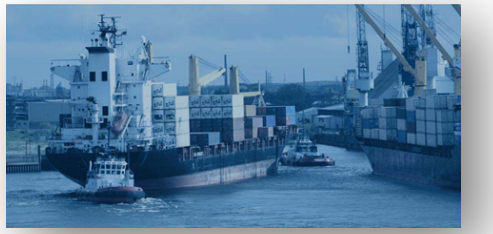
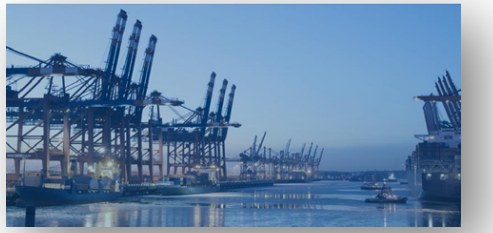
CARIS Updates
IEHG XV

New Orleans - October 2019

Cameron McLeay
Mike Redmayne

- 40 years in the GIS Software Development Business
  - Specialised focus on GIS solutions for the maritime community
- CARIS installations worldwide
- Offices in Canada, Netherlands, USA, Australia and the UK
- Industry leading team of technical support professionals with industry experience and academic backing
- Alliance Companies around the world
- ISO 9001 certified since 2006
- Focused on the use of international / industry GIS standards and development of interoperable marine GIS solutions
  - IHO S-57 and S-100, ISO/TC211, OGC, MSDIWG and others
- Teledyne Technologies acquired CARIS May 2016



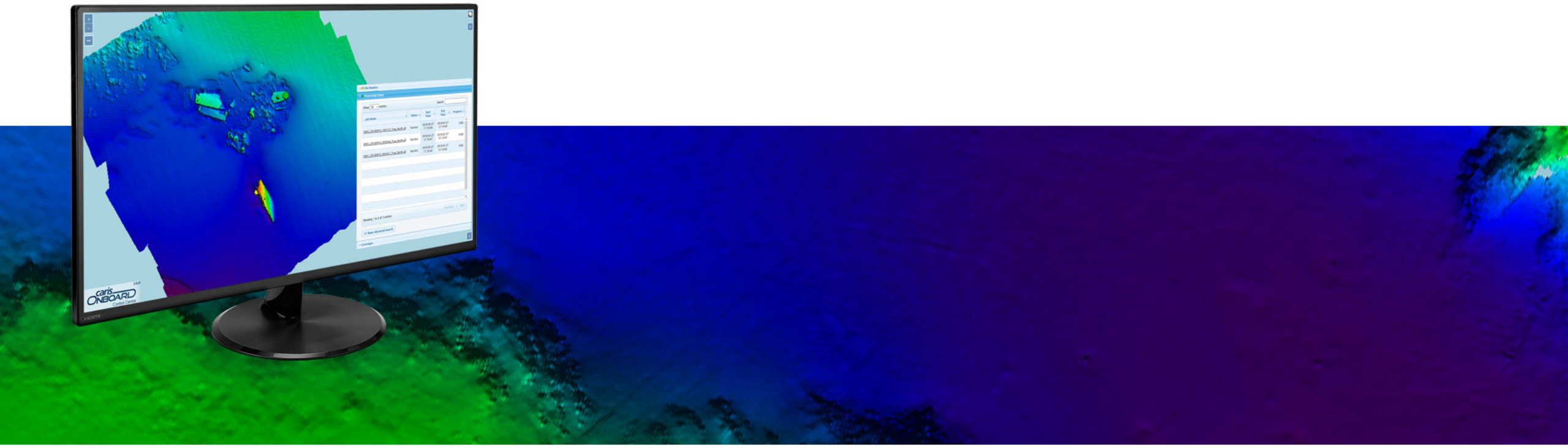


Ping-to-Chart Solution

- **Processing**
  - Hydrographic data processing and visualisation
  - Automated near real time processing
- **Analysis**
  - Elevation data (i.e. bathymetry and terrestrial) and metadata
  - Engineering analysis (e.g. ports and waterways)
  - Maritime limits and boundaries
  - Desktop and enterprise solutions
- **Production**
  - Nautical paper charts and electronic products (e.g. S-57)
  - Products under IHO S-100 (e.g. S-101 ENC)
  - Desktop and enterprise solutions
- **Discovery**
  - OGC standards based web mapping for interoperability
  - Technology in support of Marine Spatial Data Infrastructure (MSDI)

Meeting the Challenges

of Modern Hydrographic Survey Operations



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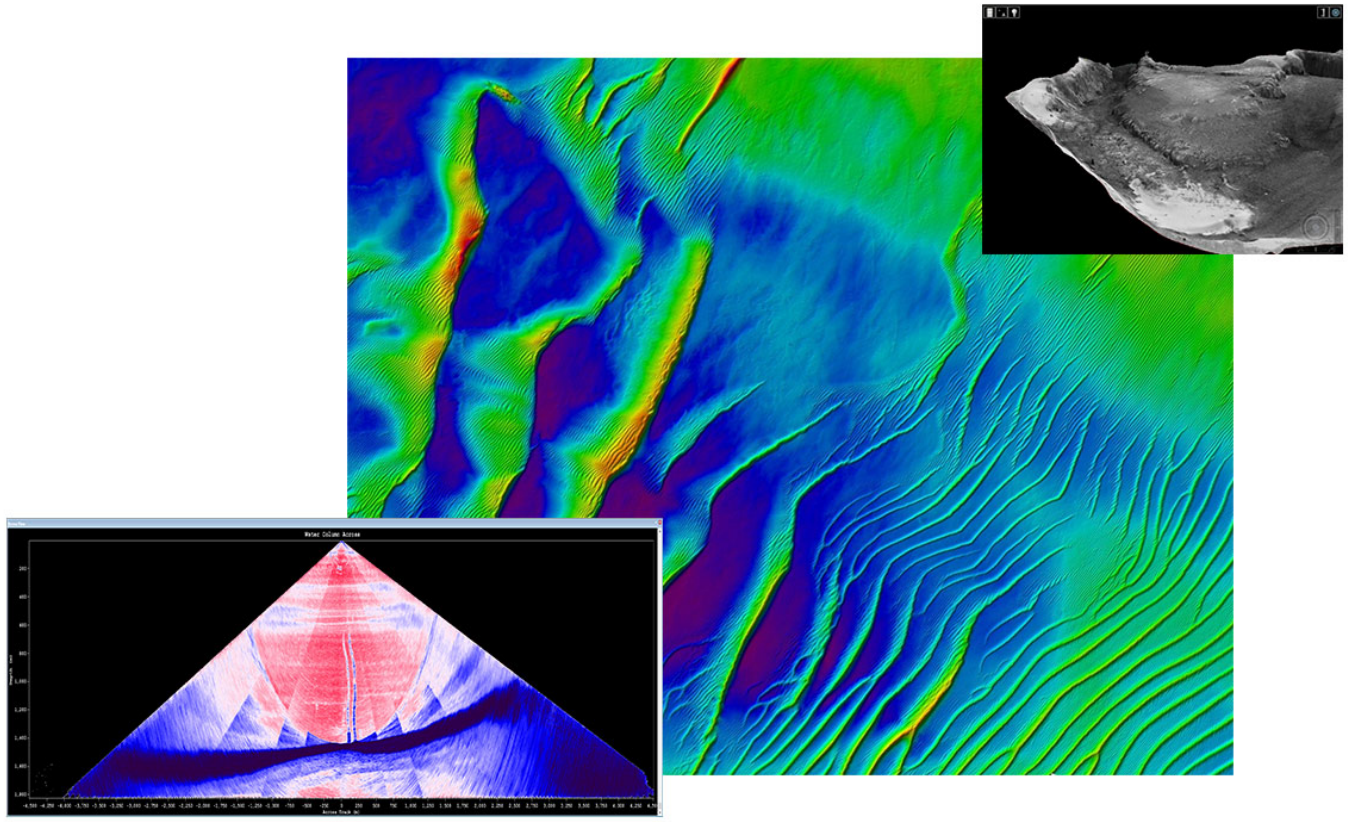
Challenges: Data Processing

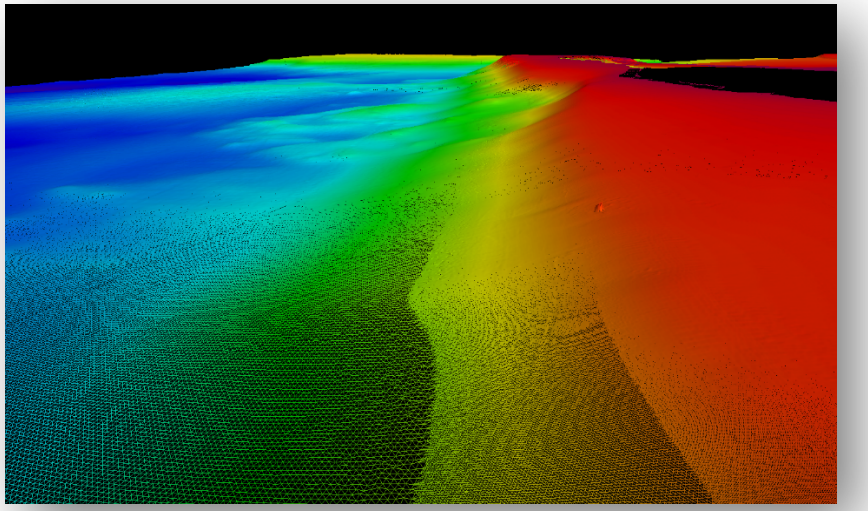
- Multiple sensors / platforms
- Inconsistent logging
- Inconsistent quality
- Large data volumes
- Experienced operators
- Current process is Manual “Button Clicking”

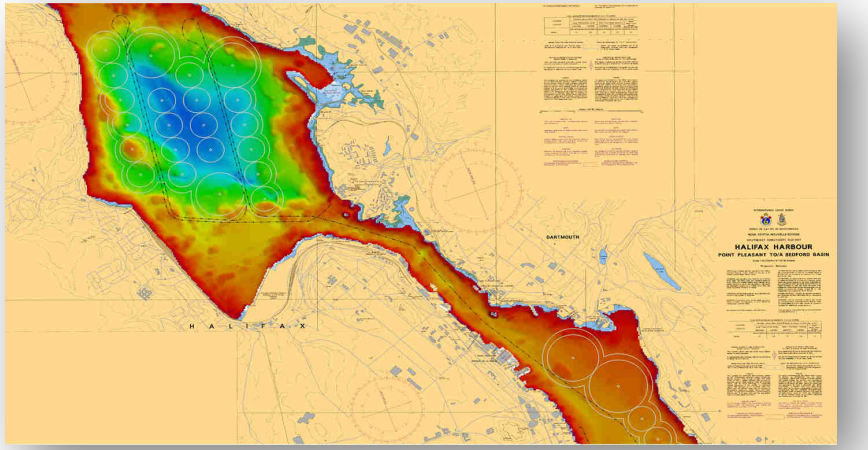


How we are Meeting the Challenge

- Continuous Improvement and Innovation
  - In-house knowledge base, as well as collaboration with industry and academia
  - Meet emerging market needs through progressive solutions
  - Advance core competencies

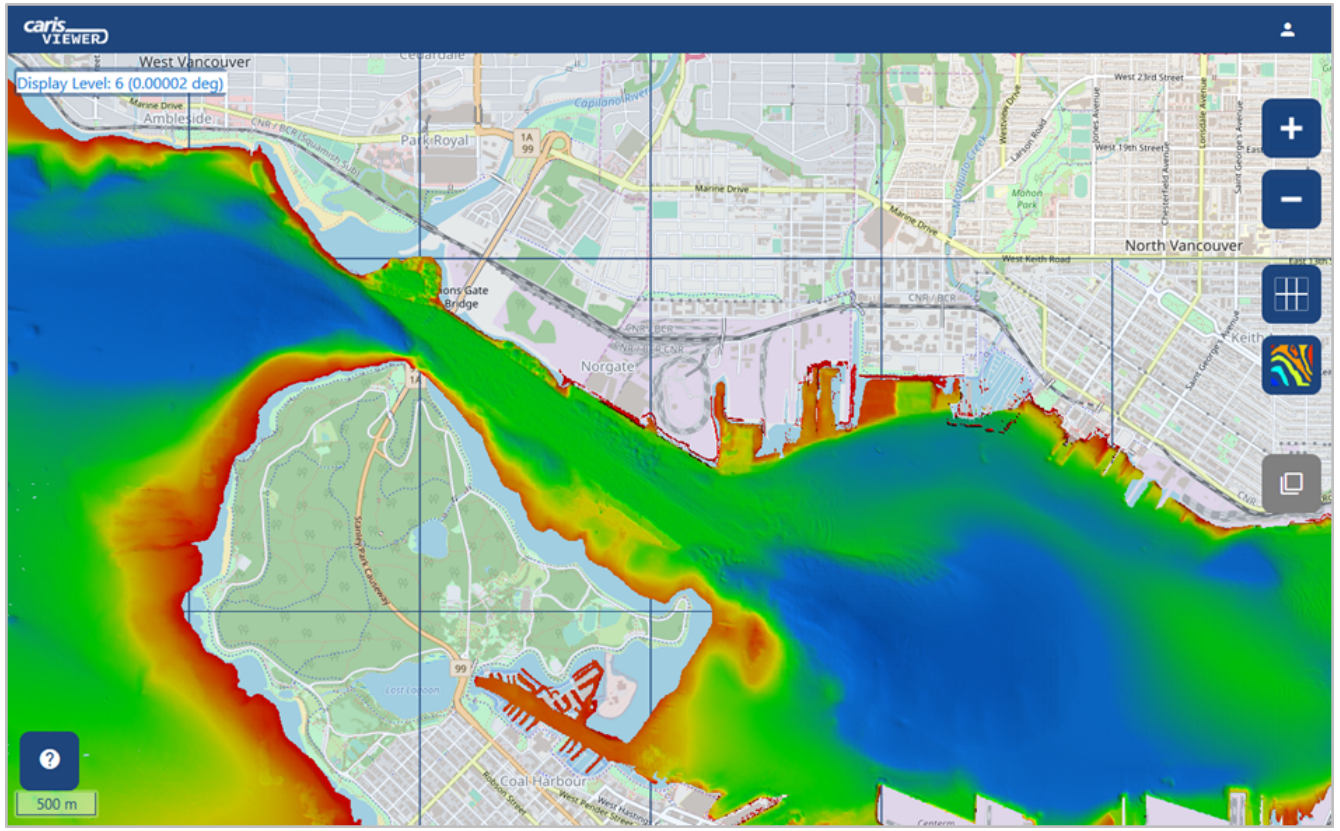
- Current initiatives
  - Cloud Databasing
  - Sonar Backscatter processing
  - Variable Resolution surfaces
  - Automated processing
  - Artificial Intelligence



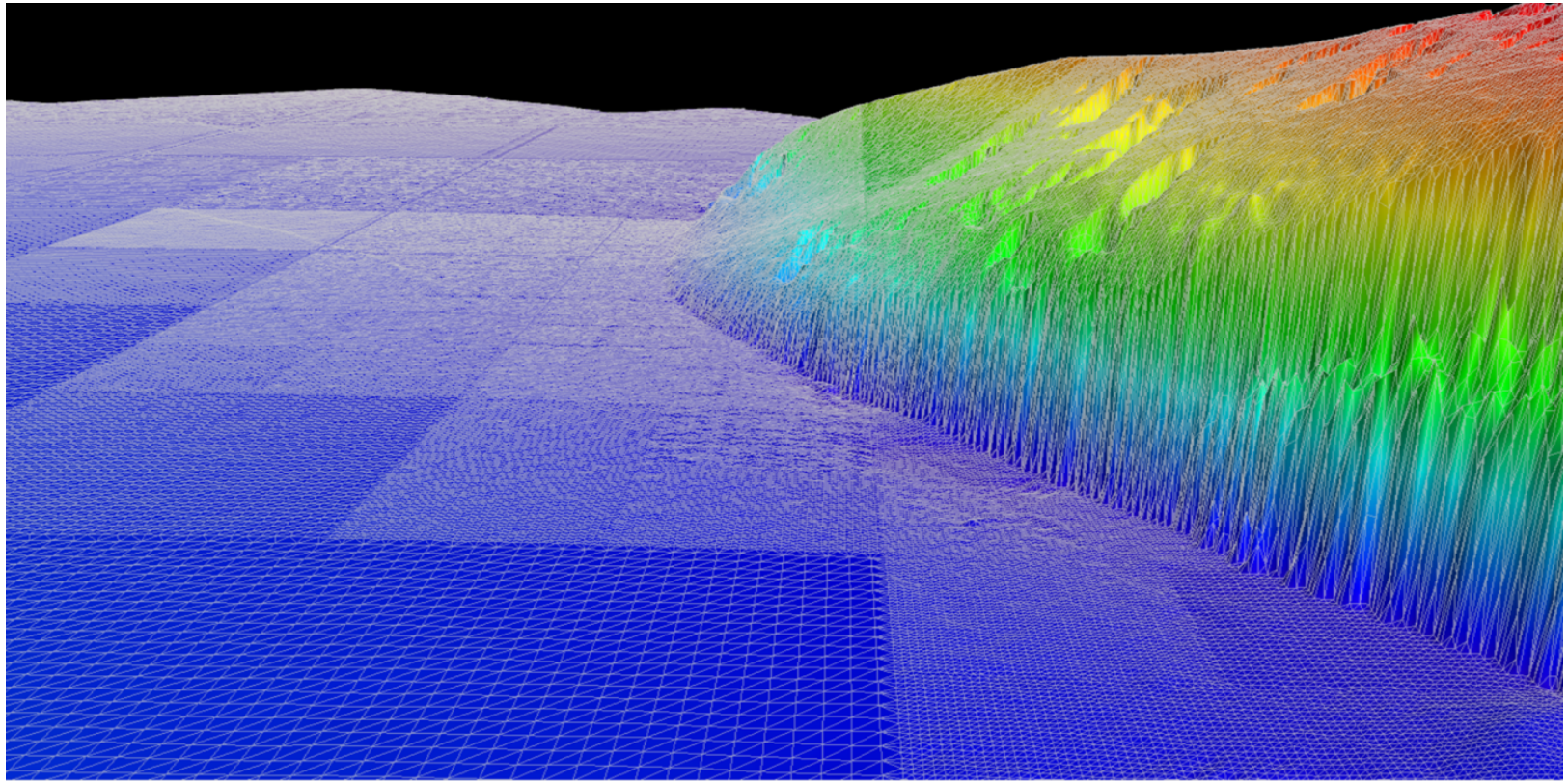


Cloud Databasing

- Vancouver harbour bathymetry shown:
  - In CARIS Viewer from Geospatial in the Cloud using B2B connection



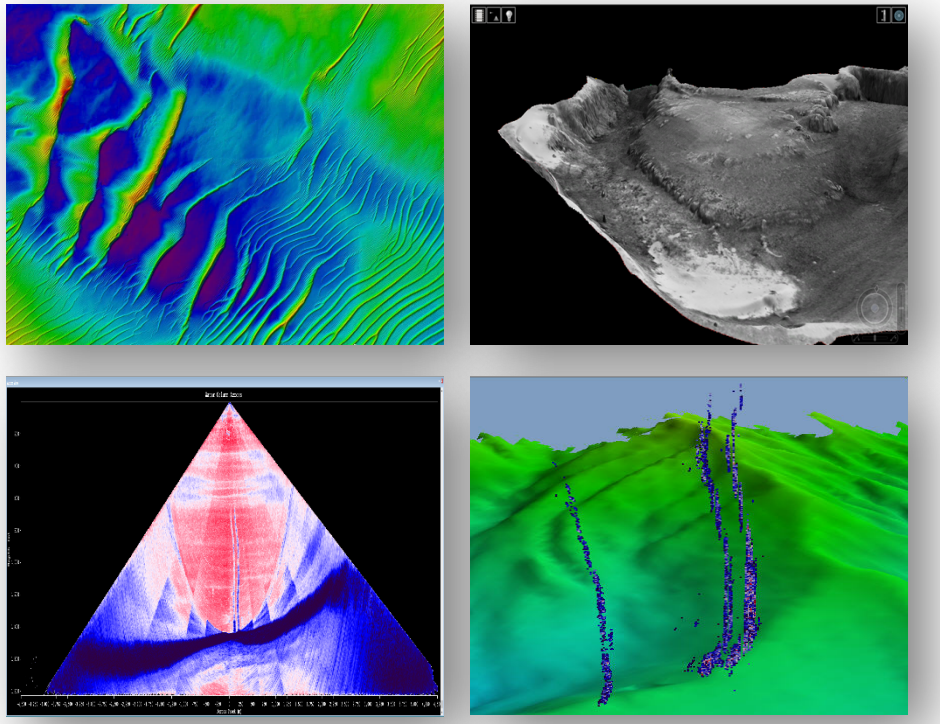
Variable Resolution Gridding



- Allows for efficient data storage
- Single surface from the shoreline to the bottom of the abyssal plain
- Can be gridded by density or depth

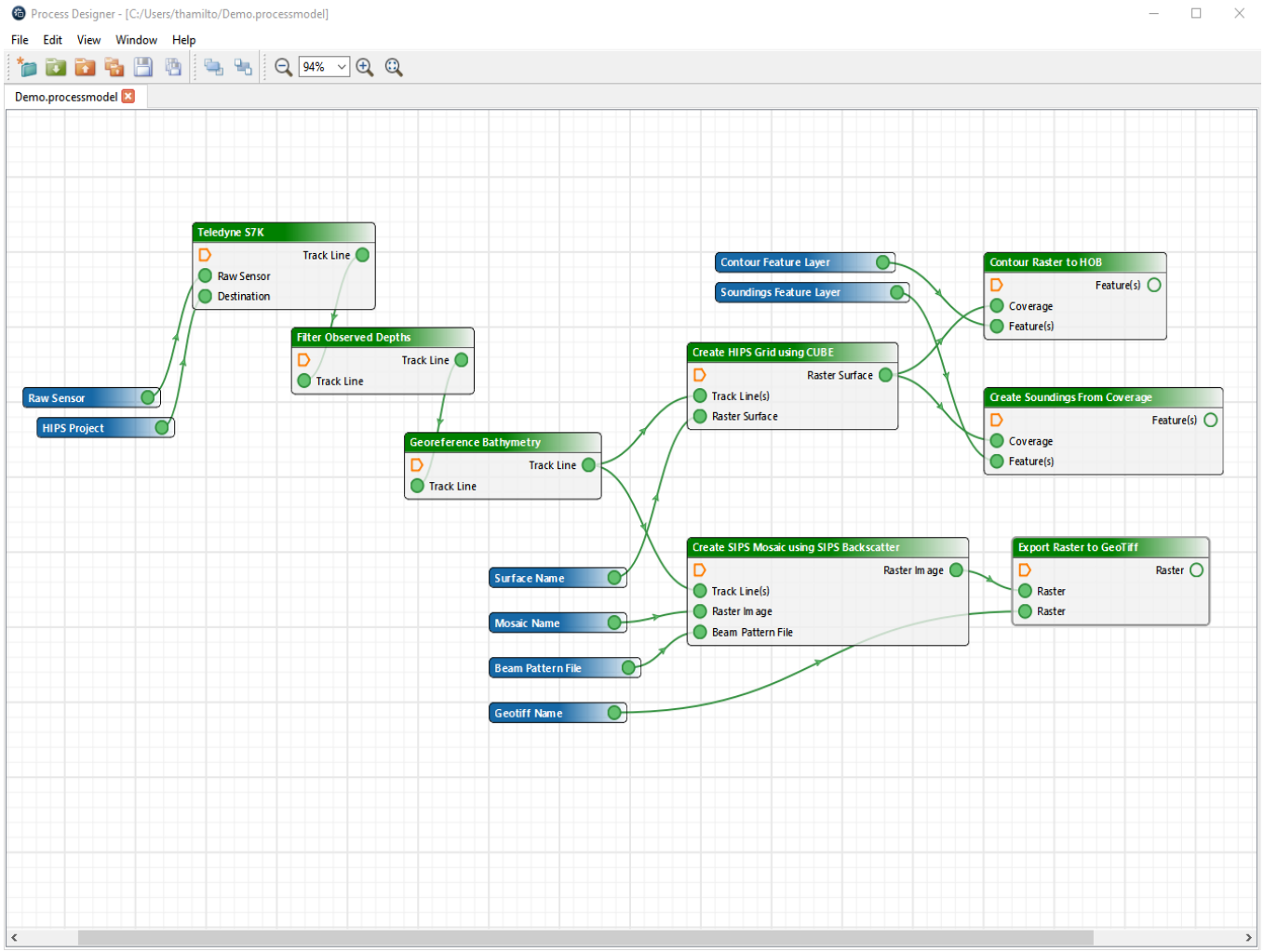
Automation: Supporting products and possibilities

- Through process automation we can:
  - Turn around larger datasets with less time
    - Shorter time from Ping-to-Chart
  - Improve utilization of human resources
    - Focus on data review, QC and other tasks
  - Efficiently create additional products and new data services
    - Including those as part of IHO S-100…



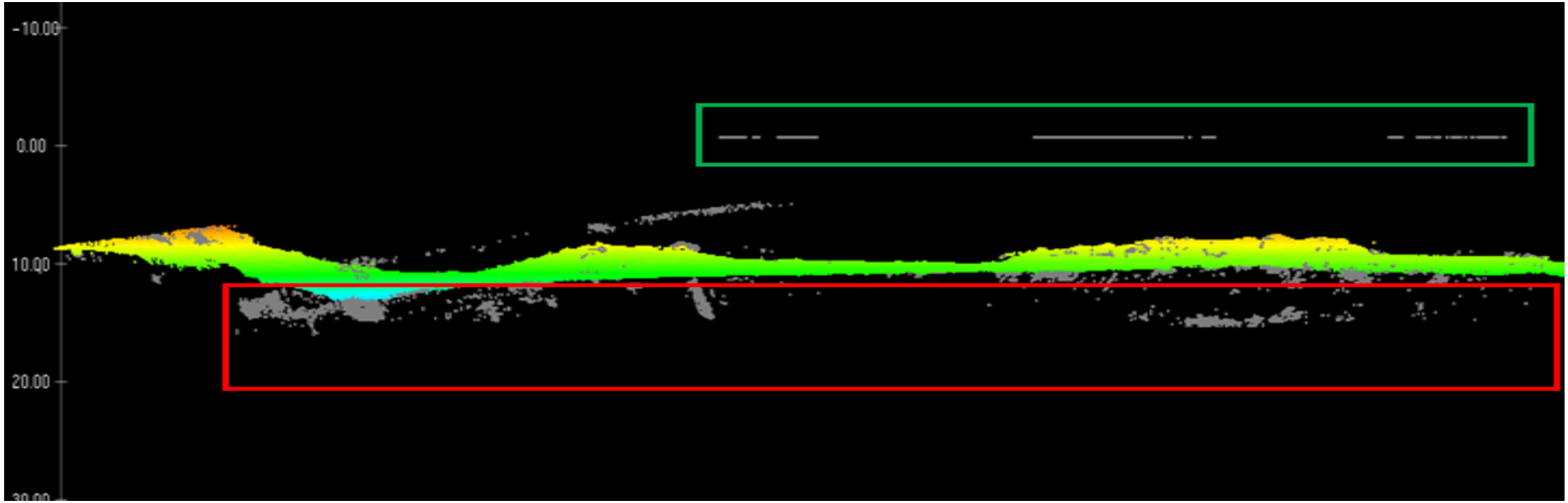
Complex Process Automation

- Graphically build your process
  - Hard code options that do not change
  - Create parameters for options user needs to set
  - Incorporate majority of the processes available in HIPS and SIPS
  - Supports branching workflows and conditional operations (if this, do that)



Automation: Artificial Intelligence for sonar noise removal

- Used to significantly reduce manual processing (i.e. data cleaning)
  - ~4x less manual interaction
- Accuracy
  - > 99% accuracy for “real” points
  - ~92% accuracy for “noisy” points



CARIS HPD 4.0

Selected Highlights and Enhancements

Release Date – July 2019

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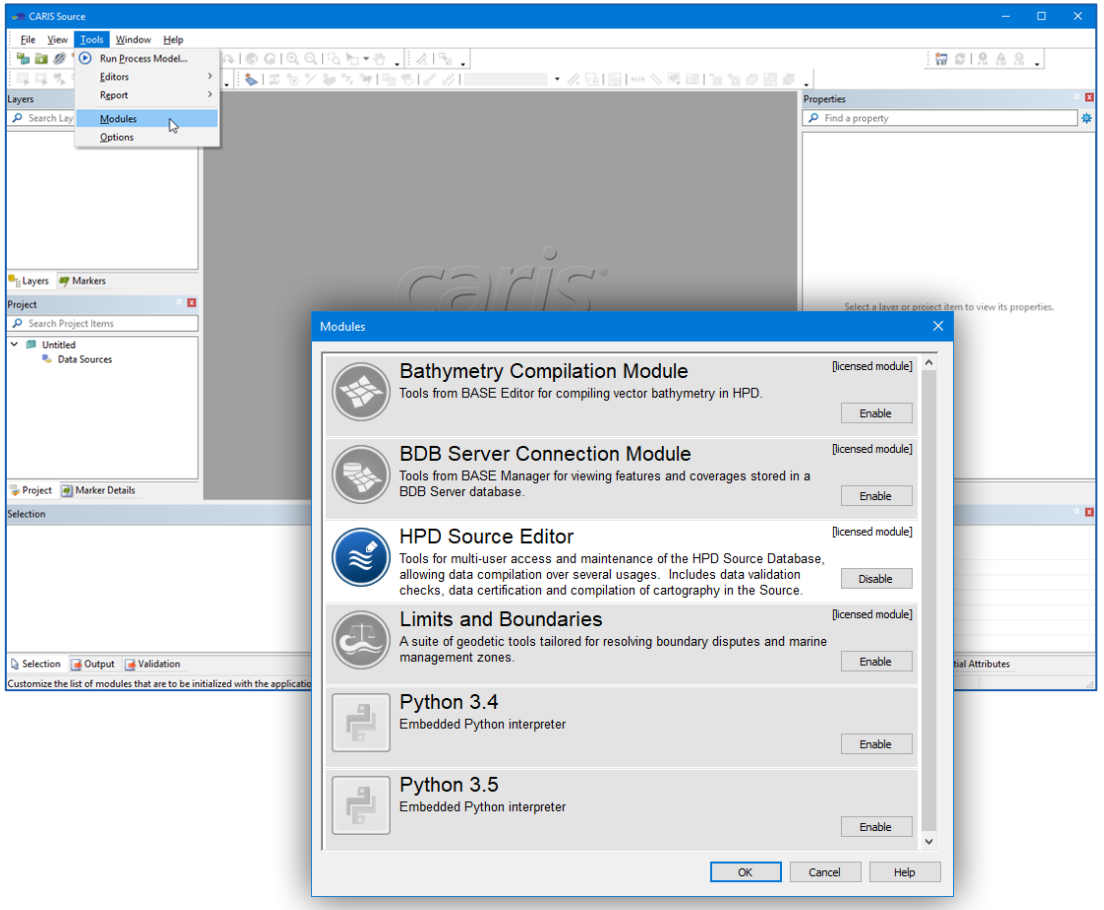
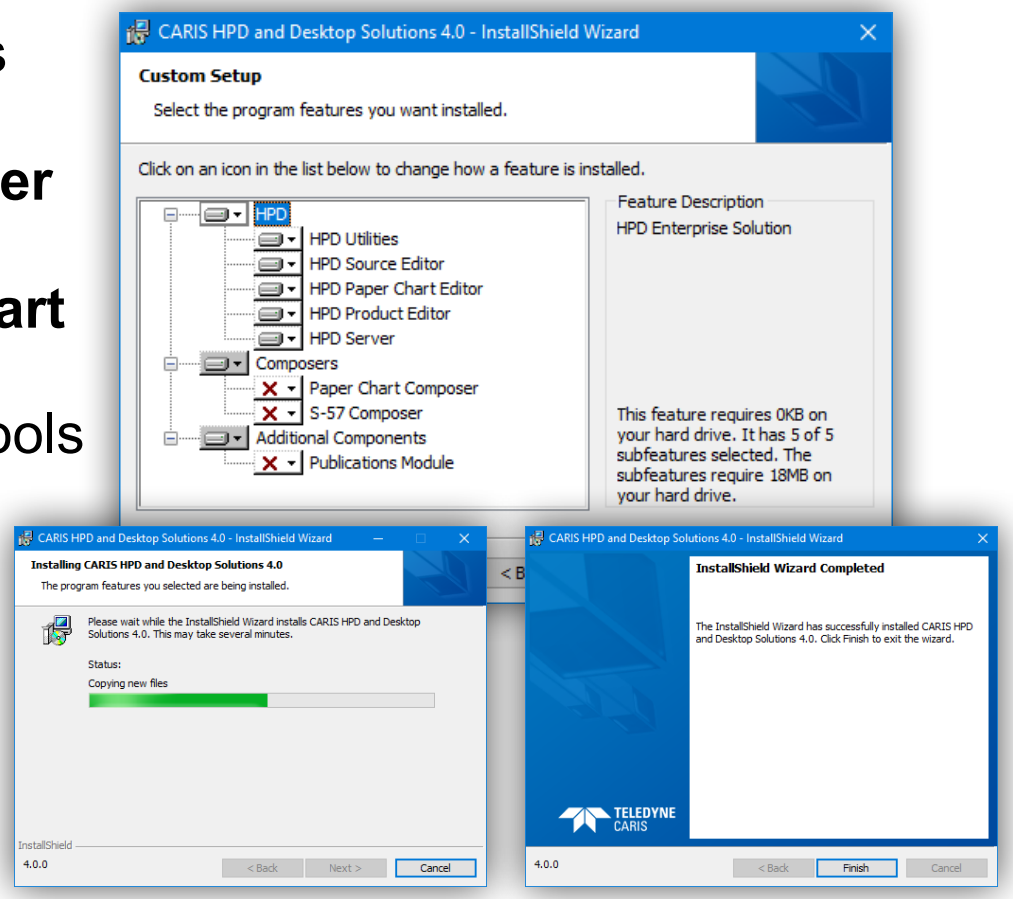
HPD 4.0

- Adopts the new shared CARIS application architecture
- New enhanced, simplified data model
  - 50+ X reduction in DB tables!
- Shared functionality separated from product-specific content
- More shared/less duplicated functionality
- Simplified maintenance
- New optional add-on Modules
- More flexibility for future products



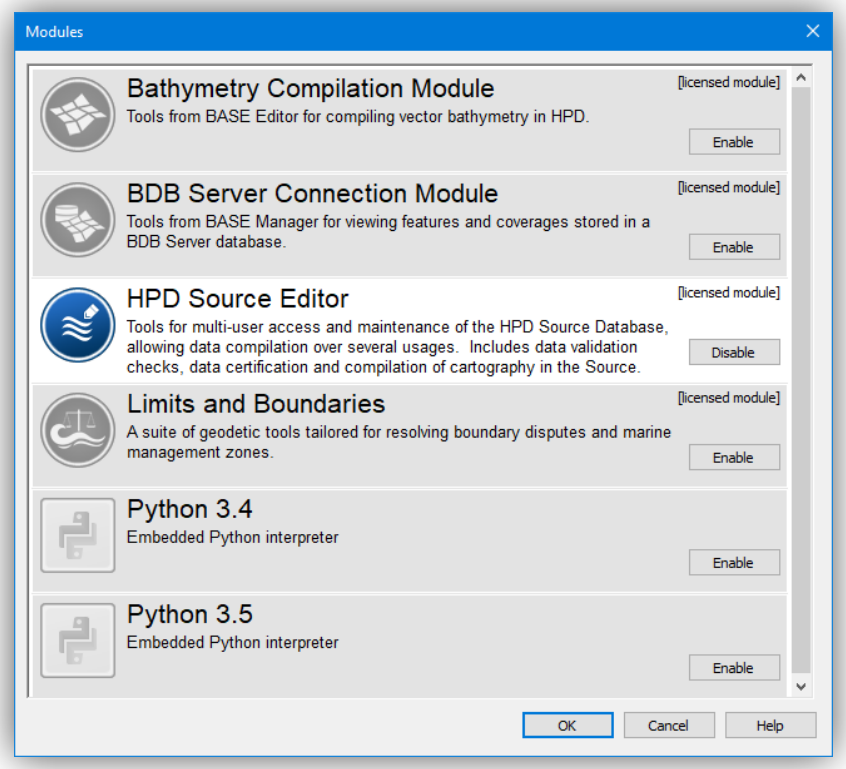
Applications: Database and Desktop

- Database and Desktop product creation applications are now the same
  - **CARIS HPD Product Editor** and **S-57 Composer** are both optional modules
  - **CARIS HPD Paper Chart Editor** and **Paper Chart Composer** are both optional modules
  - The desktop modules do not include database tools
- Single combined installation program
- Updated User Interface
  - New windows & icons
  - New Project & Layer structure
  - Reorganised menus
  - Redesigned HTML Help



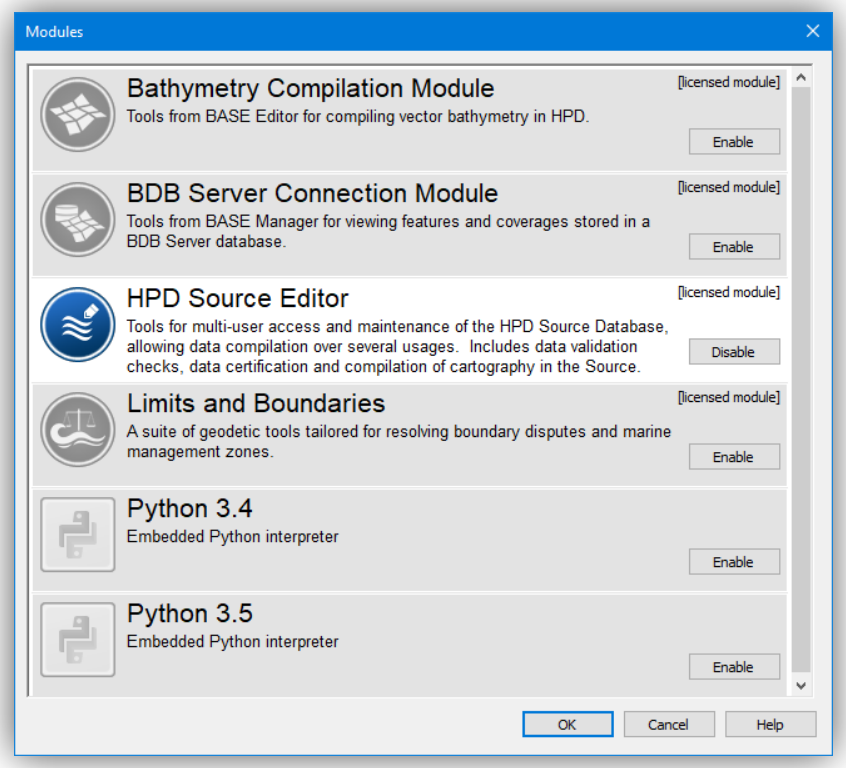
HPD Modules

- **Bathymetry Compilation**: compile vector bathymetry with BASE Editor tools
- **BDB Server Connection**: view features and coverages stored in a BDB™ server
- **Python**: Embedded Python interpreters



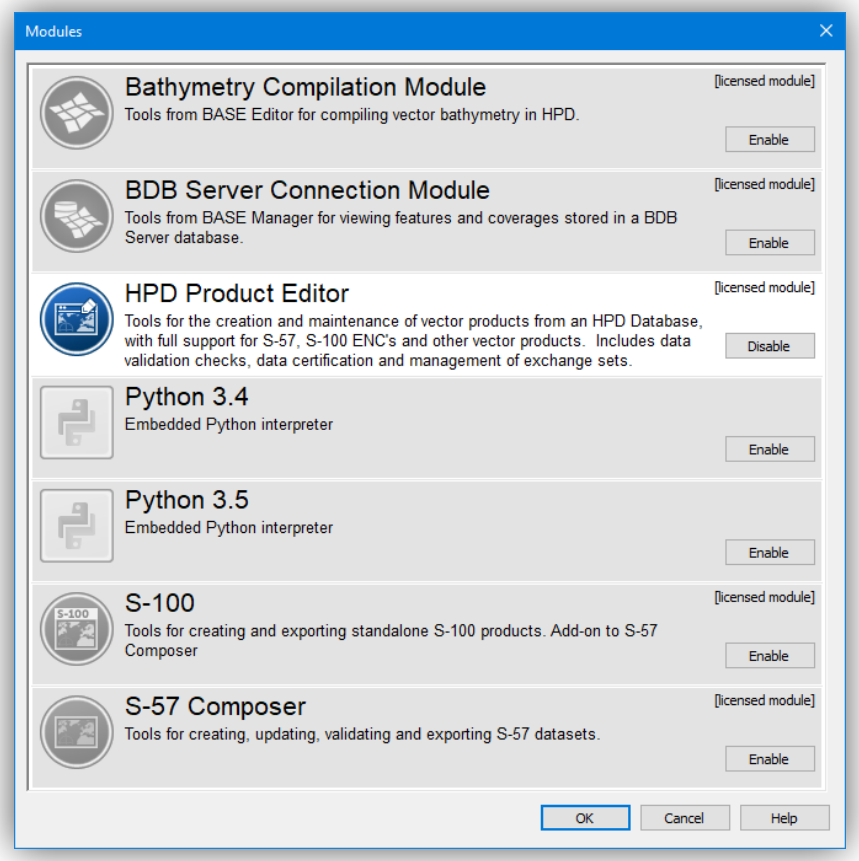
HPD Modules: Source

- **Source Editor**: this module enables the Source Editor database functionality
- **Limits and Boundaries**: resolve legal boundaries and establish marine management zones



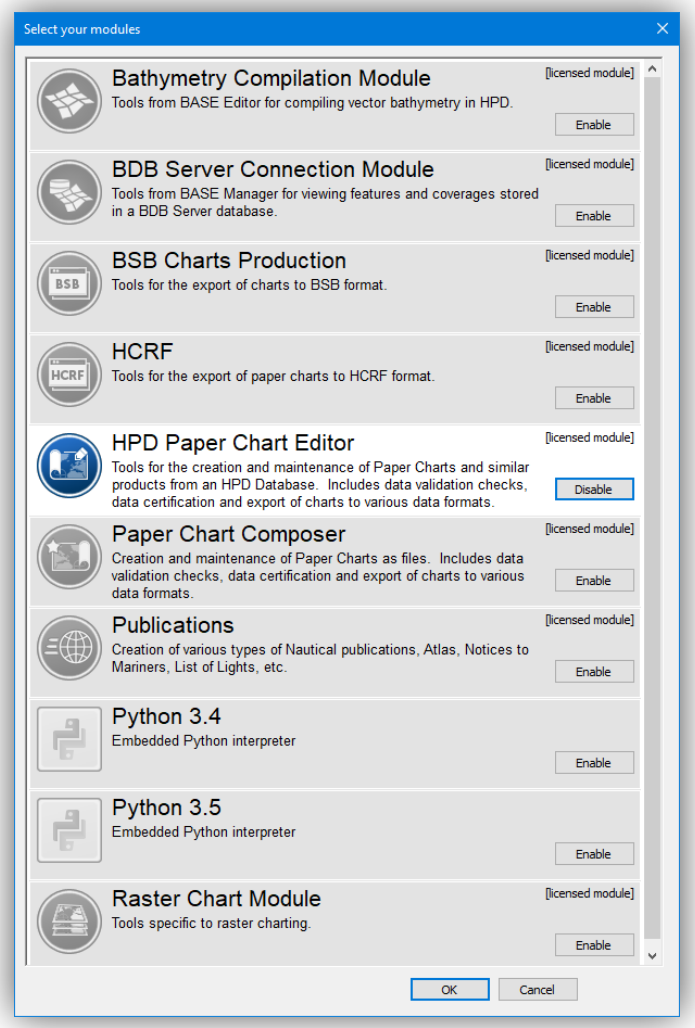
HPD Modules: Products

- **Product Editor**: this module enables the Product Editor database functionality
- **S-57 Composer**: create, update, validate and export S-57 products as desktop files
- **S-100**: adds-in support to S-57 Composer to create, update, validate and export S-100 file-based products



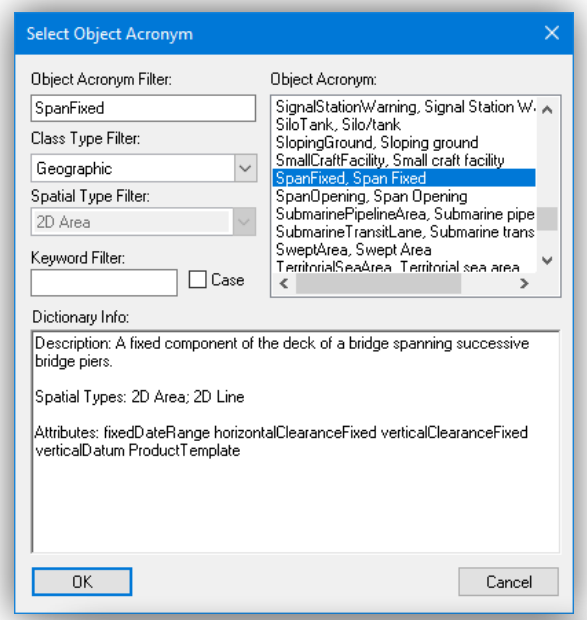
HPD Modules: Paper & Raster Products

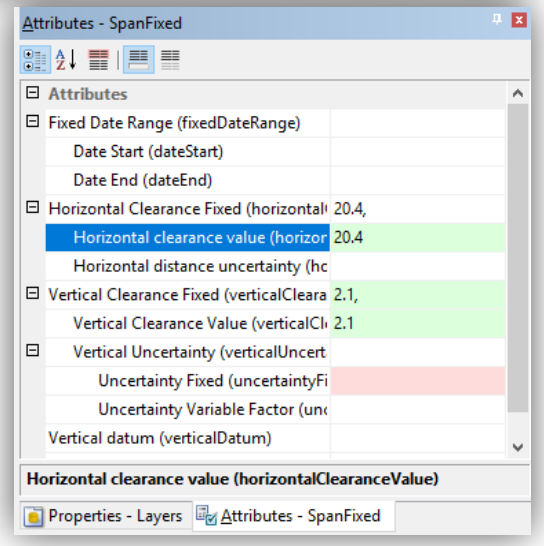
- **Paper Chart Editor**: this module enables the Paper Chart database functionality
- **Paper Chart Composer**: create, maintain, update and export paper charts as files
- **Raster Chart Module**: create, maintain raster charts
- **BSB Charts Production**: export charts to BSB Raster Nautical Chart format
- **HCRF**: export charts to an HCRF Raster Charts
- **Publications**: create and maintain notice and list-type publications in an HPD database



S-100

- **S-57 Composer 3.0** - 2015
  - Desktop S-100 production and conversion from/to S-57
  - Same familiar tools as for S-57
- **HPD 4.0**
  - IHO S-100 compliant database schema
  - S-57 <> S-101 conversion
  - Create S-101 ENC products and Updates
  - Create S-57 database products from S-100 source databases
  - Create paper chart products from S-100 source databases





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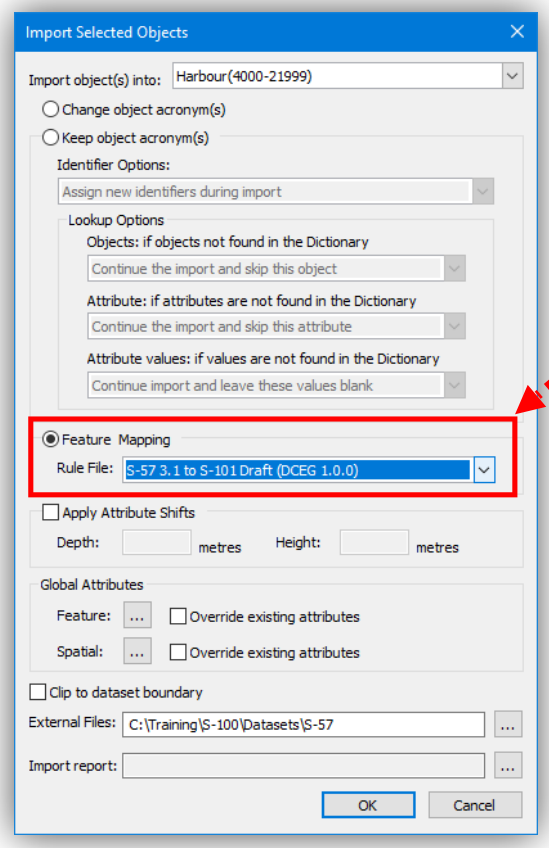
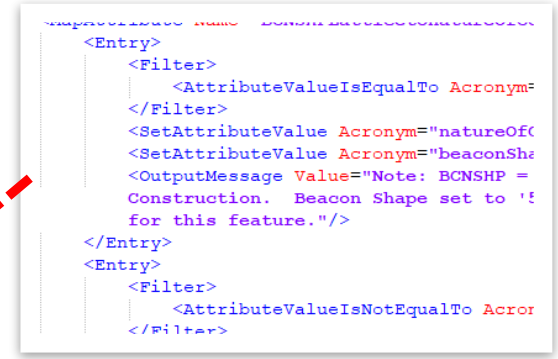
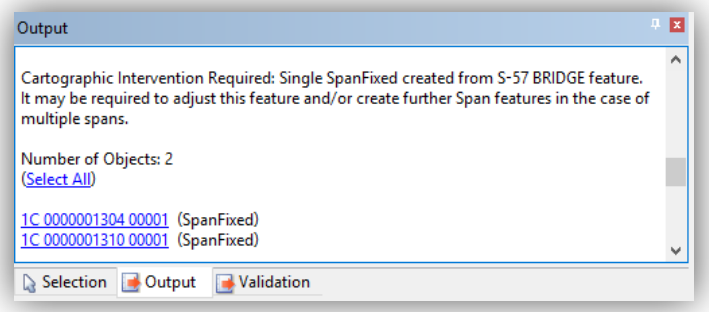
S-57 > S-101 > S-57 Conversion

- Import S-57 features into a S-100 database or file
- Automatic on-the-fly feature mapping to S-101
  - Customisable mapping rules
- Reports with hyperlinks to features show where further intervention may be required
- On-the-fly feature mapping to S-57 export from a S-100 database







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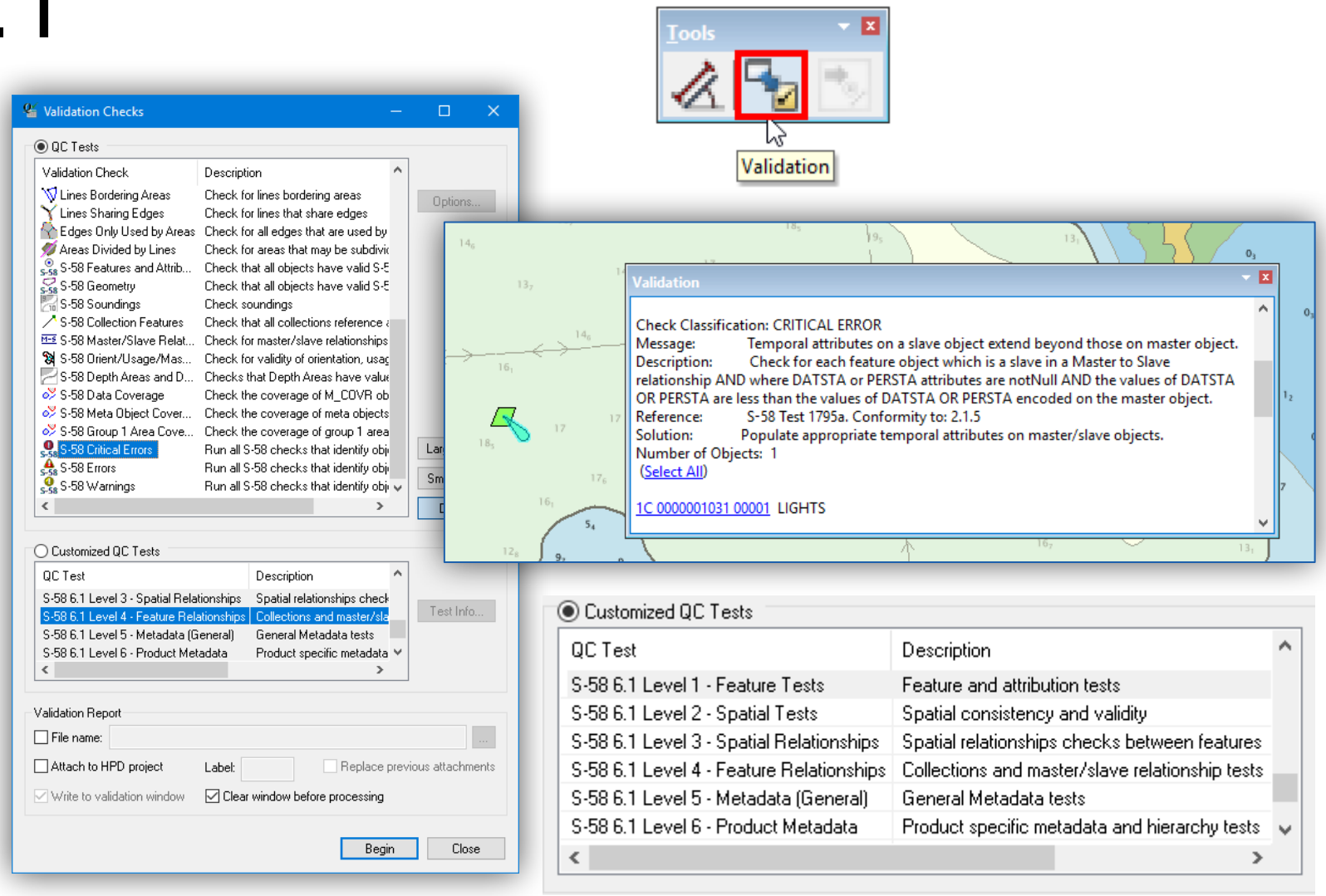
HPD S-57 to S-100 Database Migration

- The HPD 3.2 to 4.0 upgrade does not automatically implement S-100
  - Existing HPD S-57 database are upgraded to the new HPD 4.0 data model
  - Users can decide when they are ready to implement S-100 production
- S-100 migration – one-time scripts to migrate HPD 4.0 S-57 to S-100
  - The new HPD 4.0 data model already supports S-100 – complex attributes, feature associations, information types, S-101 feature catalogue …
  - Source data – features are migrated to new S-100 features and used in products
  - Legacy Products – create, maintain and update S-57 products, paper charts …
  - New Products – create new S-101 ENCs, other new S-100 products …

S-58 Edition 6.1

- Updated Validation Checks for ENCs
  - Supports the latest IHO S-58 Edition 6.1 Standard
  - One-button *Critical*, *Error* and *Warning* checking
  - Use **Source Editor** to validate S-57 source features
  - Use **Product Editor** to validate S-57 features in ENC products



Automation: Batch Processes

- CARIS Batch Utility runs batch processes from a command line
  - Processes interact with a database or with data files
- Wide variety of tasks
  - Features: add, delete, map, update, change attributes …
  - ENCs: export, update, reassign FOIDs …
  - Chart creation: create panel data, border, marginalia …
  - Export chart export: TIFF, raster layers, view

Name: Export Chart to TIFF

Description: The ExportChartToTIFF process exports a chart to a TIFFF.

Inputs: A HPD URI containing a Chart Version ID or a path of a stand alone chart.

Outputs: The path of the resulting export.

Examples

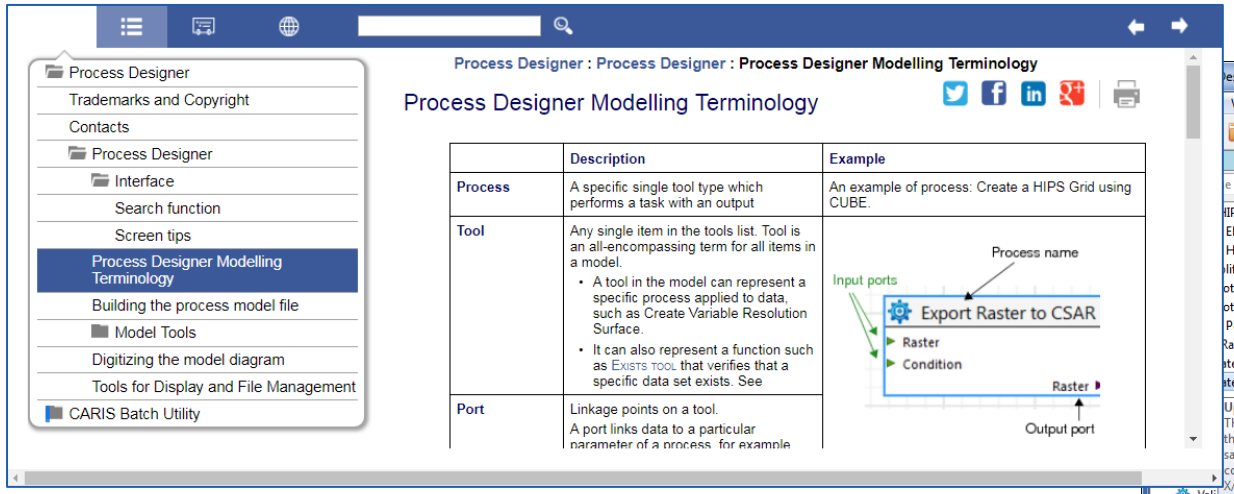
```
carisbatch --run ExportChartToTIFF --dpi 300 --extent-type SHEET --colour-depth 24 --background-
colour "RGB(255,255,255,100)" hpd://username:password@DB/db?chartversionid=3218
C:\ExportedTIFF\chart_3218.tif
```

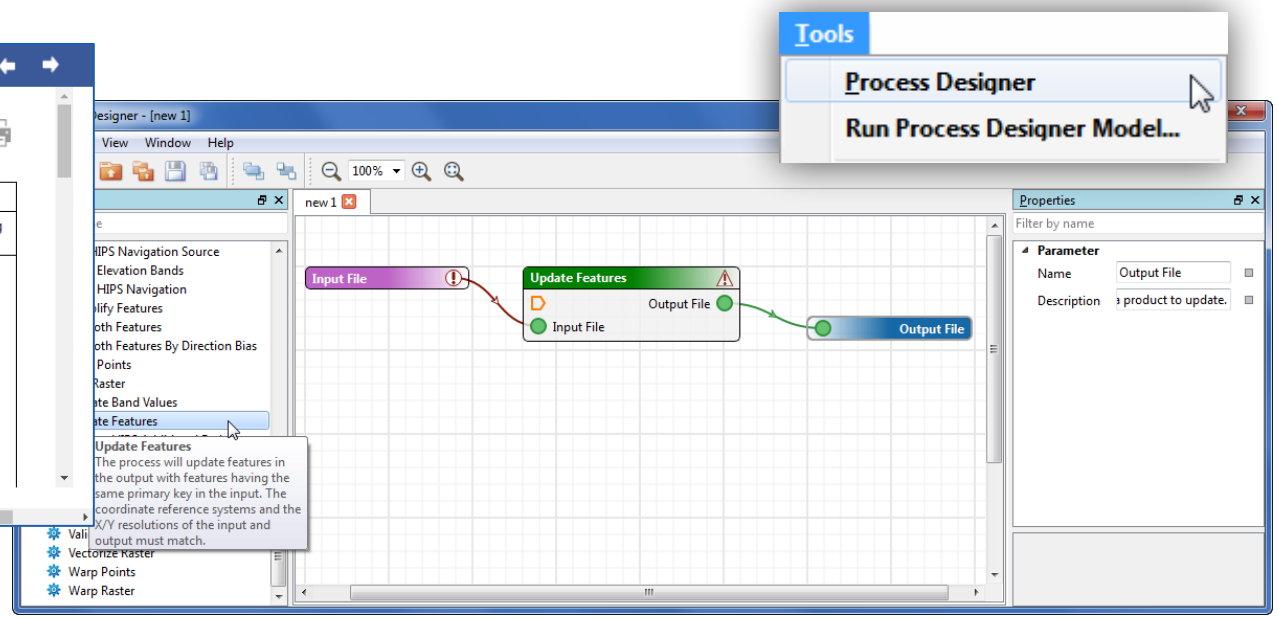
HPD Processes

Add Features
Add Features as Annotations
Assign Sounding SCAMIN Values
Change Feature Attributes
Clip Features
Compare TIFF
Conflate Feature Geometry
Create Border
Create Marginalia
Create Master-Slave Relationships
Create Panel Data
Create Product from S-57 File
Create Projected Grid
Delete Features
Dissolve Area Features
Erase Features
Export Atlas
Export Chart Raster Layers to TIFF
Export Chart to CMYK TIFF
Export Chart to HCRF
Export Chart to Spot Separates TIFF
Export Chart to TIFF
Export Features to Shapefile
Export Product
Export S-57 Product
Export to WKT
Filter Features
HPD Change Feature Attributes
HPD Check Topology
Import Catalogue
Import LDAP
Import Raster Layers to Chart
Map Features

Automation: Process Designer

- New support to execute Batch Processes via Process Designer
  - Process Designer is used to graphically build a workflow of processes and save it to a process model file that can be run from within HPD





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