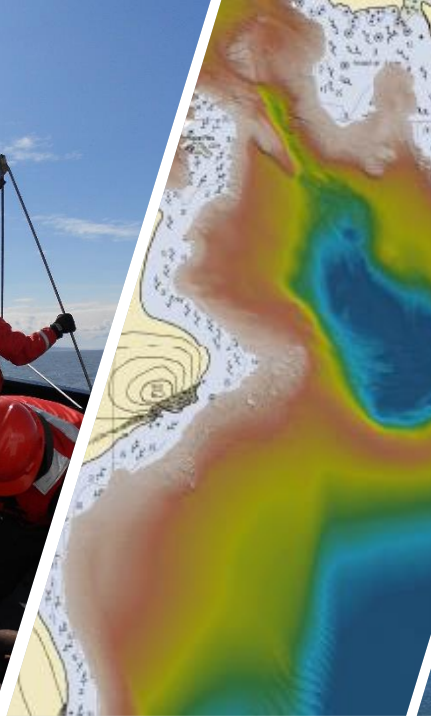
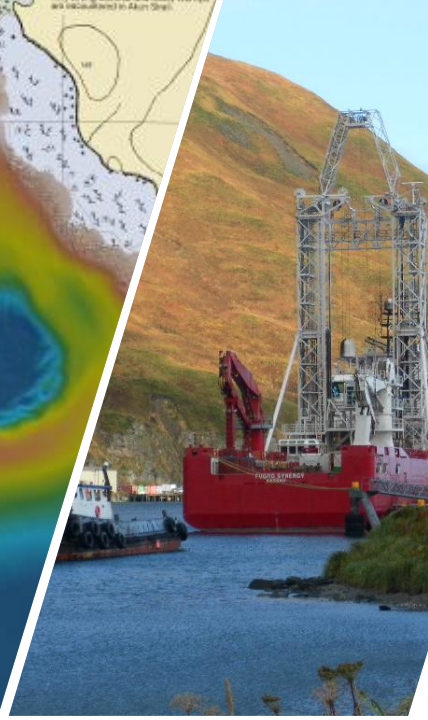
Technology Integration for Coastal Mapping Success

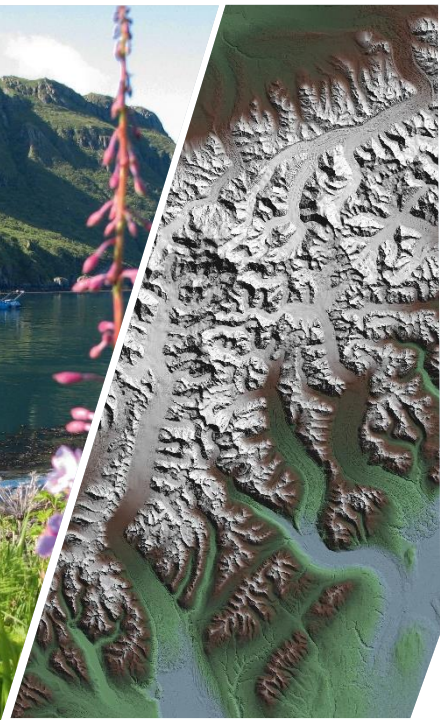
2018 Alaska Coastal Mapping Summit

We are Fugro





We collect data on topography, soil composition and environmental conditions, both on and offshore. We organize the acquired data and add value through processing, interpretation and visualization.



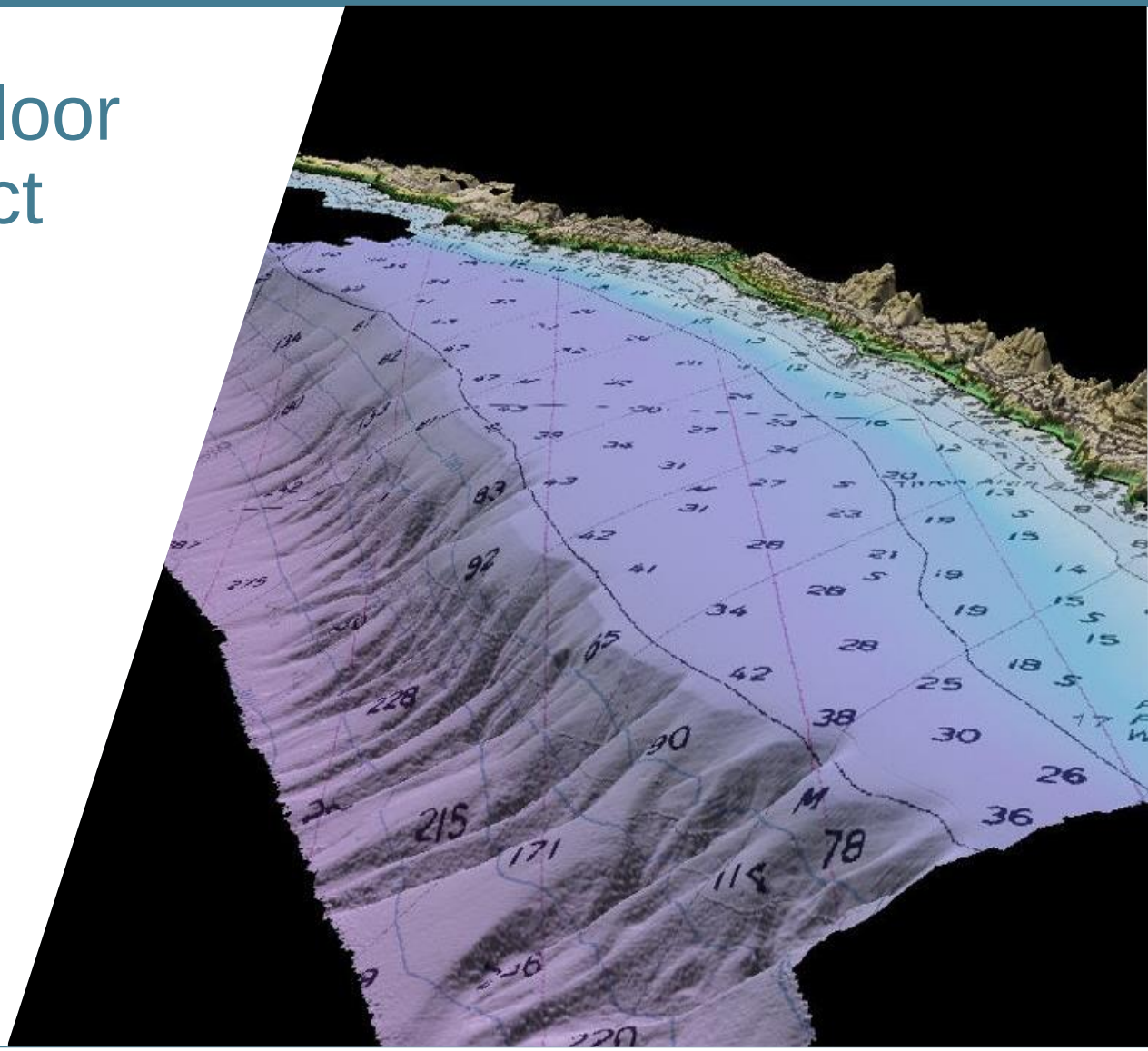
33,904 miles of shoreline

Coastal mapping requires multiple types of data:

- Nearshore
- Shoreline
- Coastal elevation

California Seafloor Mapping Project

- Multi-year effort made possible through a partnership model
- Dedicated to producing high-resolution geologic and habitat base maps for all CA waters while also updating nautical charts
- Benefitted multiple stakeholder groups



Largely uncharted territory

- Extreme weather
- Remote locations
- Short field season
- Limited tide/base stations

Integrated technologies offer time, cost, and safety benefits

- **Vessel:** multibeam echosounder (MBES)
- **Aircraft:** airborne lidar bathymetry (ALB)
- **Satellite:** satellite-derived bathymetry (SDB)

Multibeam echosounder (MBES)

Overview

Data resolution is dependent on the distance from the sensor to the seafloor. Coverage is typically 3-5 times the water depth. Works in turbid water.

Applications

- Nautical charting
- Infrastructure planning and inspections
- Dredging and volume computations
- Habitat classification
- Rate of change tracking

Experience

- Recently collected more than 1 million km² of high resolution bathymetry data per year in shallow and deep waters globally
- Extensive AK experience for public- and private-sector clients; NOAA charting projects dating back to 1999
- First company to deliver high-resolution seabed imagery from MBES backscatter for NOAA

Airborne lidar bathymetry (ALB)

Overview

Depending on water clarity, seabed type, and weather conditions, ALB maps in water depths of up to 70 meters.

Applications

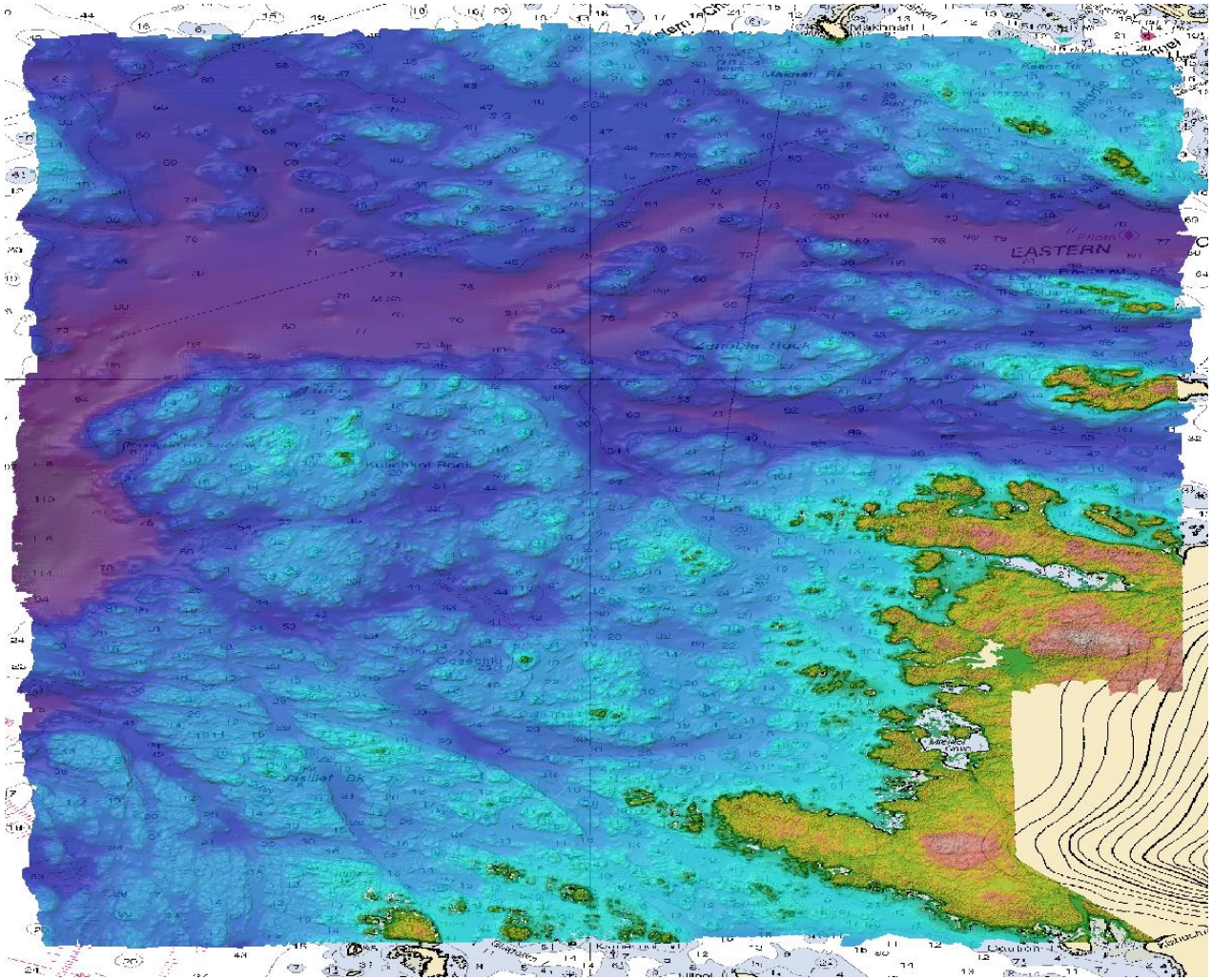
- Nautical charting
- Coastal zone management
- LOS/EEZ mapping
- Infrastructure planning and inspections
- Habitat mapping
- Rate of change tracking

Experience

- 25 years experience; 500+ ALB projects worldwide
- Multiple ALB projects in Alaska for NOAA
- First company to deliver ALB services to USACE, NOAA, and NAVO
- First company to use ALB for charting in the US
- First company to deliver ALB reflectance imagery
- First company to integrate ALB with MBES and topo lidar

Example: Combined topo lidar, ALB, and MBES

Sitka, Alaska
2004



Satellite derived bathymetry (SDB)

Overview

In optimal conditions, our SDB capabilities offer a vertical accuracy of 10-15% water depth, in depths up to 35 meters. Offers fast delivery of large, homogenous datasets.

Applications

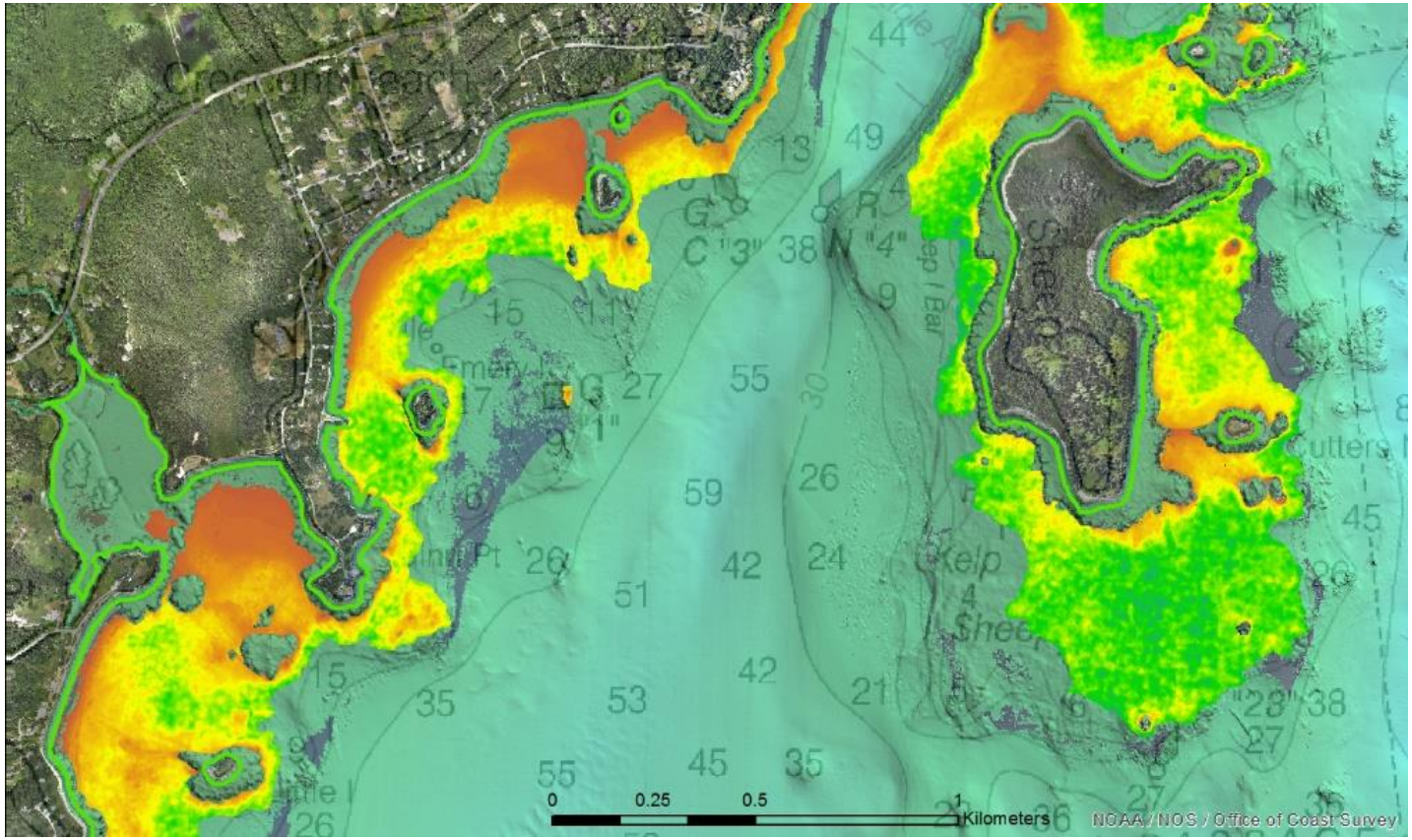
- Coastal zone mapping
- Reconnaissance for high-resolution surveys
- Environmental assessments
- Environmental impact statements
- Seabed classification
- Change detection (erosion/accretion)

Experience

- 2015 teaming agreement with EOMAP, the leading global service provider of satellite-derived aquatic information in maritime and inland waters

Example: Combined SDB, ALB, and MBES

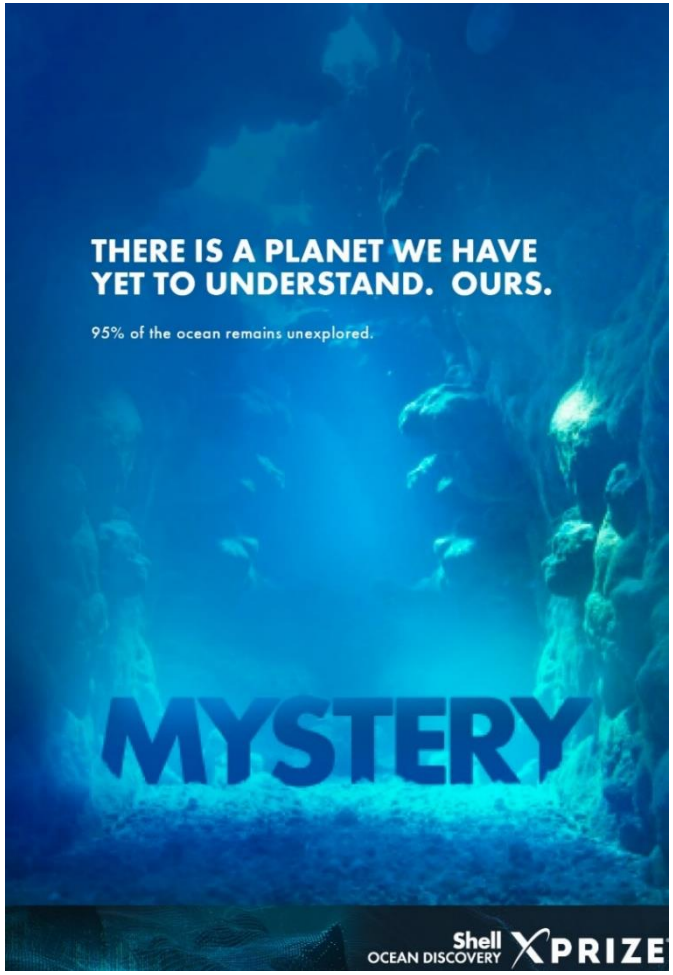
Penobscot Bay, Maine



What's next: faster, better, cheaper

Seabed 2030

Shell Ocean Discovery XPRIZE



FUGRO

5761 Silverado Way, Suite O
Anchorage, AK 99518
907 561 3478 / akprojects@fugro.com
www.fugro.com
Rada Khadjinova, Alaska General Manager