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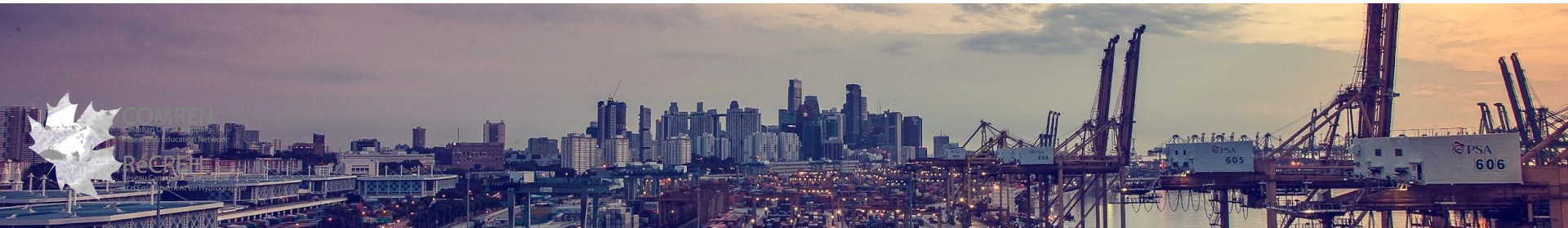


Enabling MASS Situational Awareness Through Autonomous Monitoring of the St-Lawrence Seaway Using Trusted Crowdsourced Bathymetry



Context

The emergence of Maritime Autonomous Surface Ships (MASS) represents a unique opportunity in terms of instrumentation and collaborative hydrospatial data acquisition techniques. This project aims to leverage trusted collaborative bathymetric (TCSB) acquisition techniques to build an operational framework for situational awareness technologies to facilitate the implementation of MASS technologies.



R & D Axes

Enabling MASS technologies

The emergence of next-level autonomous shipping vessels brings about new opportunities in terms of data collection and collaborative data acquisition.

Situational Awareness

Fleets of opportunity vessels can be turned into data-acquisition platforms to build a common map.

Autonomous monitoring

Channel monitoring can be mostly automated using the channel's traffic.



Trusted Crowdsourced Bathymetry

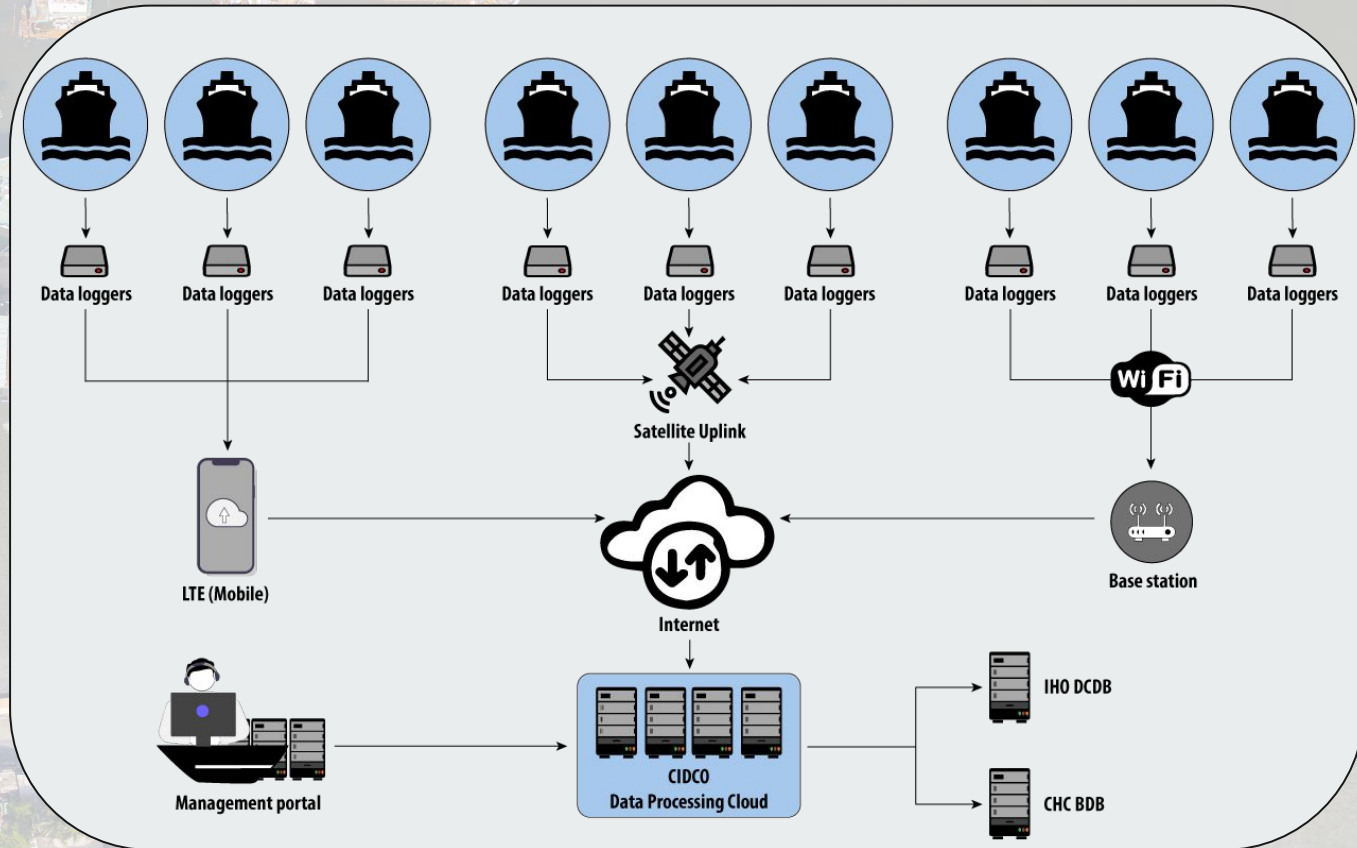
HydroBlock dataloggers can provide intelligent recording capabilities and smart uploading to cloud-based processing infrastructures.

Satellite-derived bathymetry

Implement an early warning system for quick detection of collapsing walls and hydrodynamic scour problems.

System components

- Opportunity Vessels
- Dataloggers
- Automatic data transmission
- CSB-Cloud processing backend
- CHS/DCDB dissemination
- Value-added data products
 - AIS
 - SDB





Project Partners

Opportunity Vessels

- CHS-approved installations will travel the St-Lawrence seaway's channel
- Regulation-compliant installation by professional marine electricians
- Installations pending approval in 2 Relais Nordik ships
- Cornerstone of the TCSB aspect of the project



Dataloggers

- Open-source HydroBlock dataloggers
- New smart logging capabilities
 - Speed-based
 - Explore other triggers
- New smart transfer capabilities
- Secure transfers
 - Encrypted
- Bandwidth-efficient transfers:
 - Differential
 - Block-based
 - Compressed



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Automatic Data Transmission

- Multi-mode data transfers
 - WiFi
 - Mobile
 - Satellite
- Leverages the hydroblock's secure and efficient data transfer stack
- Transparent to the end-user

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CSB-Cloud Processing Backend

- Cloud-based data processing and visualization platform
- Automated georeferencing raw data processing backend (UNB/CIDCO)
- Web portal to manage and display processed bathymetric products (CIDCO)



CHS/DCDB Data Dissemination

- Automatic uploads
- Leverages the hydroblock's secure and efficient data transfer stack
- Transparent to the end-user



Added-value data products

AIS Anomaly Detection

- Analyse AIS traffic to spot anomalies
- Multiple possible data sources:
 - AIS receiver
 - Radarsat Constellation Mission
- Proof-of-concept of an early-warning system
- Send notifications to the backend

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The logo for York University, featuring the word "YORK" in a large, black, serif font, with "UNIVERSITÉ" and "UNIVERSITY" in a smaller, black, sans-serif font below it. To the right of the text is a large, stylized red letter "U" with a white outline.

Added-value data products

Satellite-derived Bathymetry

- Combine Multispectral Sentinel data with TCSB data
- Use TCSB data as in-situ calibration source for satellite-derived bathymetry
- Explore applications as early-warning system for channel-depth alarms

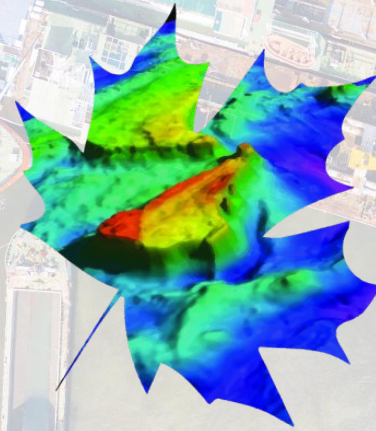




Next Steps

Confirming your participation

- **Expectations**
 - Everyone gets what they asked for in terms of budget.
 - Everyone puts in what they committed to.
- **Agree to follow the COMREN values**
 - Collaboration
 - Benefit the community
 - Open science
 - Open data
 - Open source
- **Sign the collaboration agreement that you will receive shortly**



COMREN
Canadian Ocean Mapping
Research & Education Network

RéCREH
Réseau Canadien de Recherche
et d'Enseignement en Hydrographie



Thank you

For further info, please contact
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