

Crowdsourcing Swath Bathymetry

6th Crowd-Source Bathymetry Working Group (CSBWG6) Meeting
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R. Glenn Wright

GMATEK, Inc.

GROUND MARITIME AEROSPACE TECHNOLOGIES

Annapolis, Maryland USA

Crowdsourcing Swath Bathymetry

Developing a low cost solution to crowd sourcing swath bathymetric data from 3D forward-looking navigation sonar.

- Project began in 2013 as research at World Maritime University, Malmö, Sweden.
- Swath hydrography data acquisition technologies were demonstrated and validated in 2014-2016.
- Initially presented at CSBWG-4 in February 2017.
- Transitioned to GMATEK in 2017.
- Update – June 2018...

Project Goals

- Enhance real-time situational awareness below the waterline for Hazard to Navigation avoidance in poorly surveyed and charted Polar and other waters.
- Provide bathymetry to verify characteristics of virtual (non-AIS) aids to navigation as watching properly in remote and inaccessible locations.
- Make available high-resolution swath bathymetry for crowdsourcing to supplement national hydrographic survey resources.
- Expanded to crowdsourcing Hazard to Navigation position/characteristics using automated detection and identification with side-scan sonar (2018).
- Potential application to fisheries management (2018)

The Opportunity...

- Approaches the problem as a big data issue involving local (on-vessel) computer (Smartphone) resources to initiate algorithms for data analysis and transmission of data off-vessel.
- Potential thousands of vessels of opportunity among fishing, yachts, expedition, cruise and utility vessels worldwide, and especially in the Polar regions.
- Payback for vessels of opportunity and crews:
 - Social media postings of recent events and findings,
 - Website access to swath coverage provided by other vessels they may find useful in their own voyages,
 - Tax credits for sourcing swath bathymetry.

Technical Challenges

- Navigation Sonars (solved, COTS).
- Global Broadband Connectivity (solved).
- Bathymetry Acquisition (solved locally, need large scale demonstration in the Arctic).
- HtoN Detection/Identification (in development).
- Fisheries (future).
- Add Navigation Sonar to Polar Code (MSC100, Dec 18)

Funding

- Machine Learning/AI-based HtoN (Funded)
- CSB-based Virtual (non-AIS) Aids to Navigation (Bering Strait Port Access Route Study - Pending)
- CSB-based Tactical Aids to Navigation (Arctic - Pending)
- Core Swath CSB Technology (Resubmission to NSF)

CSBWG6 Topics of Particular Interest

Agenda Items

4. Member State Data Gathering Policy (Day 1)
 - Arctic, in particular (e.g., Sweden) and general interest.
5. Outreach Strategy (Day 2)
 - Tax incentives for CSB providers.
7. Recognition Strategy (Day 2)
 - Trusted Node criteria?
8. Potential Uses of CSB: Hydrographic Offices (Day 3)
 - CSB S-100 product specification S-1xx.
9. Close – Other Business (Day 3) **POLAR CODE UPDATE**
 - Reintroduction of Navigation Sonar as a carriage requirement (1 of the 2 echosounders having forward-looking capabilities).
 - IMO acknowledgement of the need for CSB in the Arctic.

Navigation Sonar Project

NavSonarProject.com

- **Safety of Navigation**
- **Virtual (non-AIS) Aids to Navigation**
- **Crowdsourced Bathymetry, HtoN, Fisheries Data**

Contact Information: **R. Glenn Wright**

GMATEK, Inc.

3 Church Circle, Suite 266
Annapolis, MD 21401 USA

glenn@gmatek.com

Tele: +01-443-951-8001