

MARINE SPATIAL DATA INFRASTRUCTURES

Requirements for Geospatial Software

MSDI Seminar – Geomatica, CUBA

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Canada

Netherlands

United States

Australia

United Kingdom



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Introduction

- **Why is CARIS at this Seminar?**
- **The Marine environment is important to us.**
- **Marine geospatial sector is under represented in SDI's**
 - GSDI10 conference only 3% of papers related to marine data
 - 65% of the earth is covered by water
- **Encourage producers and owners of Marine data to support their NSDI or get involved in MSDI projects**
- **Want to show that today's marine geospatial software can technically support your NSDI**
- **Enable good decision making in the coastal and marine environments by providing software that agencies and service providers can use and / or interface to!**
- **As a software manufacturer we can't solve the organisational aspects although we understand the challenges and importance!**

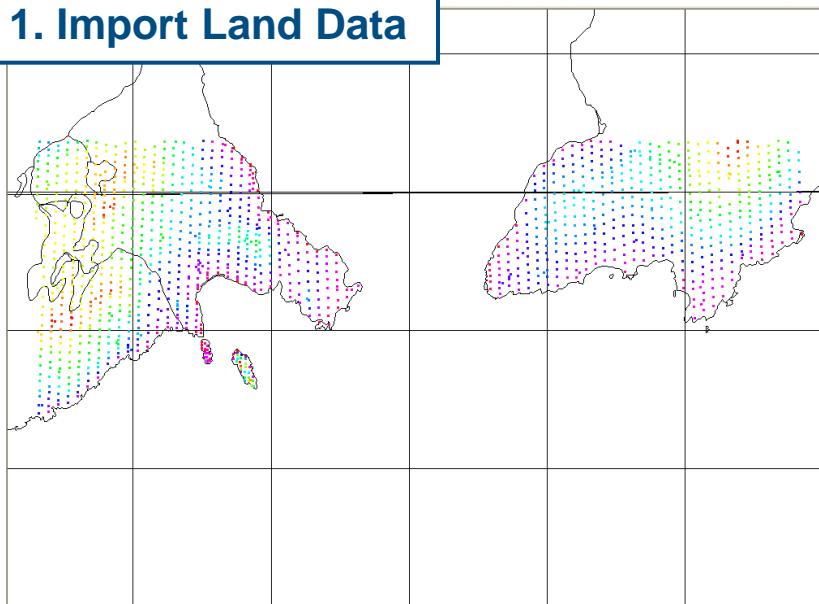


Combining Land and Sea DEM's

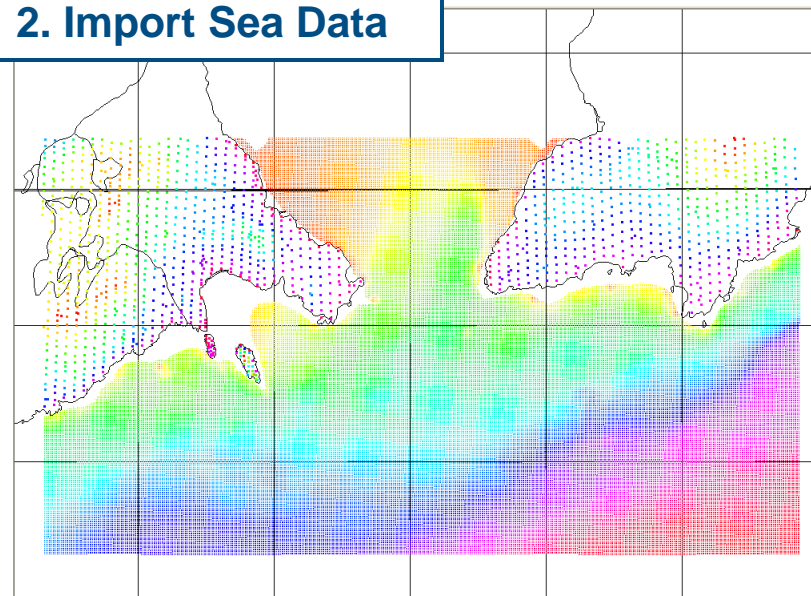
- **As per IHO MSDIWG Terms of Reference**
There is a need to identify and recommend solutions to technical issues related to interoperability between land and sea data E.g. Datum issues
- **One objective of the European BLAST Project is to**
Develop and demonstrate integrated land-sea DEM's
- **Geospatial software can off course help with this**
 - Hydro data is +ve down, Topo data is +ve up
 - Software needs to be able to handle this
 - Land and Sea data referenced to different vertical datum's
 - High Water for Land, Low Water for Sea
 - DEM's need to be shifted e.g. High, Low or Mean Sea Level
 - Survey to Shore models can be created to resolve data gaps
 - Different DEM's can be combined
 - For seamless examination and analysis
 - To derive continuous vector features



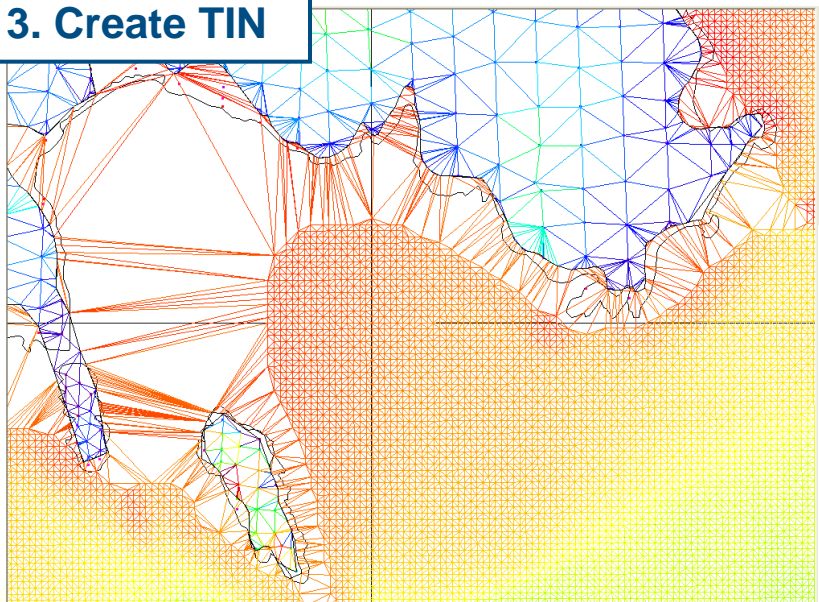
1. Import Land Data



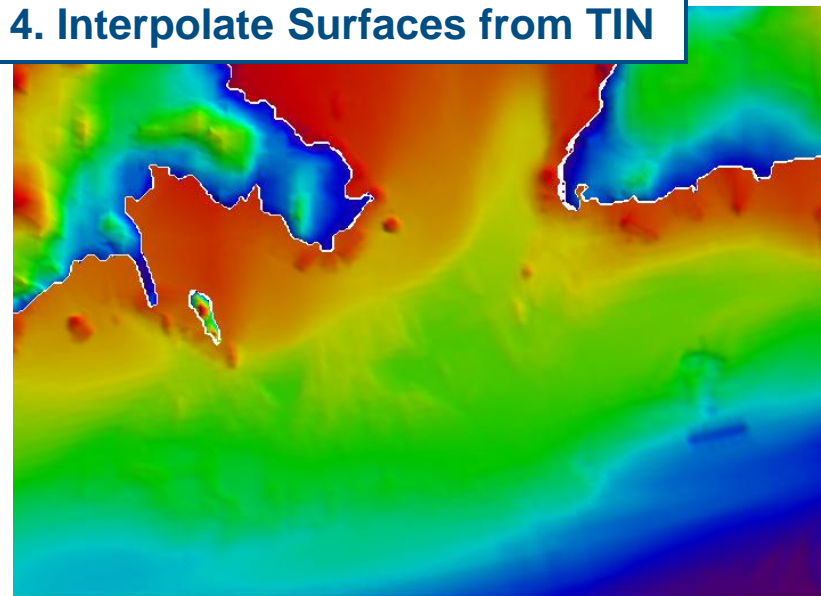
2. Import Sea Data



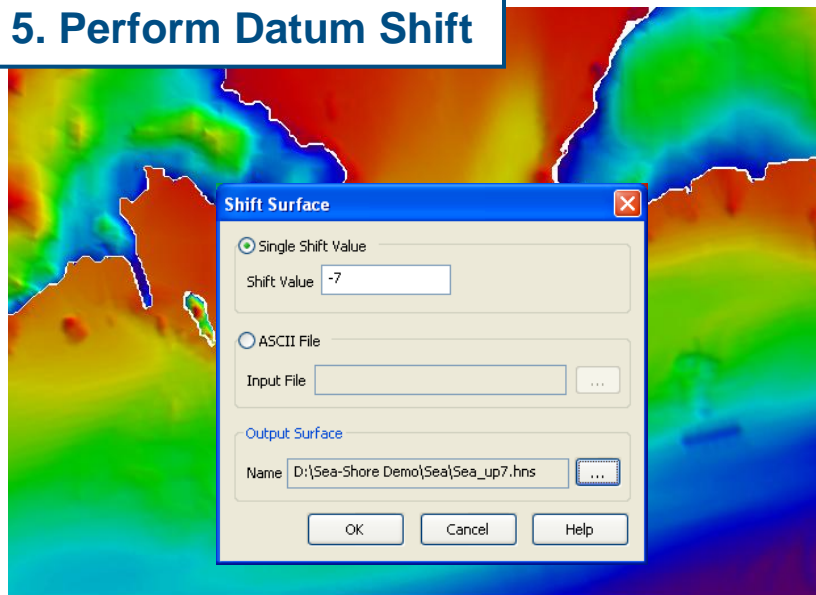
3. Create TIN



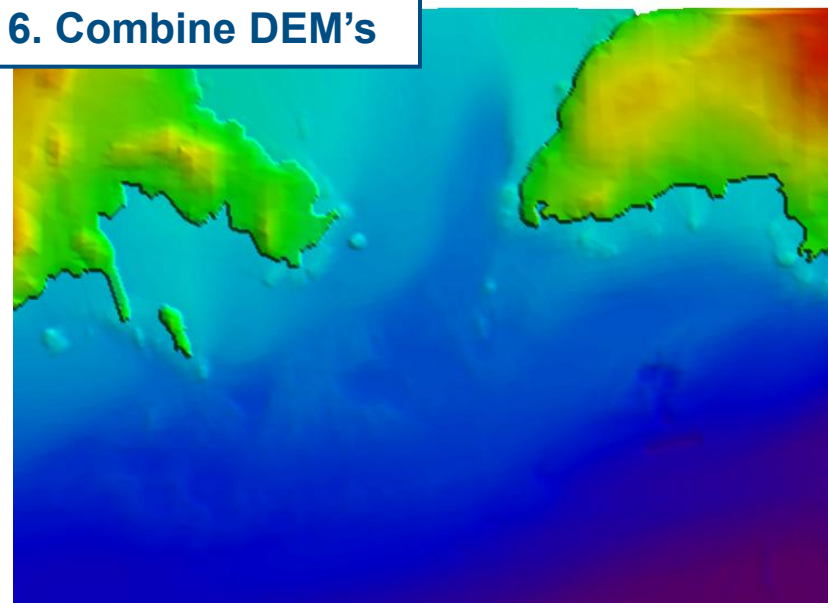
4. Interpolate Surfaces from TIN



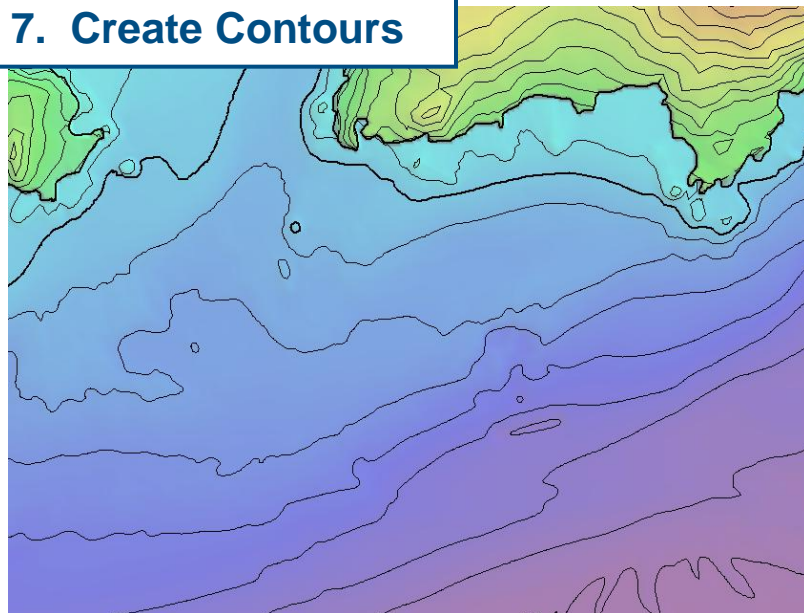
5. Perform Datum Shift



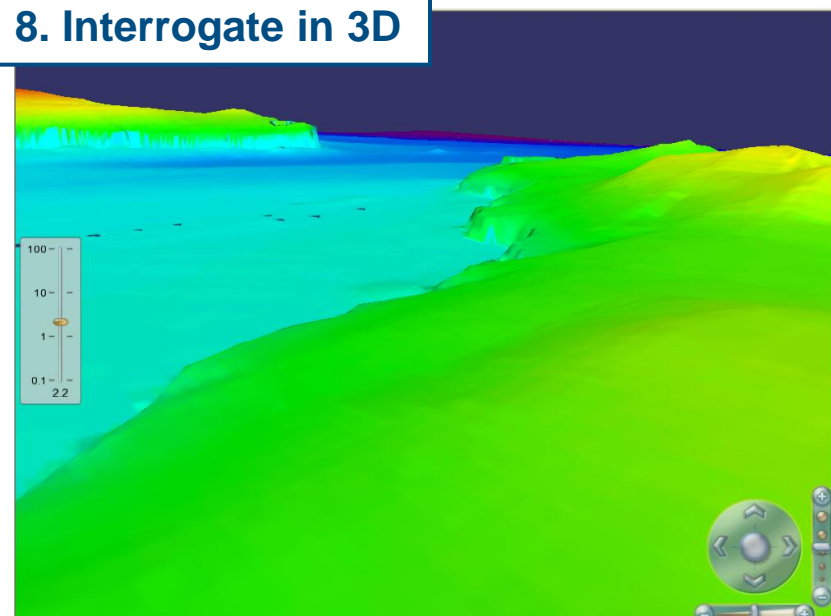
6. Combine DEM's



7. Create Contours



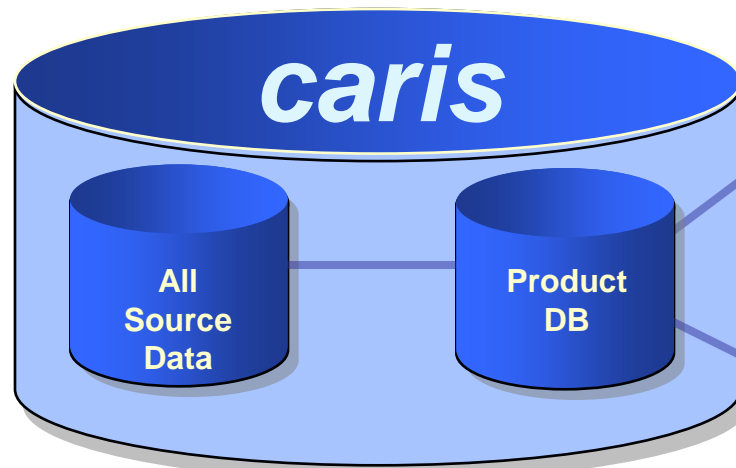
8. Interrogate in 3D



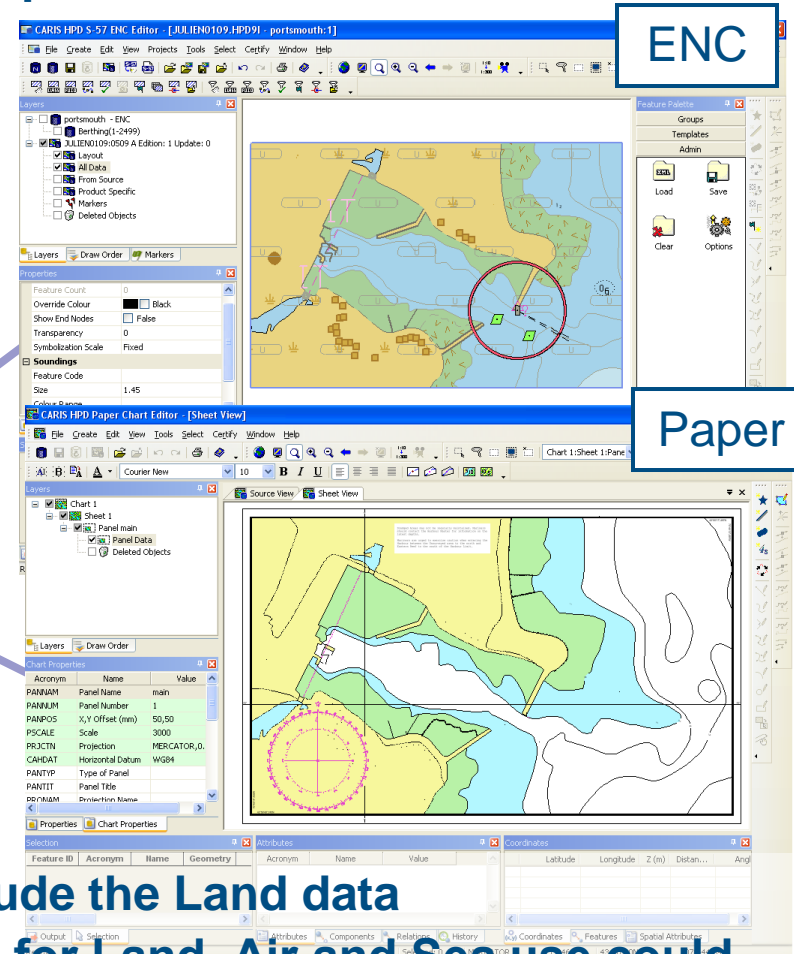
One Feature, One Time Concept

- From a Hydrographic Chart Production point of view CARIS has been talking about this Data centric concept

- *Different Products*
- *At Different Scales*
- *But Maintain Once at Source!*

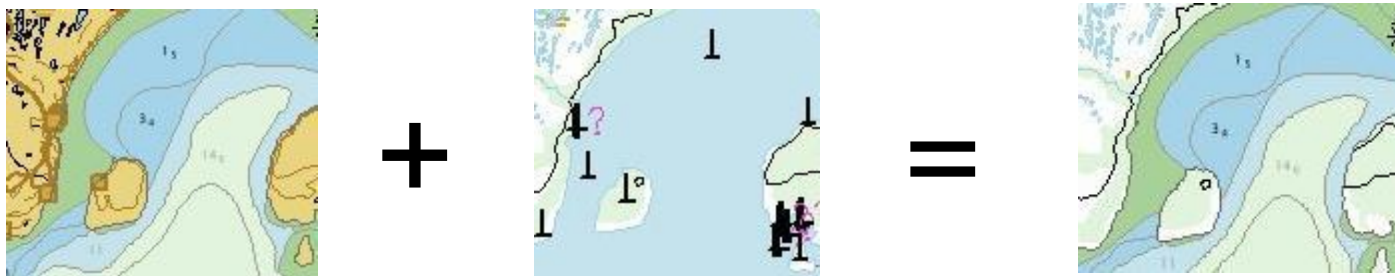


- The concept could be extended to include the Land data
- It's feasible that maps and charts used for Land, Air and Sea use could be produced from the same data



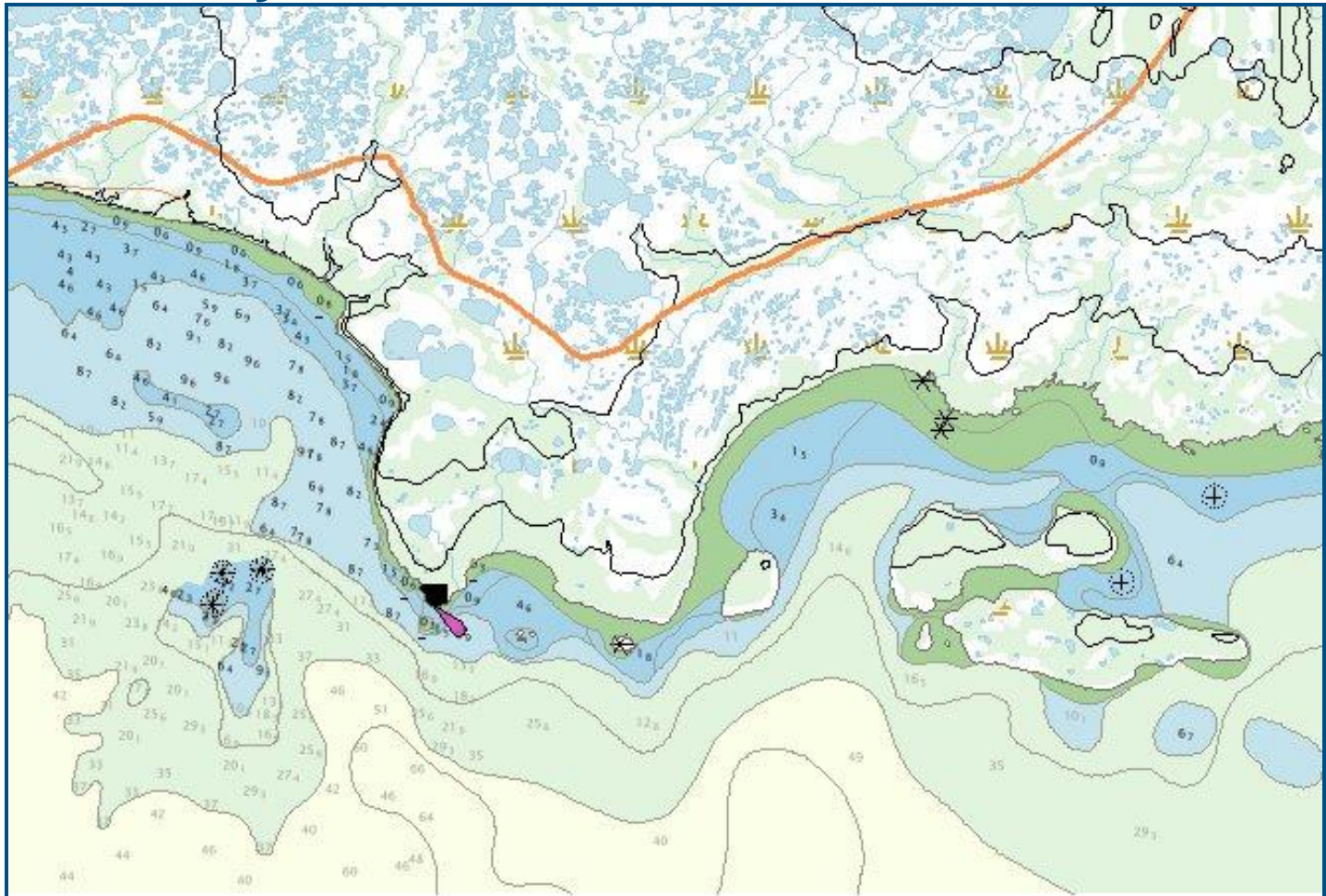
Portraying the Land and the Sea

- In this example CARIS software was used to combine an **Electronic Chart** with a **Topographic Map Sheet**
 - 1:20,000 ENC from Canadian Hydrographic Service
 - 1:50,000 Map Sheet from Natural Resources Canada
- The **ENC dictionary and symbol library** was extended
- The data was transformed from **NAD83 to WGS84**
- **Land and Sea Features** were selected for inclusion in the combined dataset, to avoid duplication
- **Topology** was shared between datasets
- The **soundings, spot heights and contours** could have been derived from the combined **DEM**



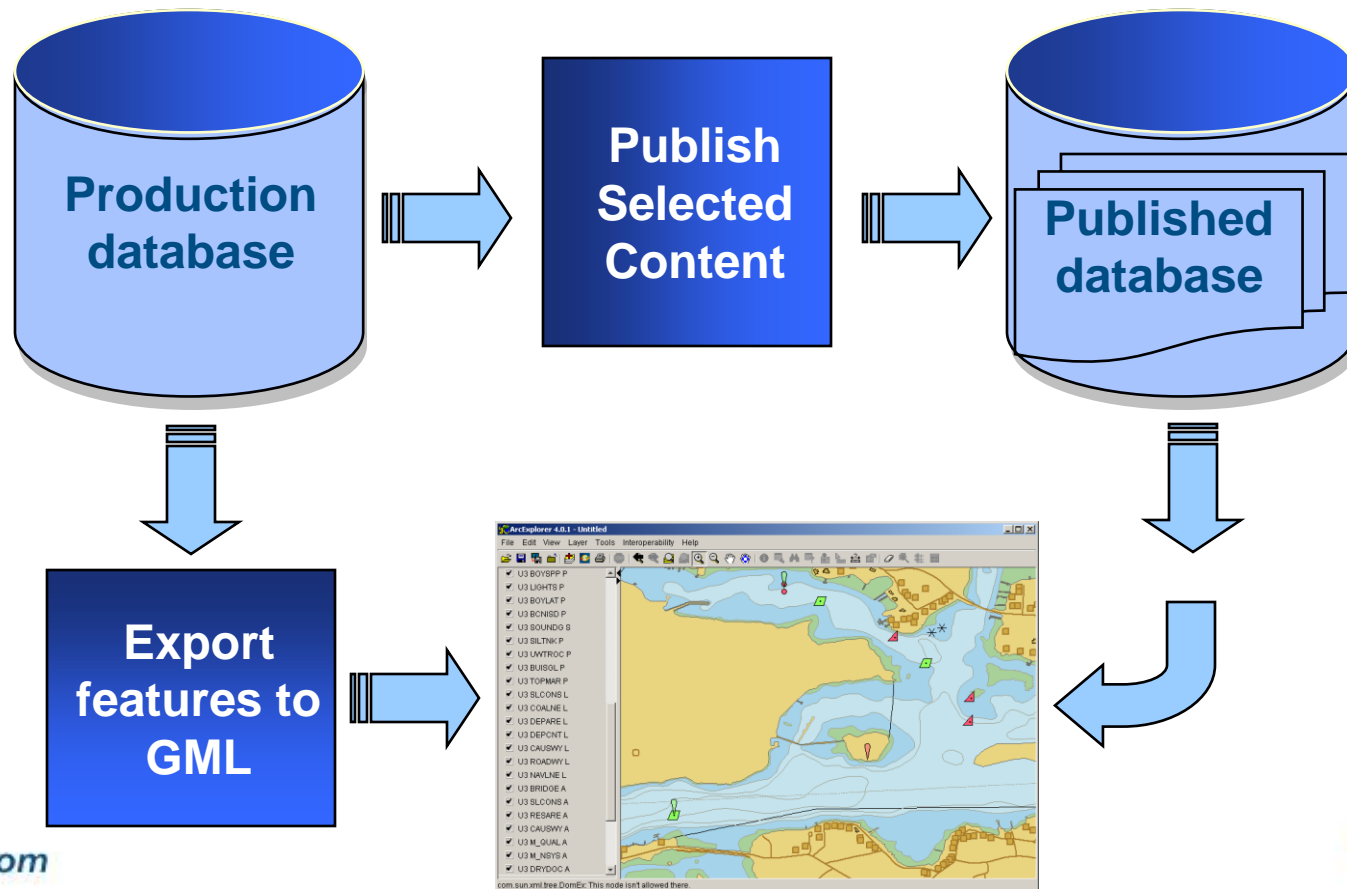
Portraying the Land and the Sea

- CARIS Easy View demo



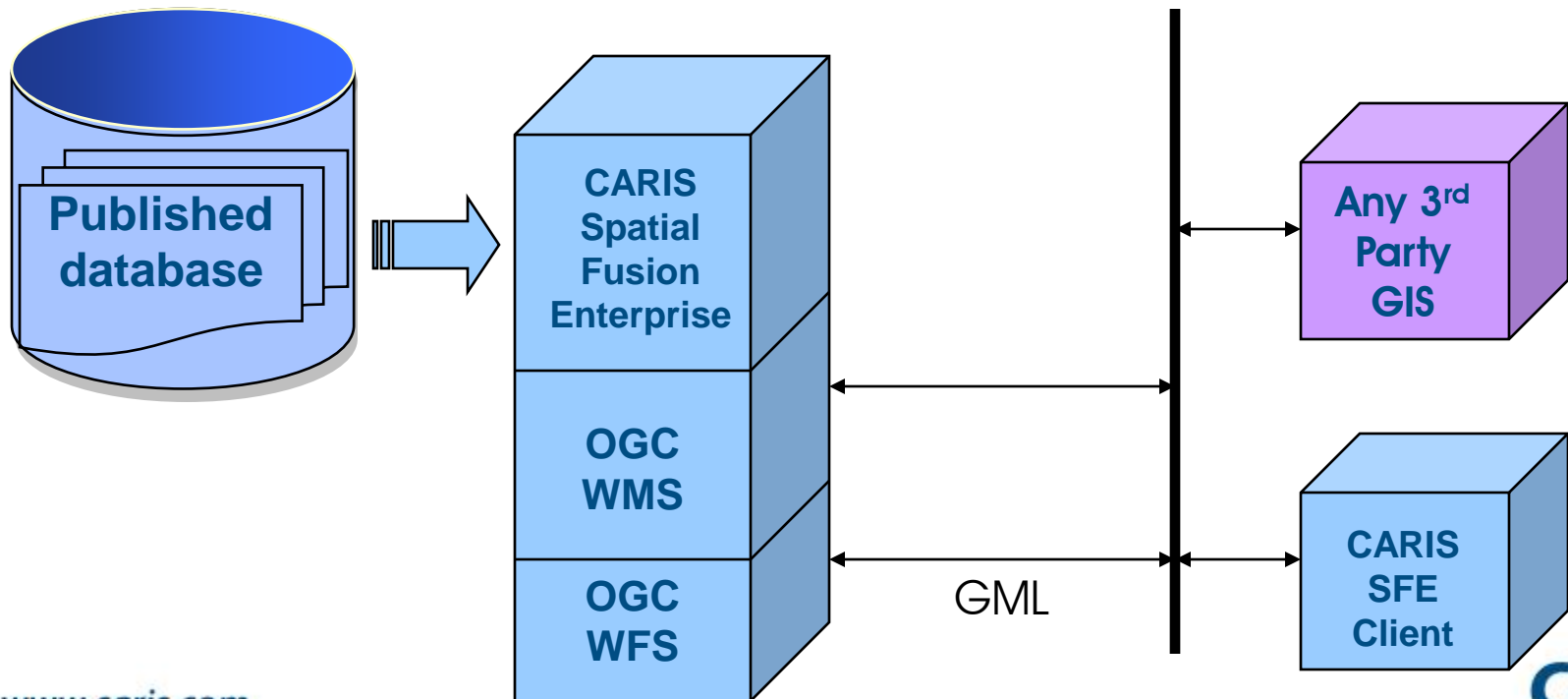
Sharing Geospatial Data from Source

- Selected data can be published from CARIS production database to a generic Oracle schema
 - Only data that has been flagged for publishing will be available
- Features in the production database can be exported interoperably
 - CARIS products allow export to GML

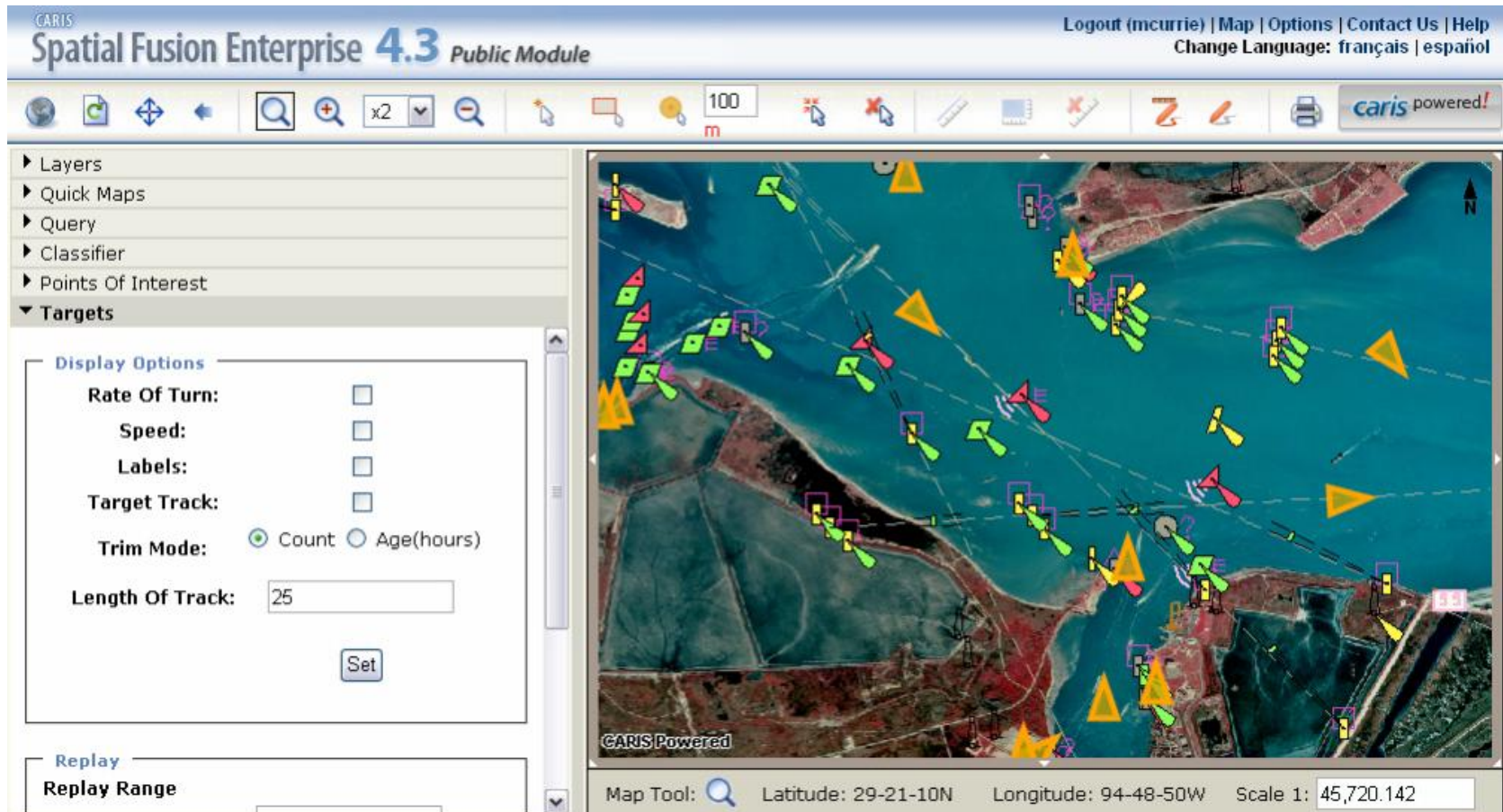


Sharing Geospatial Data via Web

- Specialised marine datasets can be made available through the web
 - Web enabled Electronic and Raster Charts
 - Bathymetric DEM's
 - Points of Interest
 - Asset Tracking through AIS
- Through the CARIS Spatial Fusion Enterprise web client
- Or in any OGC compliant browser



Decision support via the Web



- CARIS SFE 5.0 demo
- Demo of data in Google Earth



Practical use of MSDI – SHOM, France

- **Users of SHOM's data**
- **Survey Platforms**
 - Ships, Aircraft, AUV's
- **Regional Offices / Branches**
 - Responsible for the quality of data in their region
- **Hydrographic Office Headquarters**
 - Responsible for the quality of all hydrographic data
 - Supplier of data to military
 - Supplier of charts to shipping
- **Other Agencies**
 - Other HO's, National Mapping Agency, Cadastre, Science
- **Public**
 - Awareness / general interest
 - Leisure chart products



Practical use of MSDI – SHOM, France

- **Lots of Marine Data that has many uses**

- Bathymetry

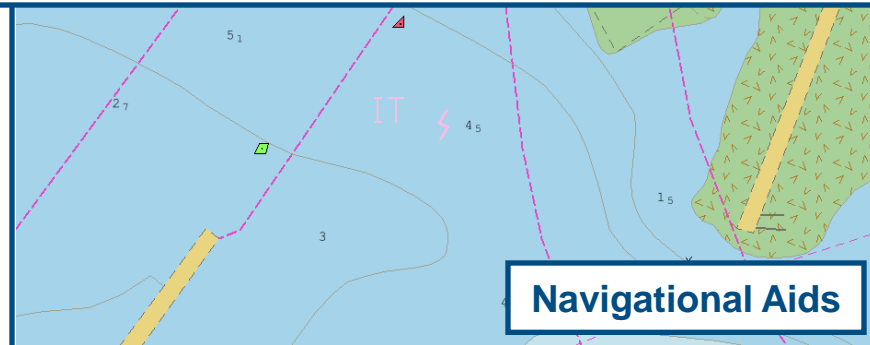
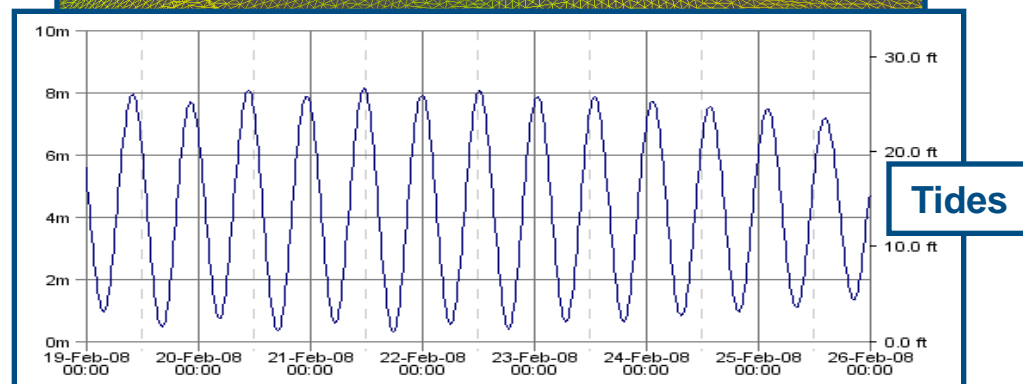
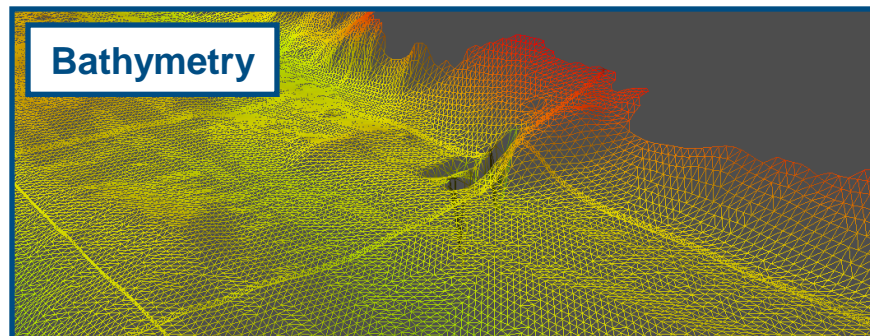
- Multibeam Sonar
- Single Beam Sonar
- LiDAR
- Legacy chart data

- Navigational Aids

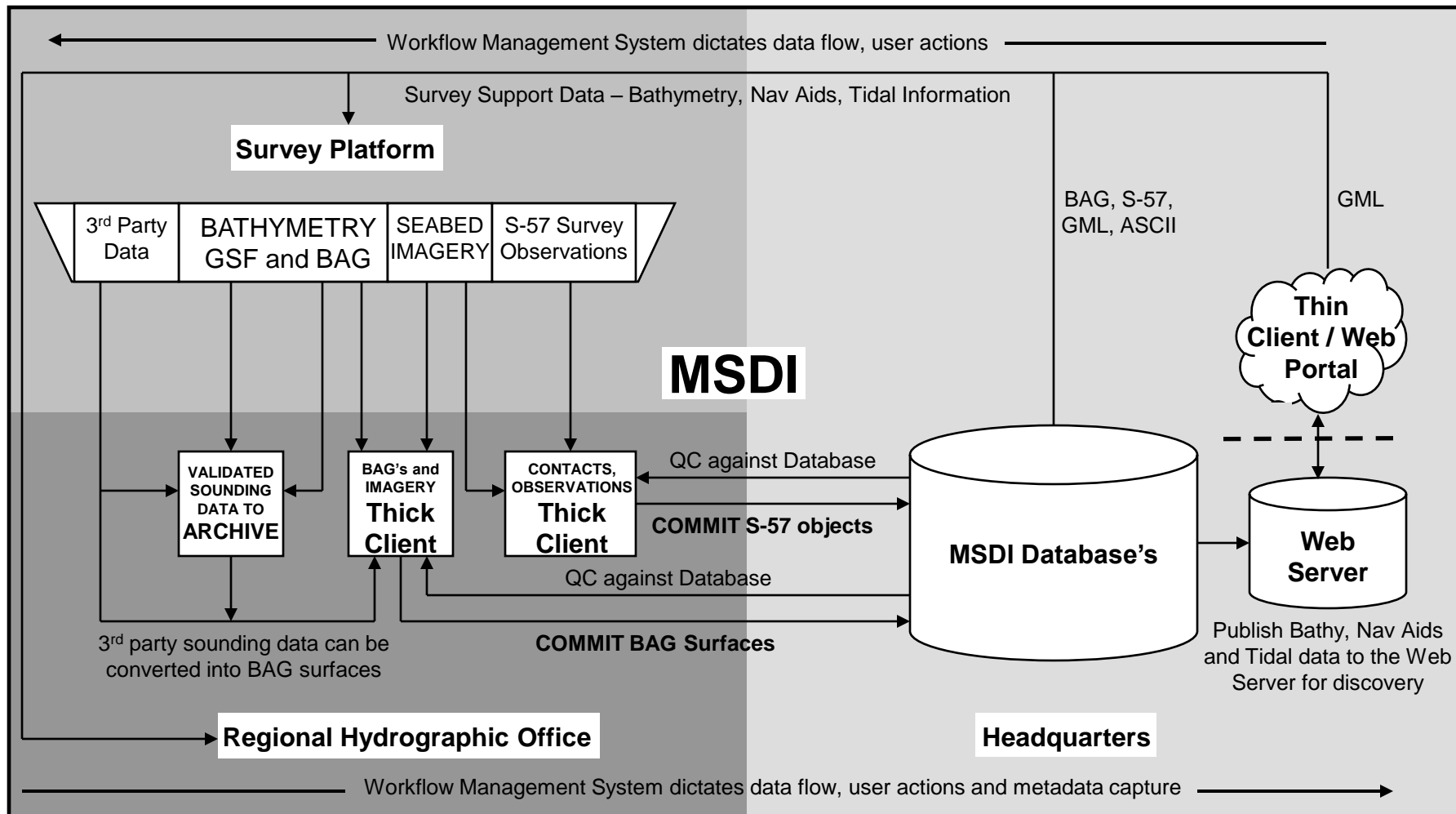
- Bouys
- Lights
- Shipping lanes

- Tides

- Tide Gauge data
- Tide models



Practical use of MSDI – SHOM, France





Summary of data types and standards described in the SHOM MSDI

- BAG: For Bathymetric DEM's
- GSF: For full density bathymetry data
- IHO S-57/S-100: For Navigational Aids
- IHO S-57 (extended): For Tide Station objects
- ISO 19115 / 19139 Metadata for all data types
- WFS / GML: For export of navigational aids
- WMS: For Bathymetric discovery
- WCS: Possible Bathymetric DEM extraction?
- ***All these are open formats and standards***



CARIS Company Overview

- 30 Years in Business
- Successful CARIS installations in over 70 countries
 - Including UK (UKHO), Australia (AHO), New Zealand (LINZ), Chile (SHOA), France (SHOM), China (MSA), India (NHO), Canada (CHS) etc.
- 145 employees in the Fredericton office, 20 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
- Develop and implement GeoSpatial Solutions for the Land and Marine Sector



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