FIG 2010

CSAR: A new way forward with high volume bathymetry

Presented By: Christian Fellinger, Account Manager – Asia Pacific, CARIS

Fredericton – Canada • Heeswijk – The Netherlands • Washington, D.C. – United States • Adelaide, Australia

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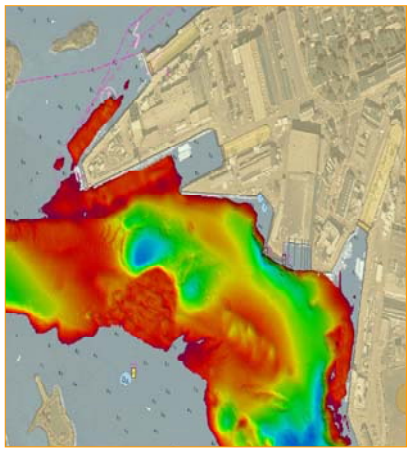
CARIS Company Overview

- 30 Years in Business
- Successful CARIS installations in over 80 countries
  - Including UK (UKHO), Australia (AHO), New Zealand (LINZ), Chile (SHOA), France (SHOM), China (MSA), India (NHO), Canada (CHS)
- 150 employees in the Fredericton office, 25 in Netherlands, 4 in USA, 2 in Australia, 1 in UK
  - Developers, Sales, Marketing, Customer Services, Special Projects
- Customer Support given by professionals with industry experience
  - Ability to converse in several languages e.g. English, French, Spanish, Portuguese, German, Dutch, Chinese
- Participate in the development of standards - IHO, OGC, ISO
- Develops and implements world leading GeoSpatial Solutions for the Marine Sector

Introduction

- The need and the goal:
  - To effectively handle, store and manage the volumes of digital spatial data generated by modern multibeam echosounders (MBES)
  - Provide the hydrographic community, and related sectors, with a scalable solution to maximize productivity in the processing, management and analysis of these large data volumes



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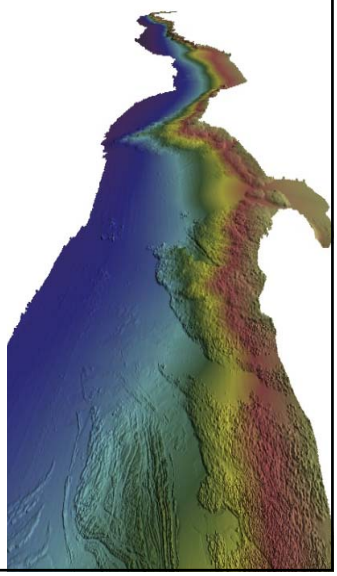
Introduction

- The Solution:
  - In 2009, CARIS® released its next-generation storage technology for multiple-attributed XY data
    - Provide improved capabilities for interaction with substantial amounts of bathymetry data, for today and the future
  - **CARIS Spatial Archive (CSAR) Framework**
    - Pronounced “Cesar”
  - **Delivers substantial benefits to CARIS products**
    - HIPS and SIPS
    - Bathy DataBASE
    - Spatial Fusion Enterprise



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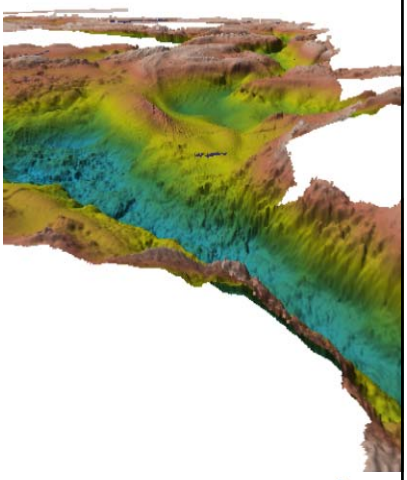
CSAR Framework

- Designed to handle large volumes of multi-dimensional data
  - Applicable to bathymetry, topographic, oceanographic information (e.g., temperature, etc.), sonar imagery and others
  - Allows for large volumes of data to be partitioned into “chunks” for efficient retrieval from file or database



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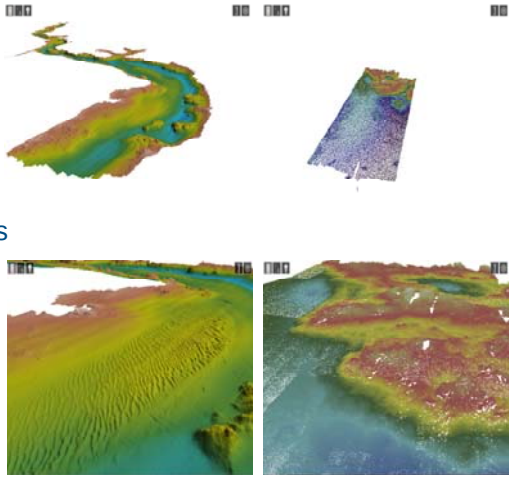
CSAR Framework

- Allowed for a redesign of data structures for gridded and point data
  - CSAR Grid
  - CSAR Point Cloud
  - Billions of grid nodes or points
- Multi-resolution implementation
  - Data is stored at several resolutions simultaneously
- Multi-attributed
  - Support XYZ plus TPU, etc.



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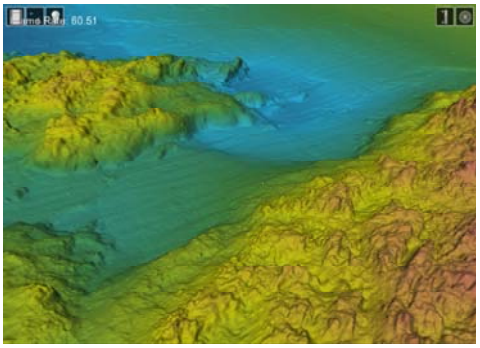
CSAR Framework

- Common format for visualization in 2D and 3D
  - Eliminates 3D scene / environment creation
- Allows for high-resolution subsets to be loaded quickly (2D and 3D)
  - Open, overview and refresh times stay constant as file size increases
  - True for data opened from local disk or network location



- Local File or Network, e.g.
  - 1.6 GB CSAR Grid
  - Open: Three (3) seconds
  - Overview: One (1) second
  - Refresh: One (1) second

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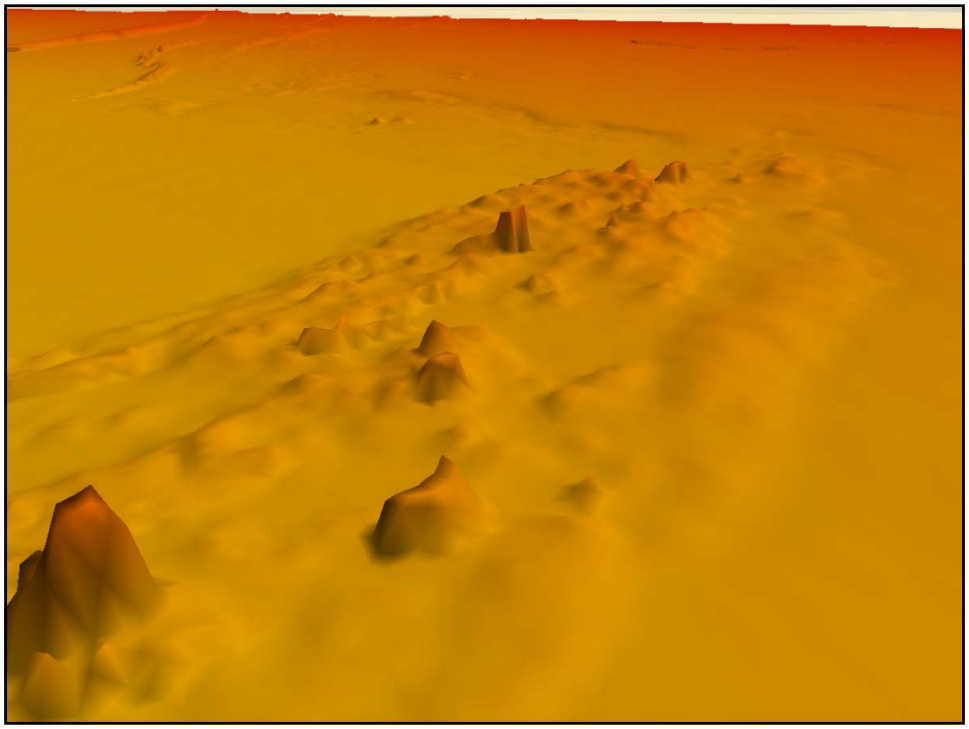
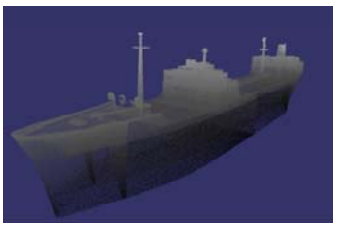


Summary of benefits to CARIS Products



- Overall:
  - Storage of large volumes of multi-dimensional data
  - Improved 2D/3D visualization
- HIPS and SIPS:
  - Multi-threaded grid processing
  - Support for imagery
- Bathy DataBASE:
  - Perform surface combines over large areas
  - Store multiple attributes per point or grid node
- Spatial Fusion Enterprise:
  - View and access bathymetry data over the internet

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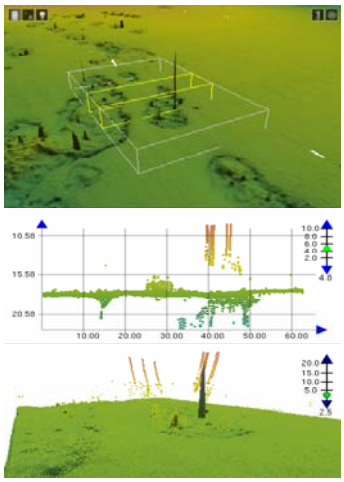
Benefits to HIPS & SIPS

- Multi-threaded grid processing
  - Traditionally applies to “line based” operations in HIPS
    - Data conversion, SVC, etc.
  - Extended to apply to CSAR Grid creation
    - “Area based” computation
  - Maximize use of computing resources
  - Observed grid file creation as being 1.4 times faster (dual vs. single processor)
    - Initial creation and recalculation
  - Efficiently maintain up to date grid representation



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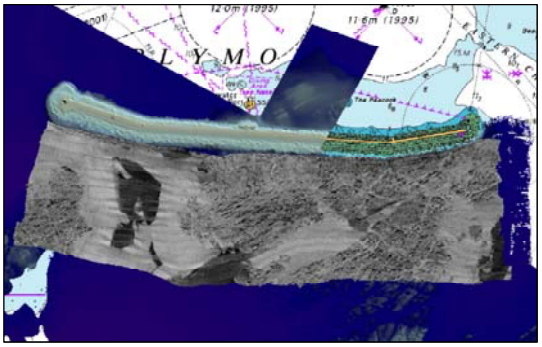
Benefits to HIPS & SIPS

- Support for imagery
  - Creation of side scan, time series, or backscatter mosaics in CSAR format
  - Compare bathymetry and imagery data concurrently to identify hazards to navigation



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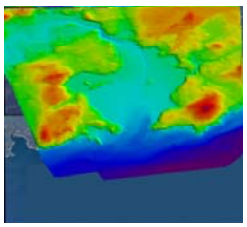
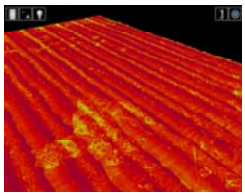
Benefits to Bathy DataBASE

- Perform surface combines over large areas
  - Users no longer limited to breaking their datasets into manageable pieces
  - Basis for 'Master Surface' concept



- Store multiple attributes per point or grid node
  - Multiple purposes and additional analysis possible
  - z-value does not have to be depth or height
  - Support for non-bathymetric data types (e.g. NetCDF)



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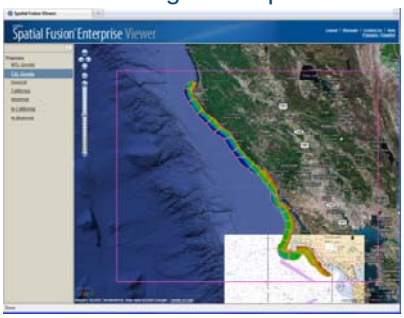
Benefits to Spatial Fusion Enterprise

- View and access bathymetry data over the internet
  - CSAR enables bathymetric data (stored locally or in Bathy DataBASE) to be viewed and accessed natively over the internet
  - Uses OGC interoperable standards (WMS / WFS / WCS)
  - Data is drawn natively meaning it can be interrogated
  - Supports decision making and improves data sharing



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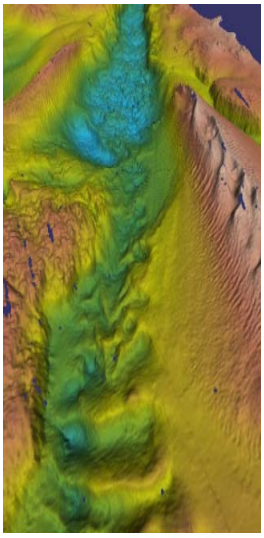
Conclusion

- Modern survey technology allows for bathymetric observations to be made at a greatly increased rate
  - Impact on agencies and the technology needed to process and manage the volumes of digital spatial data
- CSAR provides underpinning technology
  - Delivers substantial benefits to CARIS products
- Improved productivity throughout the complete hydrographic workflow



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Questions?

Thank You!

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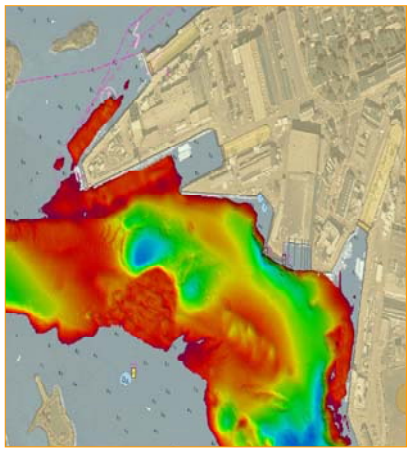

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