Bathy Database for the Bay of Fundy

Hydro 2010 – November 3rd 2010

Presented by Björn van Vliet – CARIS BV

Pilot Project by
Wendy Woodford – CHS Atlantic & Trish Groves – CARIS

Contents

- Intro
- Database Creation
  - Import
  - Validation
  - Committing
- Usage
- Conclusions
Introduction

Authors: Alexander Unrein, Ocean Surveys Inc.
CARIS Software: OPS and SOS
Description: The aircraft carrier U.S.S. Oriskany located near the Pensacola Harbor entrance. The wreck is reportedly the largest vessel (intentionally sunk 276 meters length, 39 meters beam) to become an artificial reef.
Acknowledgements: Data was collected using a Reson 7101 multibeam system.

www.caris.com
Database Creation (Import)

- Multibeam Data from 1994 - 2009
  - Data from various CHS Vessels
    - Matthew, Creed, Pipit, Plover
  - Collected using different sensors
    - em710, em1000, em3002
  - In surface formats (5m or 10m res.)
    - *.csar, *.hns, *.hcs, *.bag

Native Formats:

Import > Open > Validate > Commit

Database Creation (Import)

- Charted Soundings from 1960’s – 1990’s
  - Data from various Vessels
  - Collected using different techniques
    - Lead Line, SBES
  - In NTX format (Chart resolution.)

None Native Format:

Import > Open > Validate > Commit
Database Creation (Import)

- **3rd Party Soundings**
  - Data from various Vessels
  - Collected using different techniques
  - In a variety of formats and resolutions
    - CRS, GSF, HOB, HTF, HYD93, LAS, MDF, NTX, PFM, RDP, XYZ, ASC
  - Example XYZ of UNB used

None Native Format:
Import > Open > Validate > Commit
- Issues Found
  - Depth Units
  - Tides / Vertical Datum
Committing to Database

- Transfer of data to RDMBS Database
  - Surface and/or Point Cloud
  - Bounding Polygon
- Transfer and Addition of Metadata

- Available Metadata
  - HIPS BASE surfaces
  - NTX file header information
  - XYZ files metadata

- Metadata in Database
  - Customizable attribute model
  - Can link to external metadata

CHSDir

www.caris.com
Metadata

- Appropriate Metadata needs to be available to describe data source
  - HIPS BASE surfaces contain metadata that is available in Bathy DataBASE
  - NTX file header information can be retained and used as a metadata
  - XYZ files may contain metadata that can be carried across on import

- Bathy DataBASE also allows additional Metadata to be added when committing new source
  - Customizable attribute model
  - Can link to external metadata
    - CHSDir

Tidal Issues

- HIPS data from 1994, 1999 and 2006 used a combination of predicted and observed tides
- HIPS data from 2007 onwards used GPS heights
- NTX soundings were already reduced to Chart Datum (LAT)
- XYZ data from the Heron surveys was reduced to Chart Datum
- The result was discrepancies between the datasets making seamless analysis impossible

1996 survey on top of 2007
Usage, Client Requests

• Parks Canada
  – Request for highest resolution possible for all the Bay of Fundy Data.
  – Combined 10m grid exported as GeoTIFF image

• National Research Council (NRC) Canadian Hydraulics Centre
  – Request for gridded data for Bay of Fundy including Minas Passage
  – Combined 10m grid as points

• Other frequent request include Contours or Soundings of an area in Shape file format
Resolving the Tidal Problem

- Dr. David Dodd while at UNB (now at CHS Central) carried out a project for the Geological Survey of Canada to provide a common datum for Multibeam data for the Bay of Fundy.
  - Tide gauge and GPS height comparisons were conducted using specifically developed MatLab routines
  - Multibeam data was re-processed using CARIS HIPS
  - 5m BASE surfaces were created relative to the ITRF Ellipsoid
  - Transformation model used to convert to MSL

- The resulting surfaces were not available for use in this pilot project but it is envisioned that they could be added later although a transformation to LAT may be required
Conclusions

• It is viable to use CARIS Bathy DataBASE to:
  • Easily manage the disparate datasets.
  • Efficiently retrieve data required for clients’ requests
• Tidal discrepancies can, but still need to be resolved
• Deliverables from surveys could be revised to include GPS heights.
• Previous data deconflicted by Dr. David Dodd could serve as a basis for the seamless surface.

Recommendations

• Revise expected deliverables from future survey missions to aid smooth ingestion into Bathy DataBASE including use of GPS height information
  - Consider breaking down surfaces by vessel and / or region
• Consider using Dave Dodd’s ITRF 5m surface as starting point for Bay of Fundy Database and append as new survey data becomes available
  - This could require a transformation to LAT (currently MSL)
  - Alternatively store surfaces referenced to ITRF Ellipsoid
    + PRO = Perform transformation to client required datum on export
    – CON = The z-values in the map window won’t be logical which may make validation difficult
Acknowledgments

- Dr. David Dodd, University of New Brunswick (now at CHS Central)

- Ron Macnab, Geological Survey of Canada (Retired)

BDB Workshop

This Afternoon
15.40 – 17.25
Salon 27