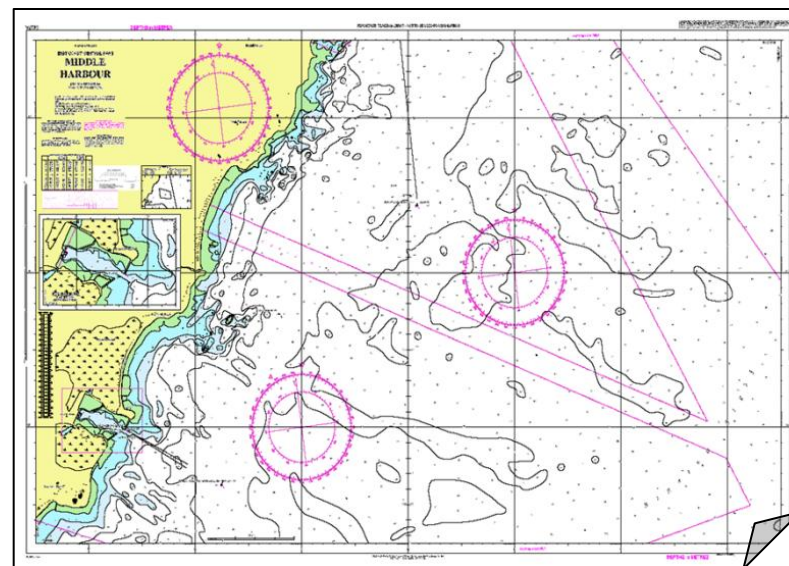
Paper Chart Composer Workflow

1. Open Vector Source Data
2. Define Chart Layout and Content
 - Charts, Sheets and Panels – metadata and content
3. Add Borders, Scale Bars and Grids
4. Compile Chart Content
 - Import, Add & Edit chart data
 - Text & Annotation options
 - Presentation & Masking
 - Quality Control
5. Print/Export Chart



Paper Chart Composer Workflow

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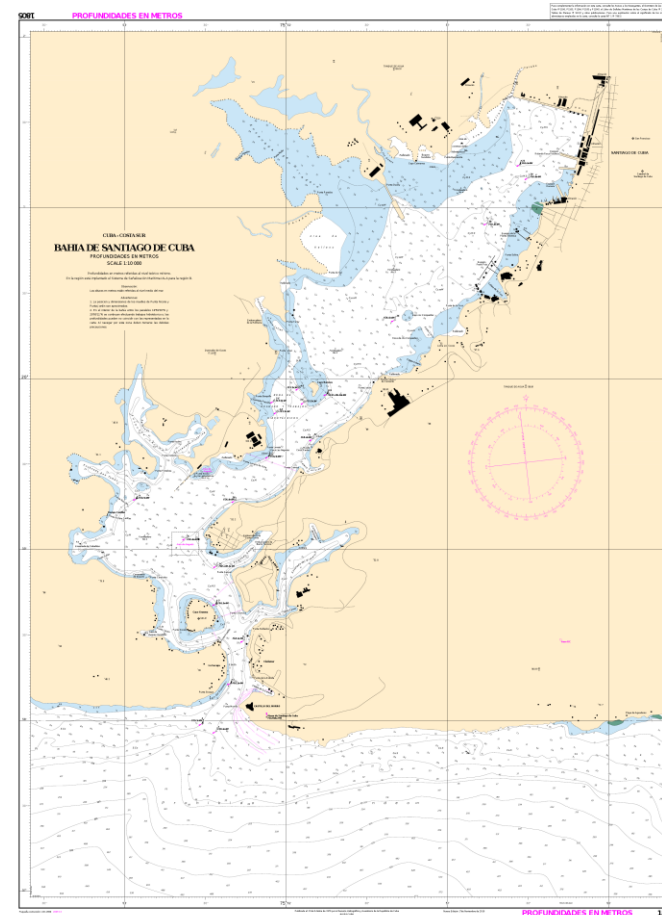
INETER - Nicaragua

- Project to produce the first nautical charts of Nicaragua
- Port of Corinto
 - Largest port on the Pacific coast of Nicaragua
 - Paper chart with new bathymetric information
- Plans to produce more Paper Charts and ENCs



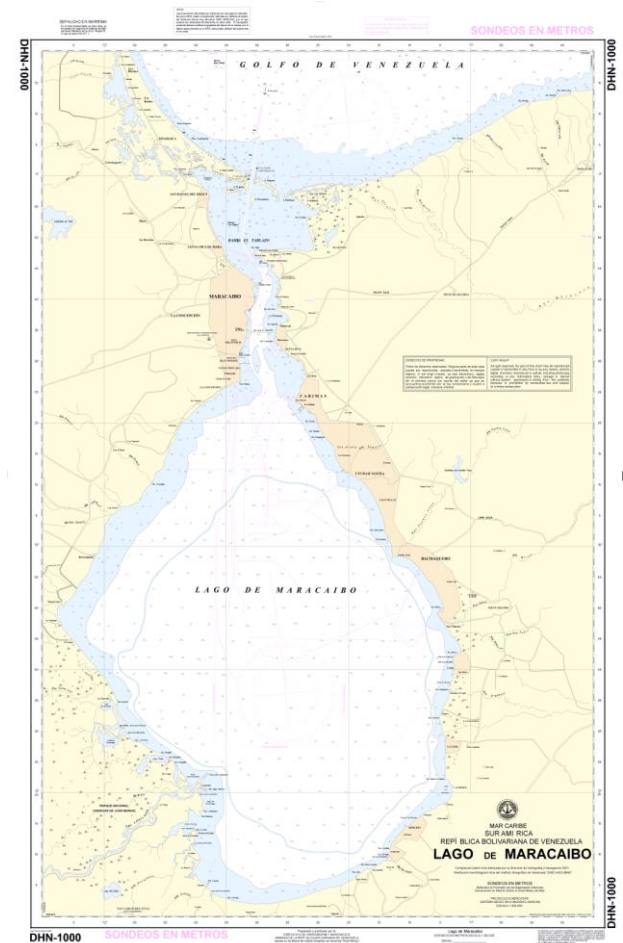
CUBA

- Implementation of Ping to Chart Solution in 2010
 - CARIS HIPS&SIPS
 - CARIS Notebook
 - CARIS BASE Editor
 - CARIS GIS Professional
 - CARIS S-57 Composer
- Training
 - 4 weeks in 2010
 - 1 week in 2011



Venezuela

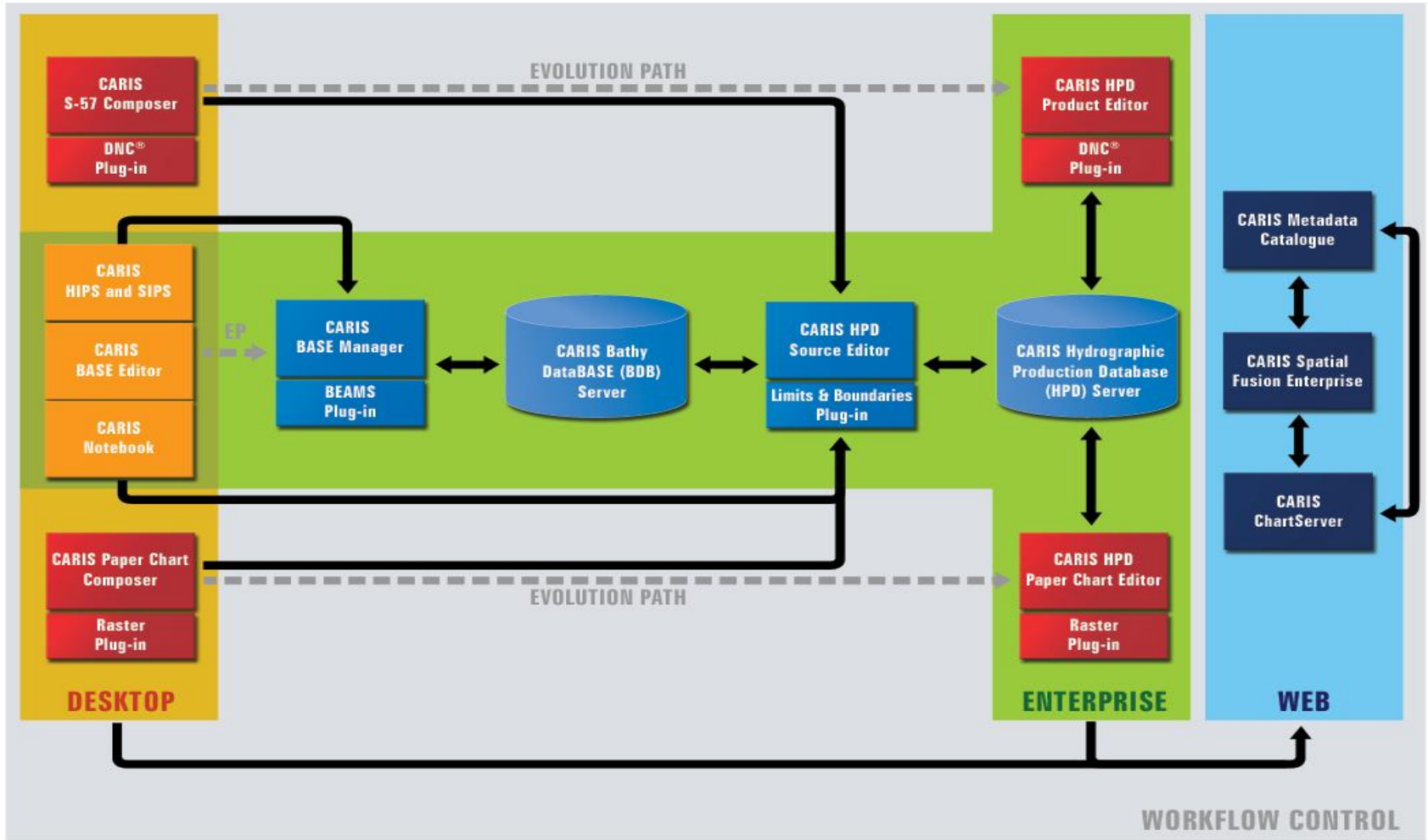
- Combined Ping to Chart Solution
 - Desktop
 - Enterprise Solution
- CARIS Software
 - HPD
 - S-57 Composer
 - HIPS&SIPS



Mexico

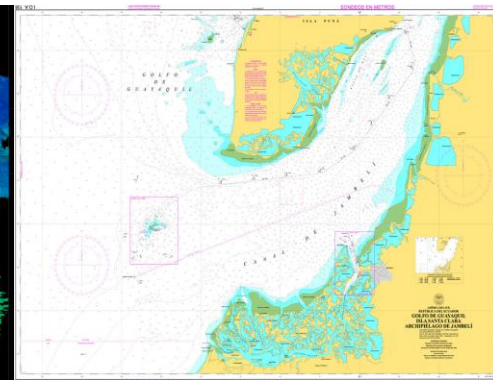
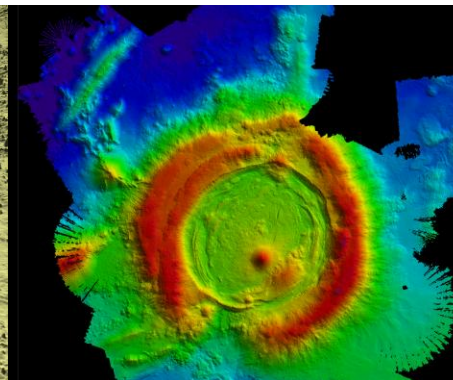
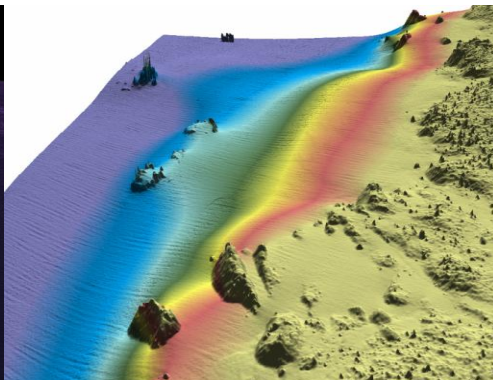
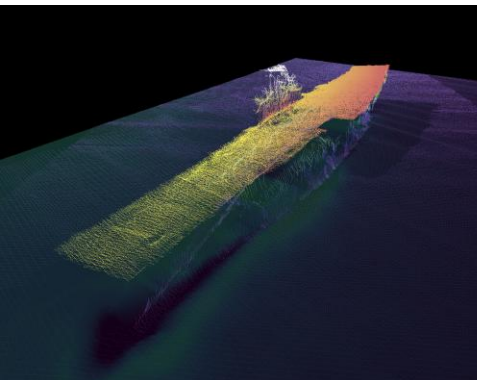
- Migration from traditional production to the Hydrographic Production Database
 - BDB and HPD integration to improve workflows.
- New ENC and Paper Charts produced with HPD
 - From new sources and existing ENCs
 - New ENCs have been validated by IC-ENC

System Evolution in Mexico

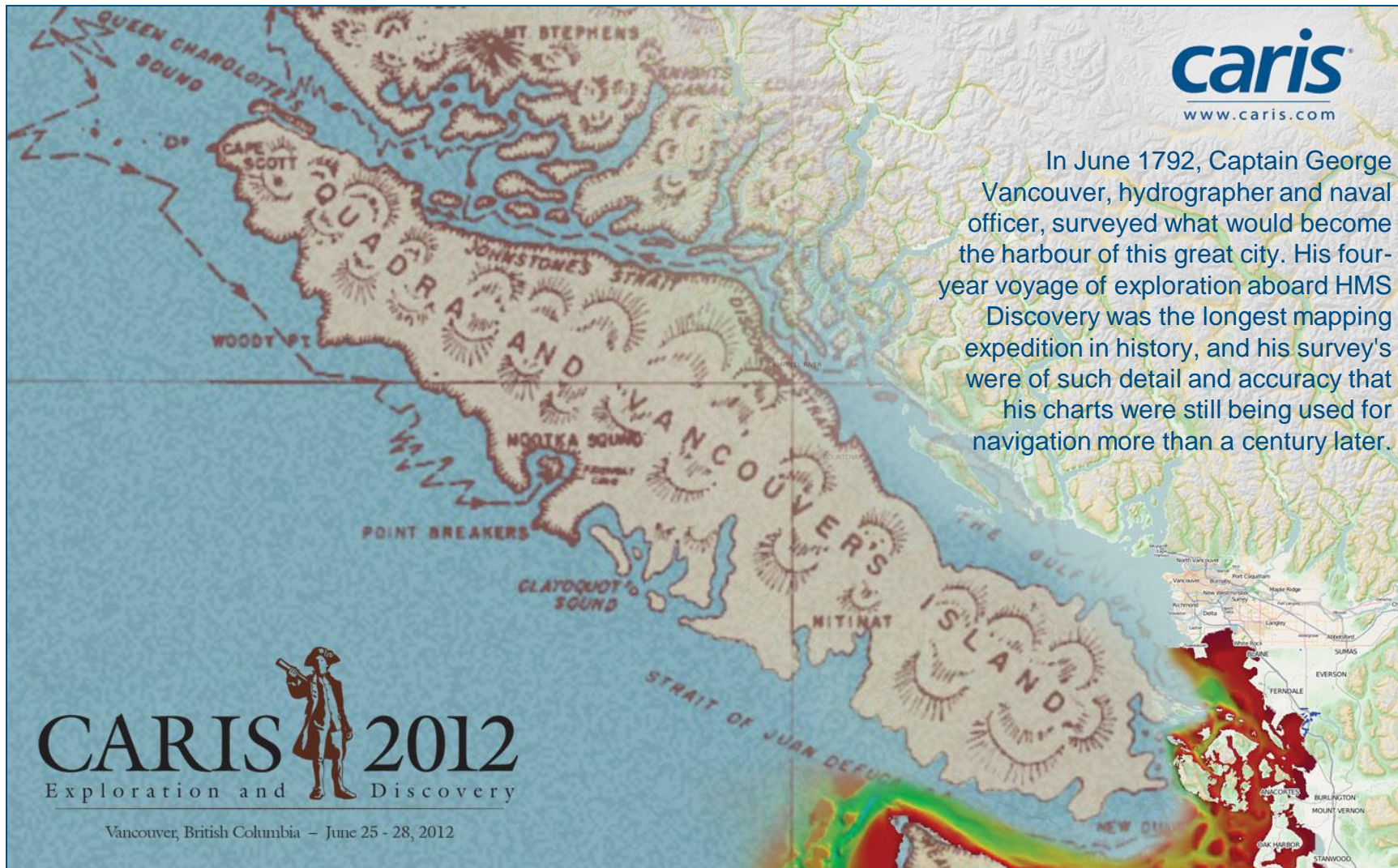


Summary

- CARIS has over 30 years experience as a GIS software provider
 - Specializing in Marine GIS Solutions
- Focused on the use of industry standards, interoperability, and maintaining a close working relationship with the maritime community
- Solutions developed to meet the specific needs of the marine industry and increase efficiency for optimal return on investment



User Community



In June 1792, Captain George Vancouver, hydrographer and naval officer, surveyed what would become the harbour of this great city. His four-year voyage of exploration aboard HMS Discovery was the longest mapping expedition in history, and his survey's were of such detail and accuracy that his charts were still being used for navigation more than a century later.

CARIS 2012
Exploration and Discovery

Vancouver, British Columbia - June 25 - 28, 2012



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www.caris.com