

# Crowd Sourced Bathymetry

Operationalizing the concept – moving from prototype to full scale  
deployment



# OFM – Who we are and our approach

## Mission

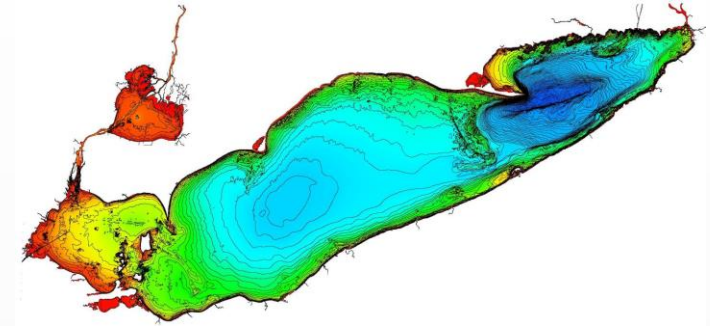
The goal of Orange Force Marine is to provide safe, professional, cost effective & efficient commercial vessel services and maritime operations expertise, while improving mariner competency, reducing risk and enhancing safety of life at sea through education & training.

## Background and Qualifications

- Marine services and operational expertise
- Hydrographic & Bathymetric Survey
- Specialized marine technical services
- Marine Project Management
- *Canadian Navy and Coast Guard experience*
- *Search and Rescue expertise*
- *Training*
- Enterprise IT solution development
- IT project Management
- Enterprise Risk Management
- Utility and Infrastructure Inspection Data Management

# Lakebed 2030

- Extension of Seabed 2030, but focussed on Great Lakes
- Only 7% of Great Lakes surveyed to acceptable degree of accuracy
  - 100-2500m between soundings
  - Most surveys from the 1950-1960s
- Fully mapping via traditional survey means (MBES, LiDAR, SDB) has significant cost (\$130-\$200M)
- Crowd Sourced Bathymetry as an incremental, contributing option



# GLOS Project Scope and Timelines

## Mission

Take a system integrator approach to implement a CSB solution to:

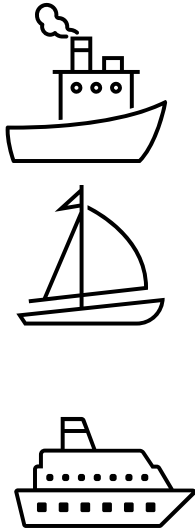
- Gather and process CSB data
- In near real time
- In an automated manner
- Format data for use by GLOS
- Format data for submission to IHO DCDB

## Timelines

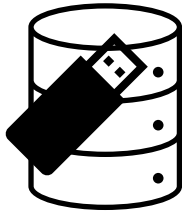
- 2021
  - Development Prototype
  - Pilot – Spring (2 Vessels)
- 2022
  - Development v2
  - GLOS Rollout (Additional 10)
- 2023
  - Additional Trusted Node Instances
  - Rollout outside of the Great Lakes
  - Development v3
  - GLOS Rollout (Additional 10)

# CSB pipeline ecosystem

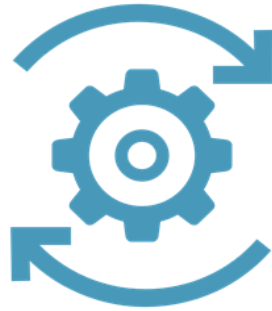
## Participating Vessels



## Data Collection



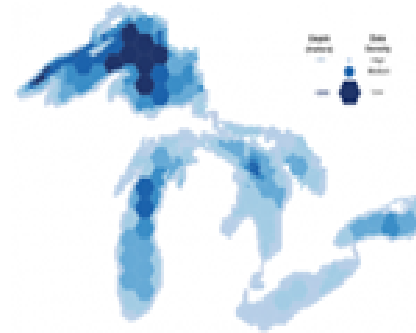
## Processing and Auto Analysis



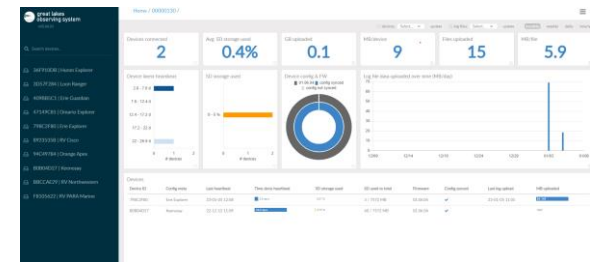
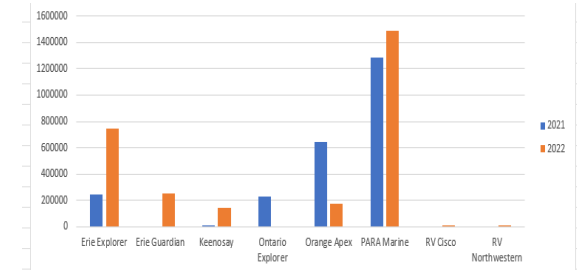
## Data Consumers



## Visualization and Tools Partners



## Reporting & IoT Management



# Solution Benefits

## Data Collection

1. Mussel kit
  - a. Non intrusive install
  - b. Industry proven data logger
  - c. IMU (optional)
  - d. local storage
  - e. data transfer communications (Wi-Fi / cellular) without operator intervention
  - f. Message filtering is optional.
  - g. Remote management of IoT devices
2. IHO Quality levels (verified against existing data sets)



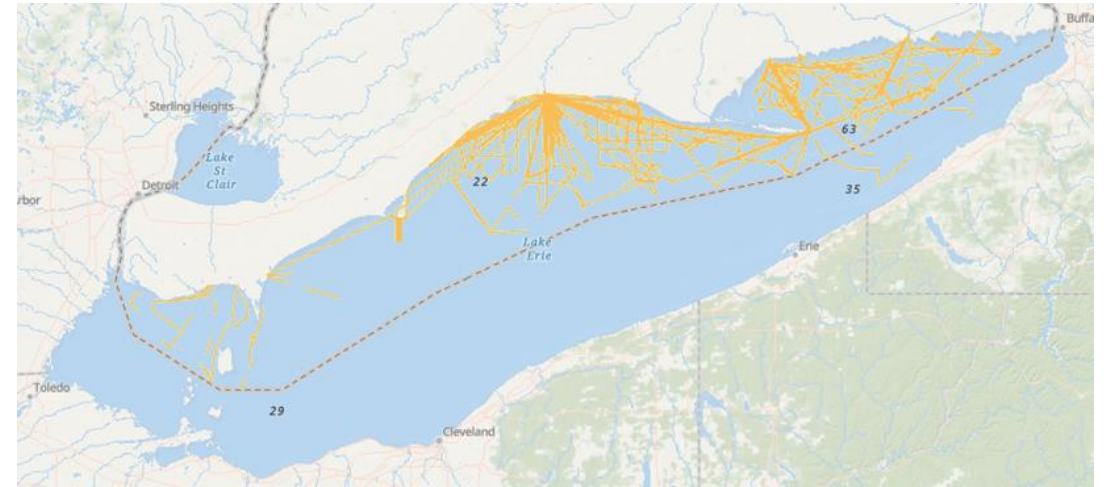
## Processing and Analysis Environment

1. Pre-deployed cloud environment
2. Configurable for multiple IHO Trusted Nodes
3. Quality Control data checks
4. Automated processing pipeline to convert data formats
5. Automated transfer data for various external uses
6. Data management processes and archive
7. Dashboards and metrics
8. Fully auditable workflow

# Successes - Statistics

In 2 Great Lakes boating seasons:

1. 12 participating vessels across various US and Canadian government and industry organizations
2. Data collected on 3 of the 5 Great Lakes (Lake Michigan started fall in 2022)
3. 5.7M depth records collected & sent to IHO DCDB
4. 1600 sea hours
5. 13,500 nm travelled



# Operational Successes and Challenges

## Successes

- Able to get vessels online quickly
  - installed and offset measurements
- Monitoring and managing the fleet

## Challenges

- Vessel equipment age and configuration status
- Vessel electronics complexity – from single to multiple devices
- GNSS coverage areas and quality signals
- Emerging – variable drafts on freighters



# Sample of Participating Vessels (types)





# Successes - Datasets from 2021-2022



Review Data in  
Terradept-Absolute  
Ocean



# Next steps



Continued innovation



Increase #  
Trusted Node Pipeline  
Instances



Continued Integrations



Increase #  
geographic areas



Support the industry



Increase #  
participating vessels

# Questions, Discussion & Contact info



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