Database Driven Bathymetry

NOAA Open House on Nautical Cartography

July 7, 2017
Silver Spring, Maryland, USA

Derrick R. Peyton
Overview

- Cartographic Challenges
- Past/Present Approaches
- Database Drive Approach
- Community of Practice
- Challenges
Cartographic Challenges

Problem Definition

“Among the proposed boater-friendly changes in the National Charting Plan, according to Shingledecker, are more frequent chart updates – weekly, instead of long intervals, and the better integration of data with other agencies such as the U.S. Army Corps of Engineers and the U.S. Coast Guard, which could mean integrating the latest channel depths and aid to navigation positions. The plan also allows NOAA to focus attention on underserved waterways, such as resolving chart discrepancies in areas of importance to recreational boaters.”

“We see a more efficient chart production that allows more frequent updates of obstructions, discrepancy resolution and exploration of using crowd-sourced data,”

Problem Definition

This year, Admiral Smith would like to join you in a discussion focused on “Charting Challenges,” encompassing challenges associated with charting from the compilation of the chart to final shipboard and small vessel presentation and display. Tours of the Center and

Larry Mayer
Director, Center for Coastal and Ocean Mapping
Co-Director, Joint Hydrographic Center
Present Approach
More demand... More data....

Photo courtesy: CHS
Present Approach

Paper Chart

ENC

NEW PATHS, NEW APPROACHES
Less than perfect

**Stretched**

Technologies
Formula!!!!

$\text{Charting}^{2017} = f (\text{Hydrography, Cartography, Oceanography})$
NEW PATHS, NEW APPROACHES

Multi Sources …. Multi Products

Paper & Raster Charts

ENCs

Bathymetric Database

Hydrographic Database

Oceanographic Database
More than just nautical charts

GeoPortal (supporting MSDI)

Bathymetric Database

Hydrographic Database

Oceanographic Database
Bathy Database Workflow

Source Data Load
   (load survey results and mandatory meta data)

Meta Data Population
   (load survey surface meta data)

Source Data Integration
   (surface cleaning & comparisons, find gaps, interpolate)

Source Data Validation
   (check meta data, surface objects, visual check)

Product Surface
   (create bathy surface)

Combined Surface
   (create final bathy surface from surfaces)

Depth Contour Interpolation
   (interpolate / generalize)

Survey Object Creation
   (wrecks, coastline, obstructions)

Sounding Selection
   (sounding selection)

Export data
   (prepare for product database)
Product Database Workflow

Source Data Load
(from bathy database or S57 files, shape files, etc)

Source Data Integration
(harmonization, generalization, final sounding select)

Source Data Validation
(validation checks, visual checks, certification)

New ENC
(create ENC, add product specific features, certify)

New Paper Chart
(create chart, add cartographic features)

Source Data Update
(load new source, apply corrections, create NtM, certify)

ENC Update
(apply changes to ENC, validate, certify, update exchange set)

ENC New Edition
(apply changes, validate, certify, export new ENC edition)

Paper Chart New Edition
(apply changes, validate, cartographic edits, certify, export new chart)
Bathy and Product Database Overview

NEW PATHS, NEW APPROACHES
Field Database Deliverables

Remote Connection
Or
Database Extraction

Field Survey
NEW PATHS, NEW APPROACHES
Community of Practice
Training and Education

INTERNATIONAL FEDERATION OF SURVEYORS

INTERNATIONAL HYDROGRAPHIC ORGANIZATION

INTERNATIONAL CARTOGRAPHIC ASSOCIATION

FIG

ICA

ACI

STANDARDS OF COMPETENCE FOR CATEGORY "A" HYDROGRAPHIC SURVEYORS

STANDARDS OF COMPETENCE FOR CATEGORY "B" HYDROGRAPHIC SURVEYORS

STANDARDS OF COMPETENCE for Nautical Cartographers

Publication S-5A
First Edition
Version 1.0.1 - June 2017

Publication S-5B
First Edition
Version 1.0.1 - June 2017

Publication S-8
Third Edition
Version 3.1.0 - December 2014

NEW PATHS, NEW APPROACHES
Canadian Ocean Mapping Research and Education Network (COMREN)
Perform Survey
- Clean data (as automatically as possible)

Bathymetric Database processes……..
- Store result in bathymetric database as a single “master product surface” using variable resolution (dense inshore, sparser in deeper water). Older data gets superseded at this point.
- Generate contours and selected soundings in at the largest required scale
- Identify shoals, wrecks, other features of interest

Product Database processes…..
- Load up generated product sources (contours, soundings, other features) into Source Database
- Update the products based on those sources
It’s not perfect… yet.

Challenges

- Quality Control
- Workflow Processes
- Monitoring
- Education and Training
- Certification
Thank you!