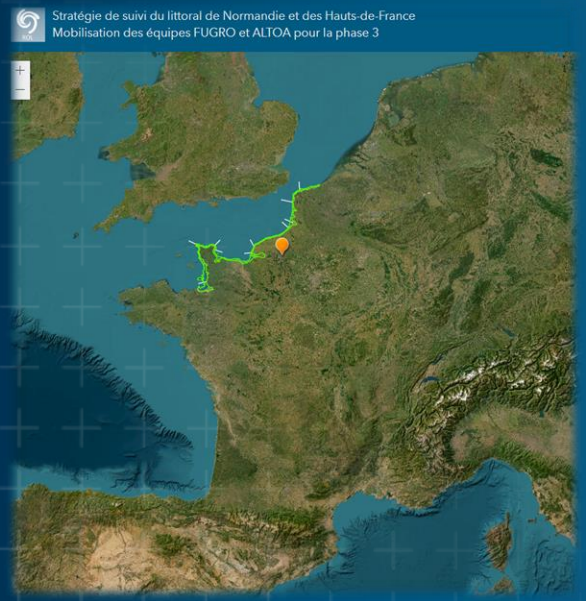
Fugro's ALB echo-system solution

Maximizing operation effectiveness and data quality within challenging coastal environmental conditions

Véronique JEGAT – November 28, 2023, JALBTCX, Kiln, Mississippi, USA

Normandy and Hauts-de-France Coastal Monitoring Strategy



ROL

RÉGION NORMANDIE

Région Hauts-de-France

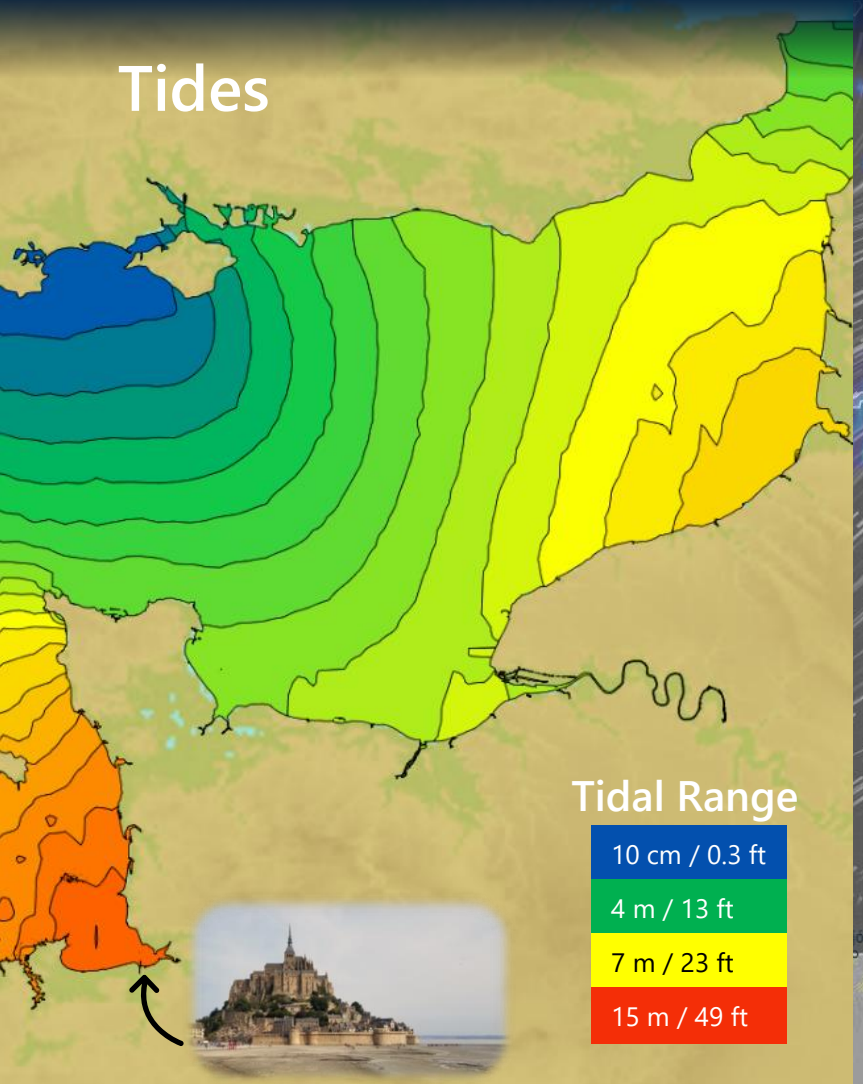
Conservatoire du littoral

MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET DE LA COHÉSION DES TERRITOIRES

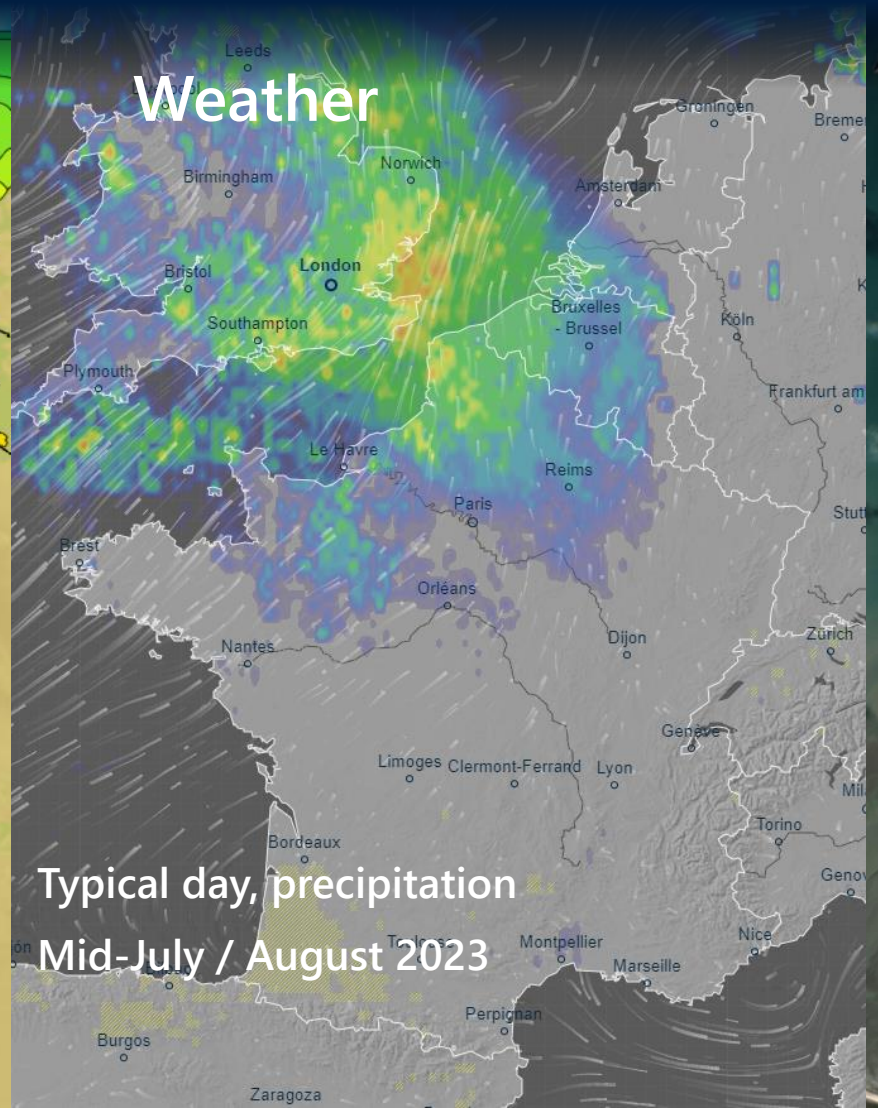
FUGRO

Challenges

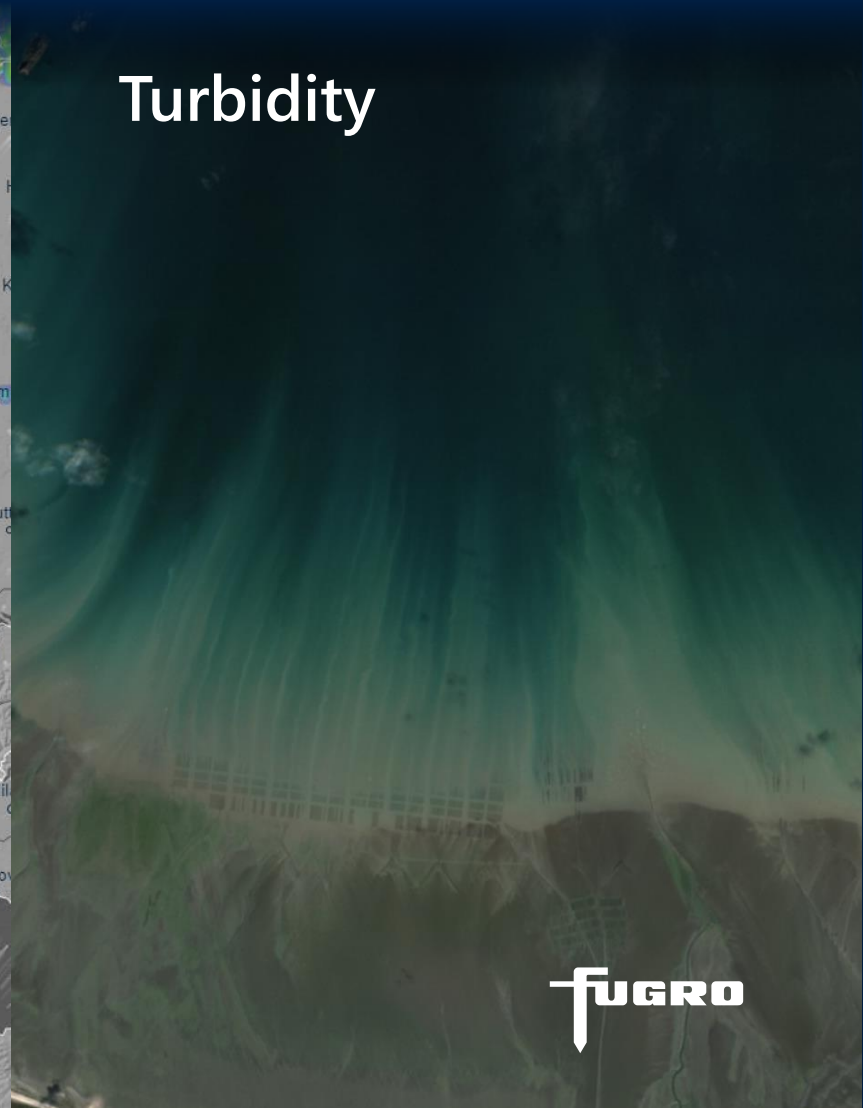
Tides



Weather

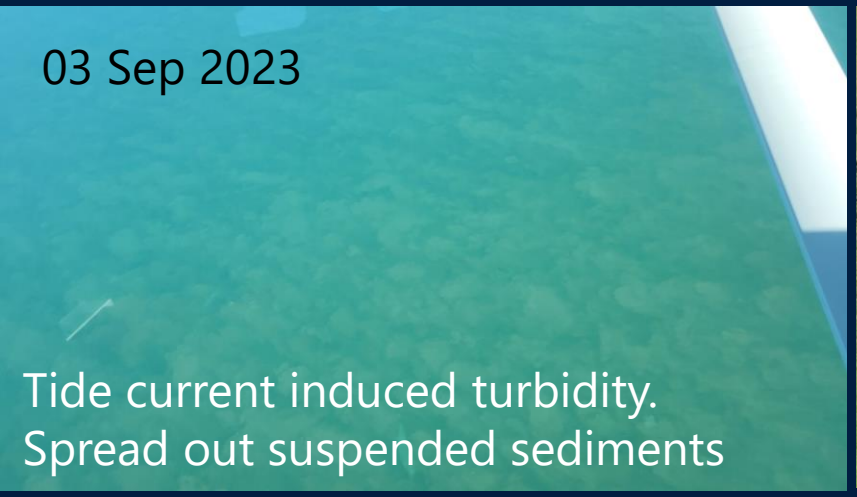


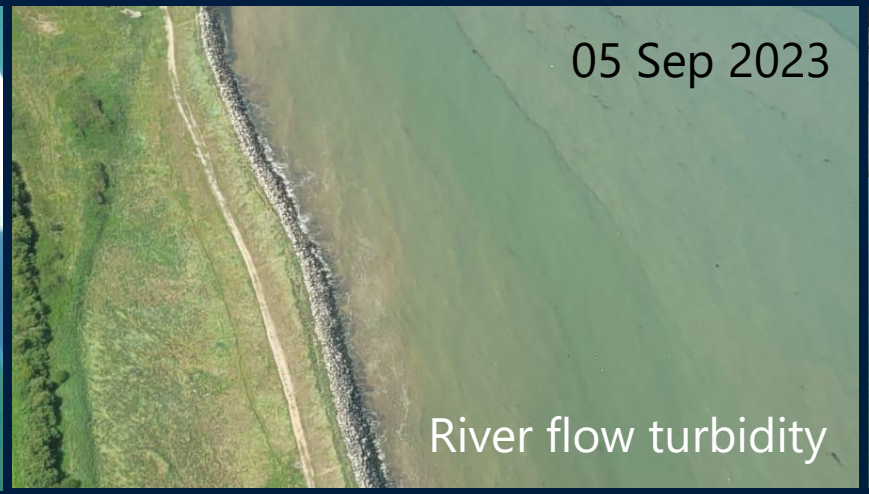
Turbidity

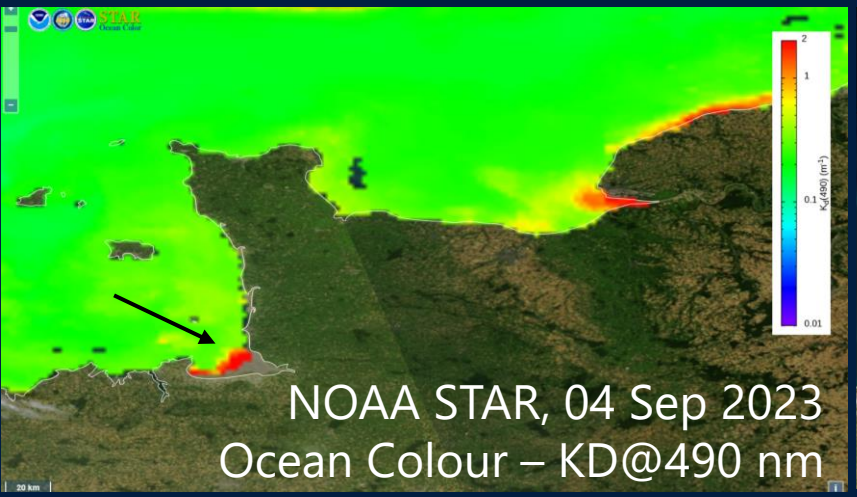


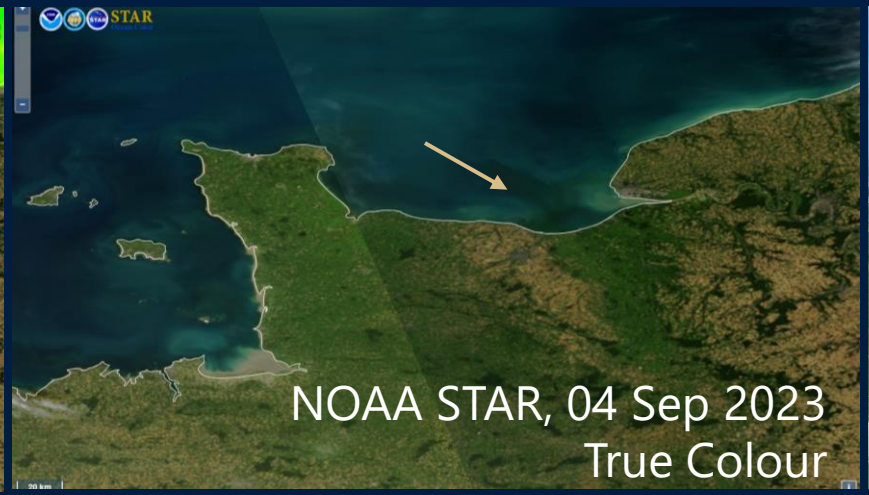
FUGRO

Site Observations



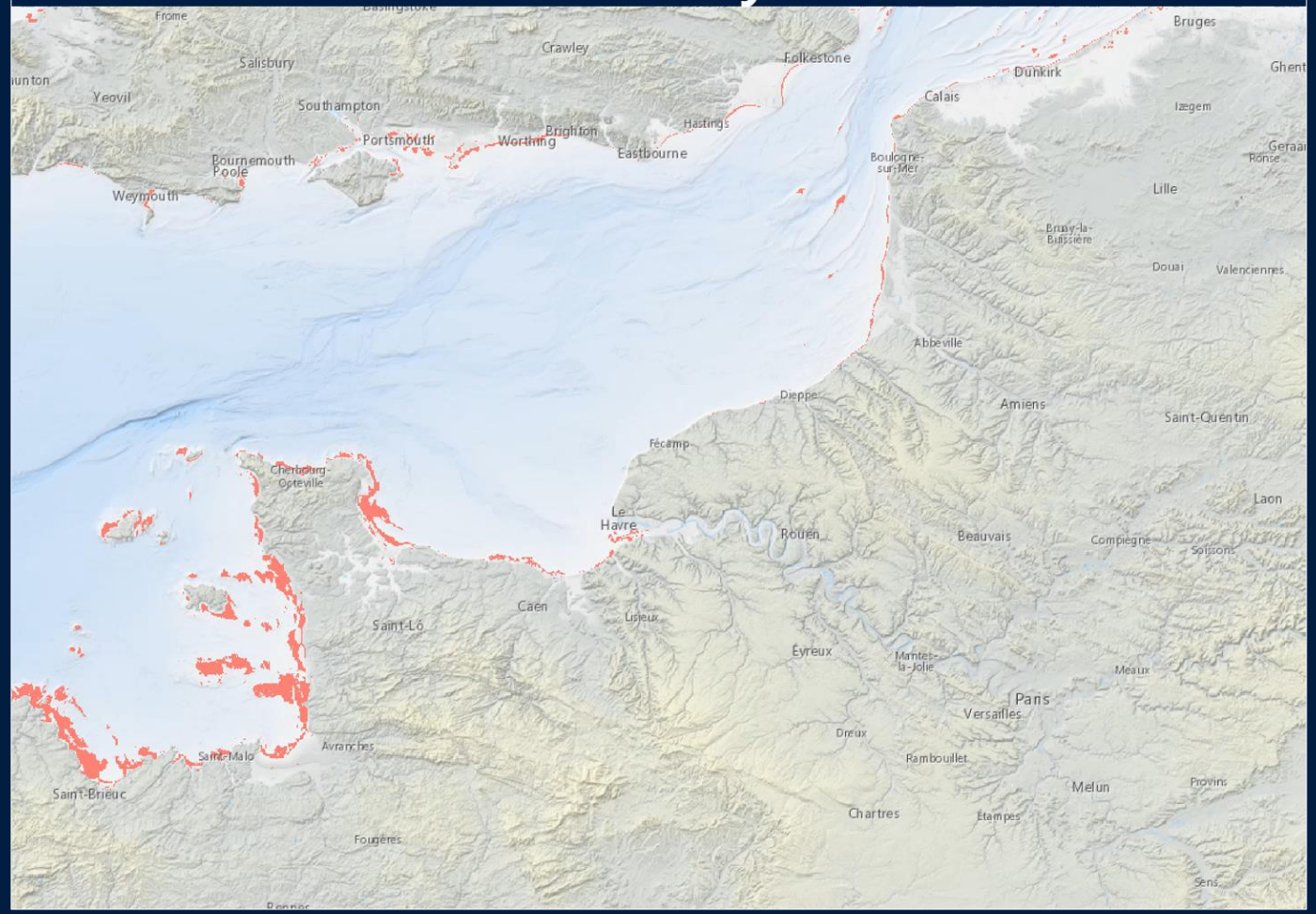


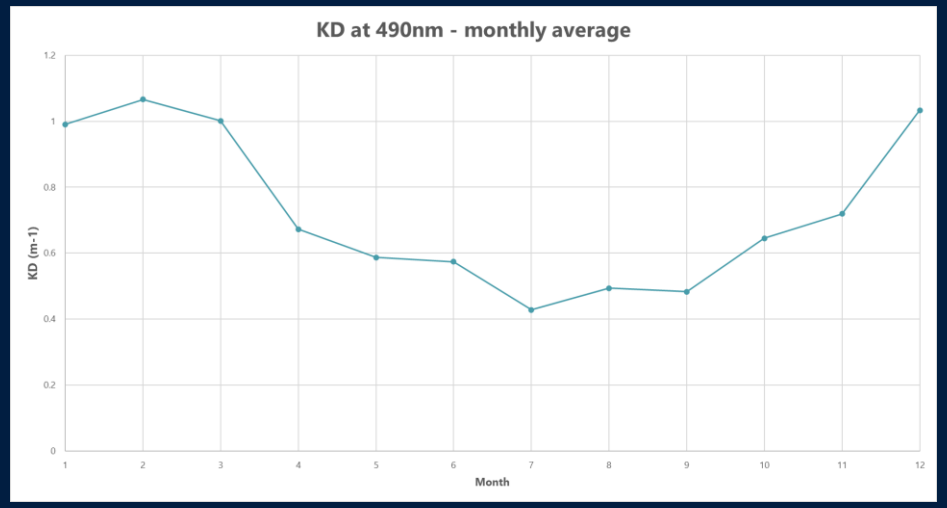


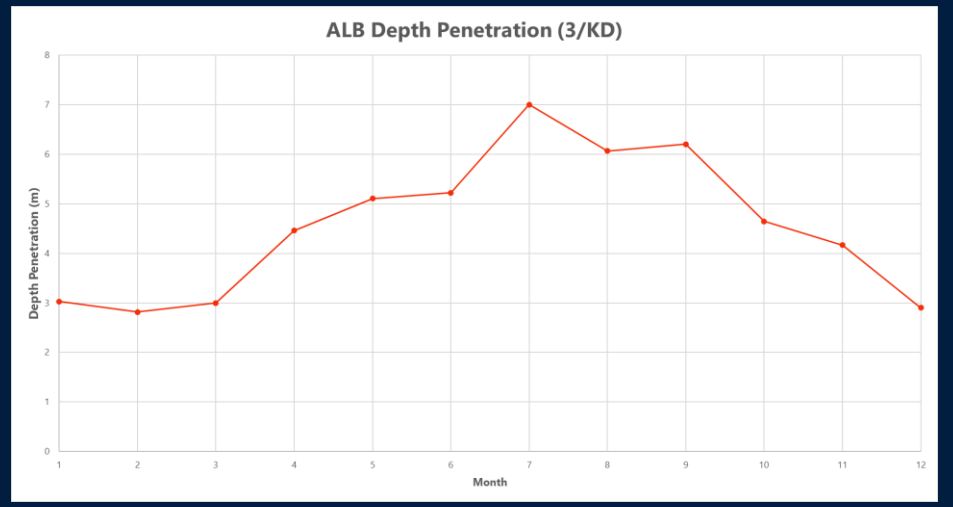


Pre-engagement leveraging from the SatAnalytic tool

January







RAMMS 2.0

Rapid Airborne Multibeam Mapping System

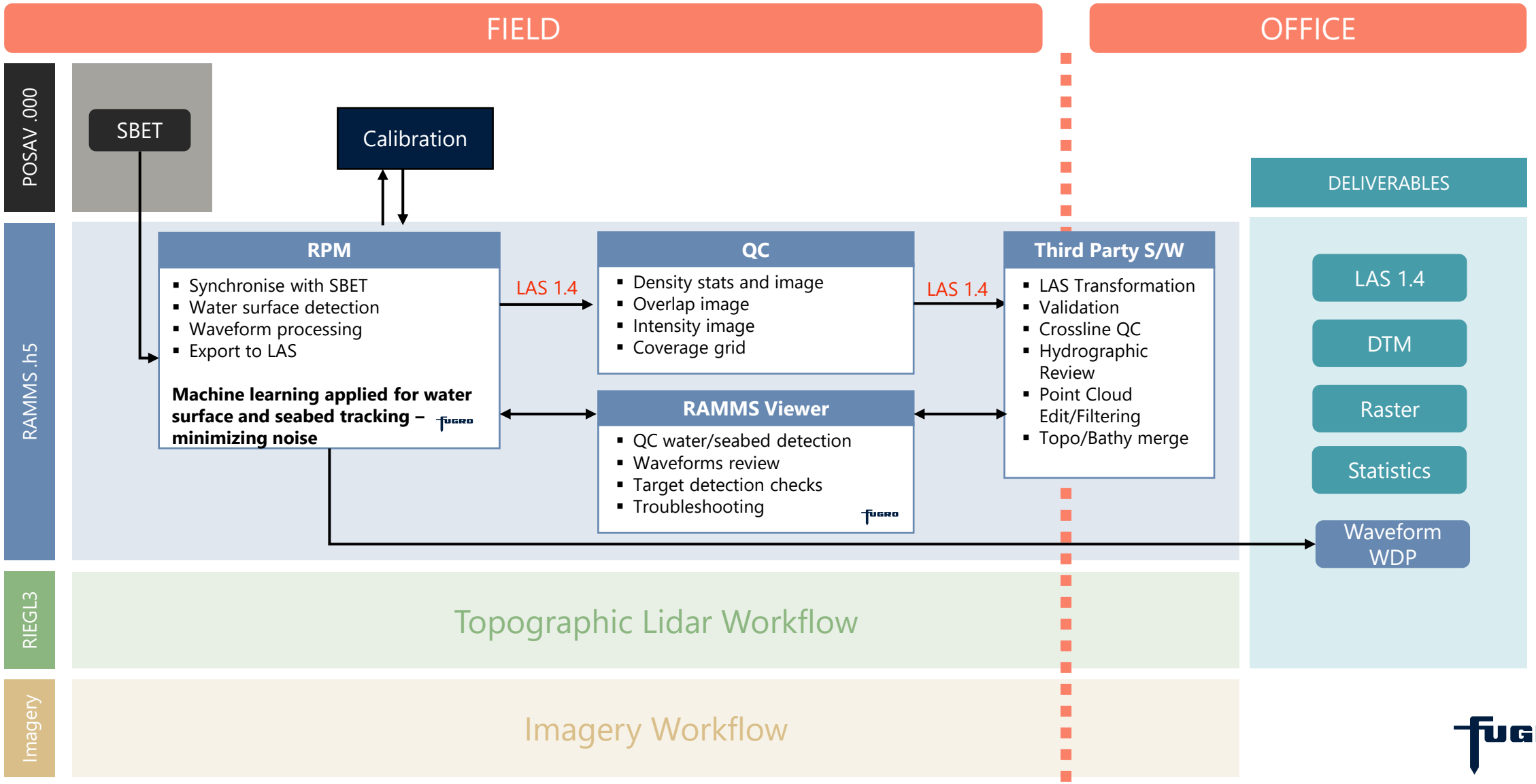
Enhanced 60 Hz / Machine Learning

Compatible with uncrewed solutions

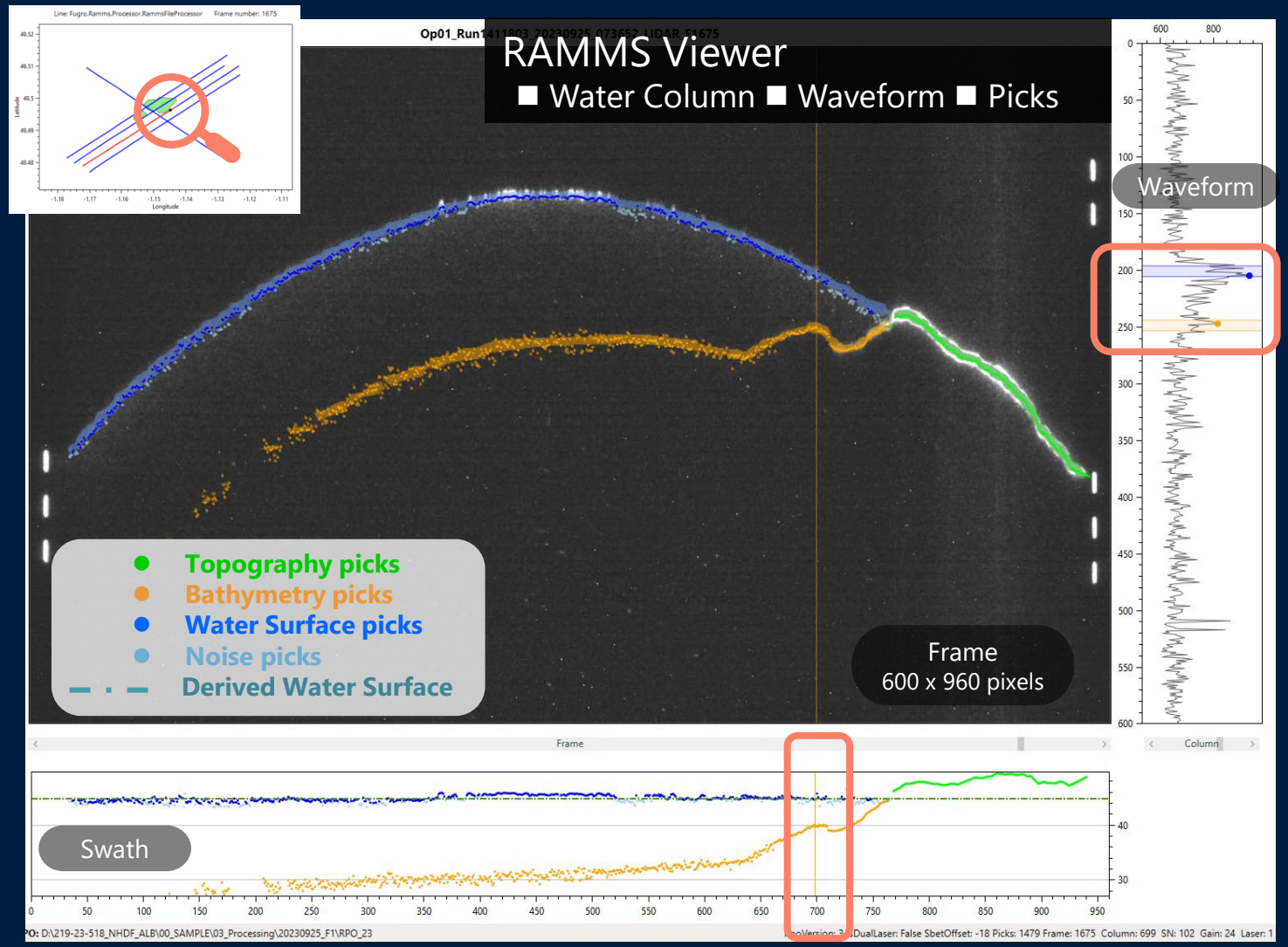
Dual lasers

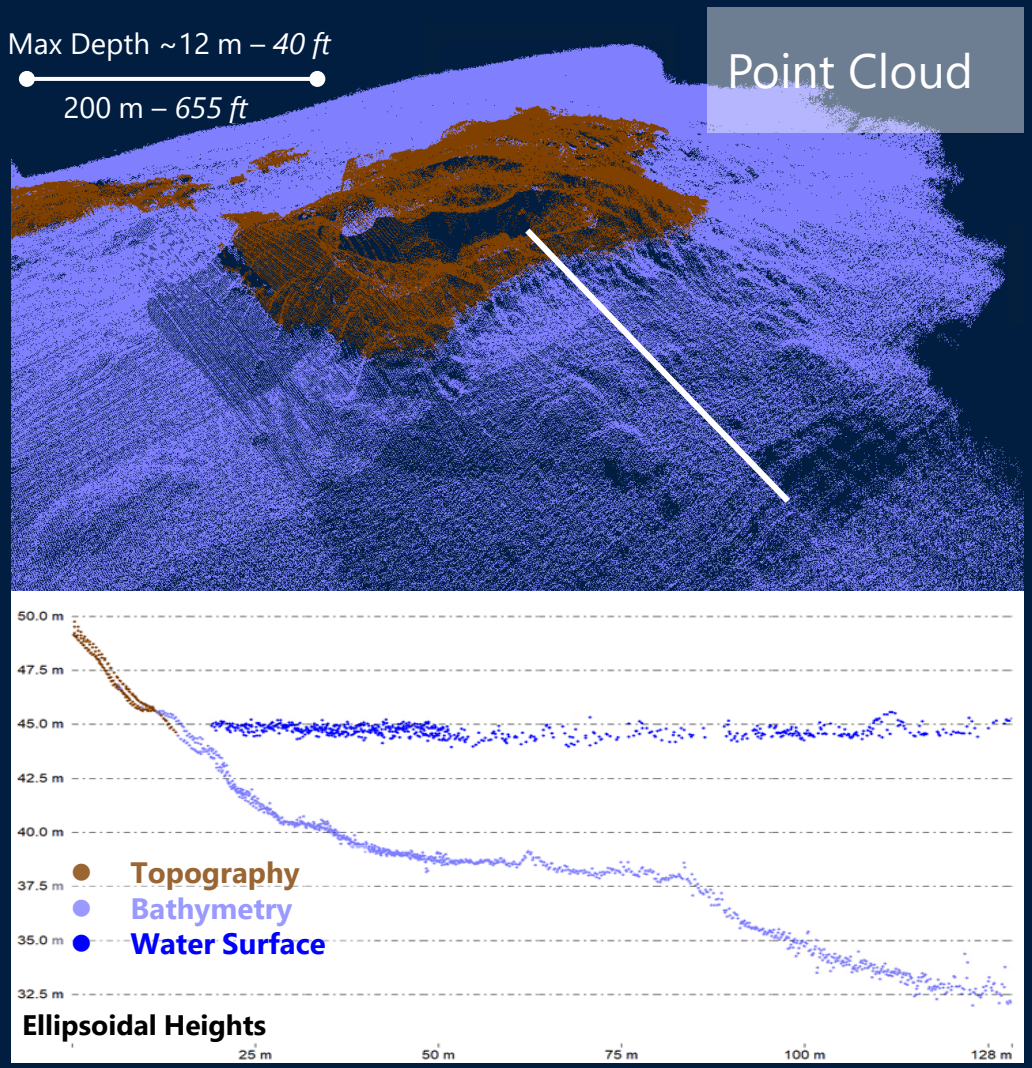
Full water column

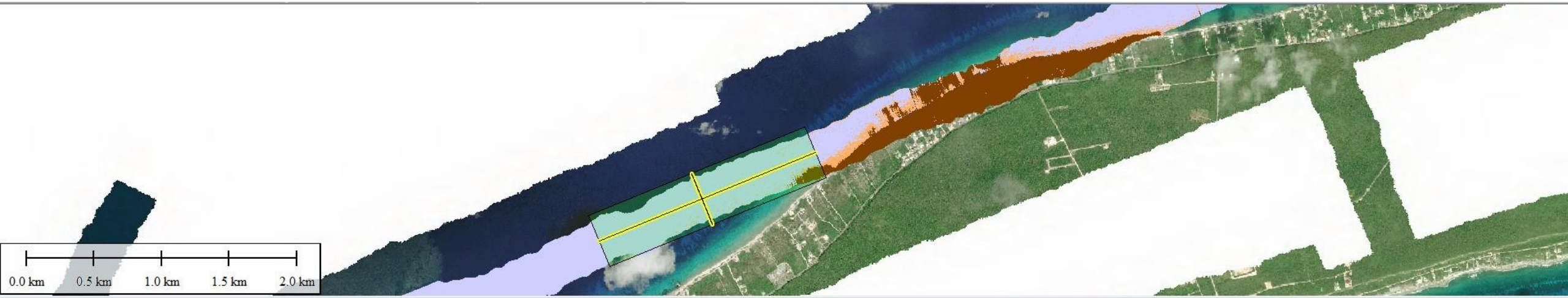
Simplified Workflow



Machine Learning Data Classification





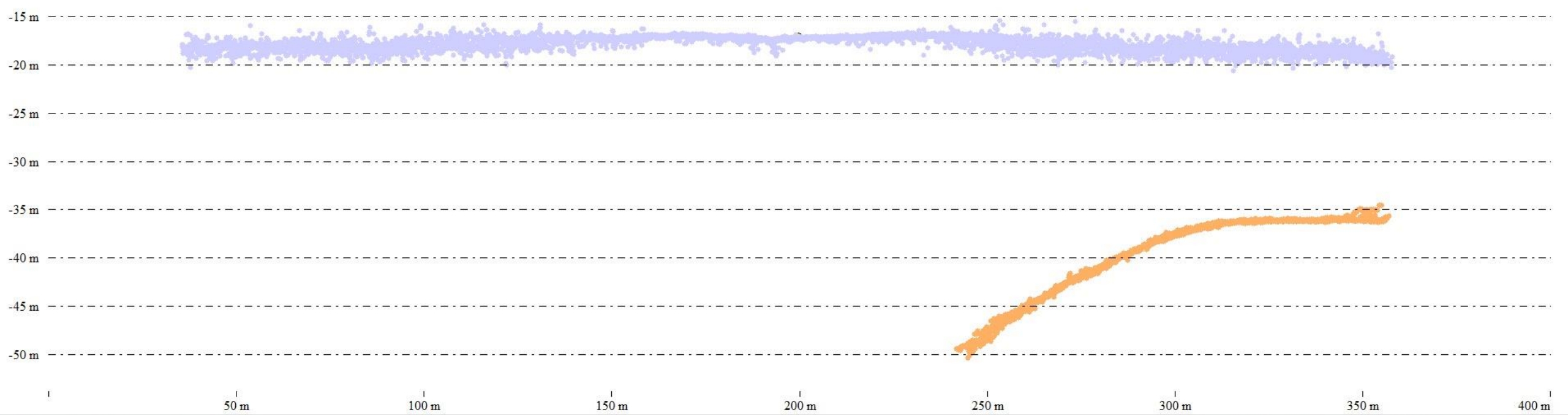


Path Profile/Line of Sight

Color Lidar by Classification

From Pos: -79.832872281, 19.721994911

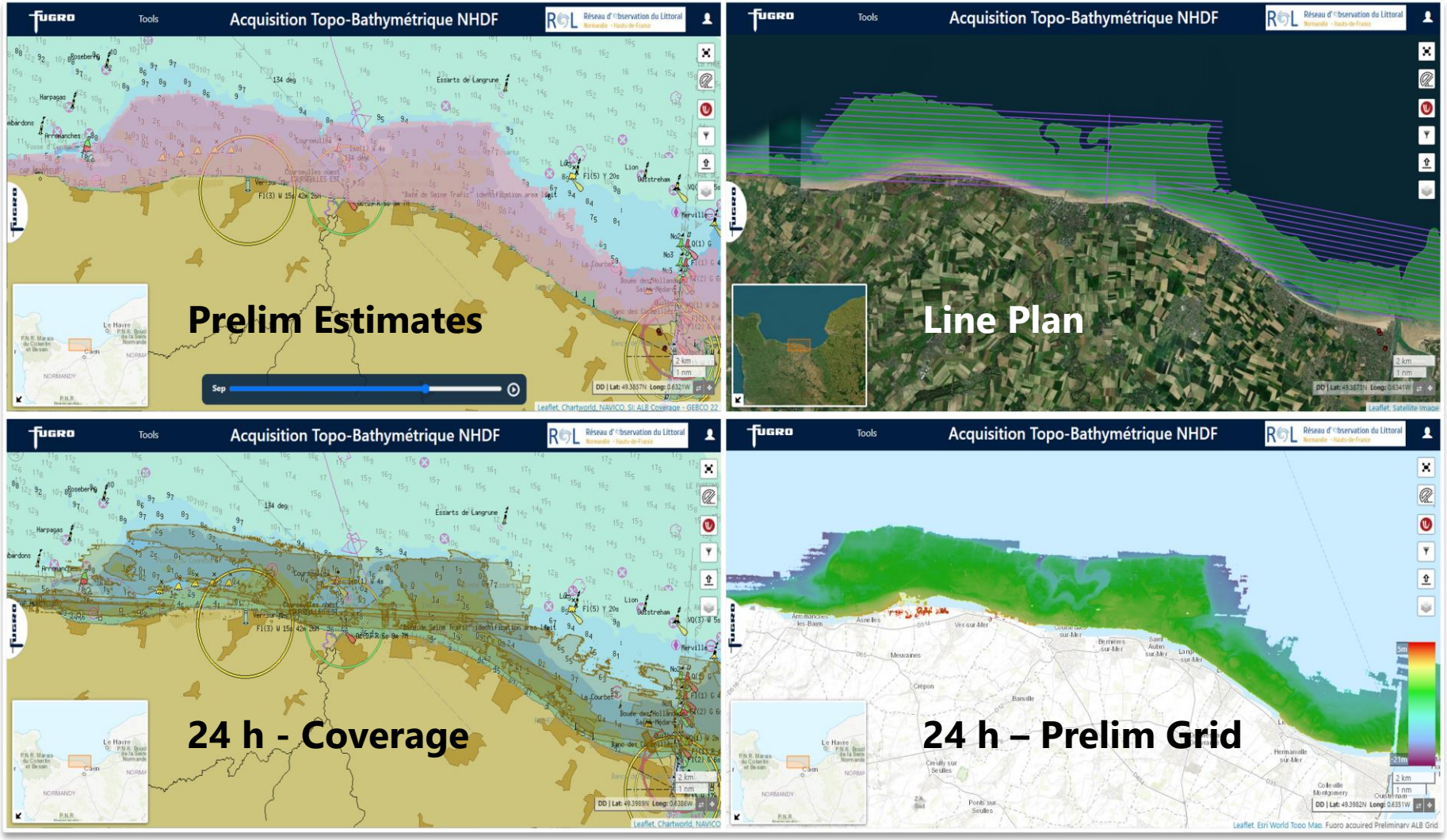
To Pos: -79.831487177, 19.718628042



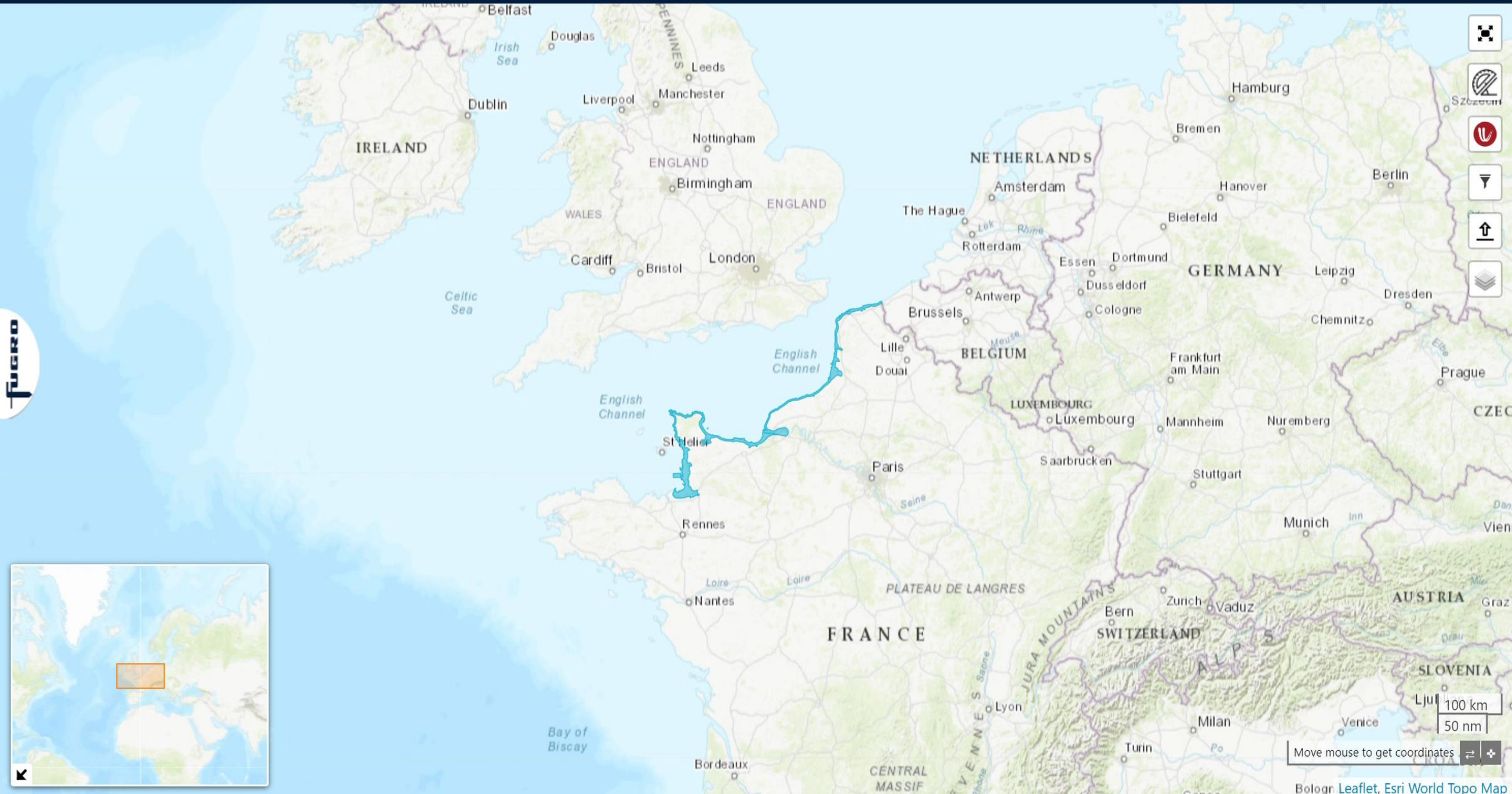
Left click to start adding points. --> RGB(255,255,255) (cb.ecw)

1:22860 | WGS 84 (-79.876487355, 19.731322504) | 19° 43' 52.7610" N, 79° 52' 35.3545" W

Implementation: VirGeo® WebGIS platform

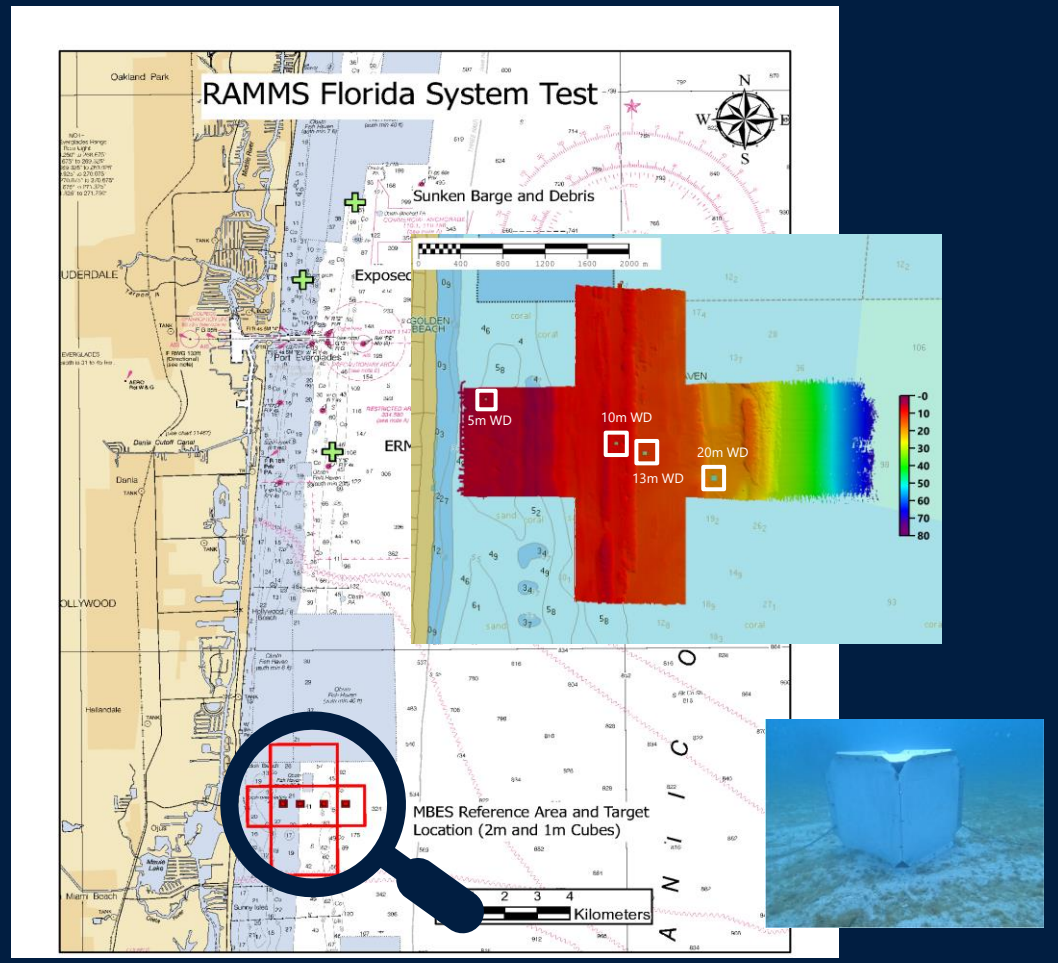


Acquisition Topo-Bathymétrique NHDF



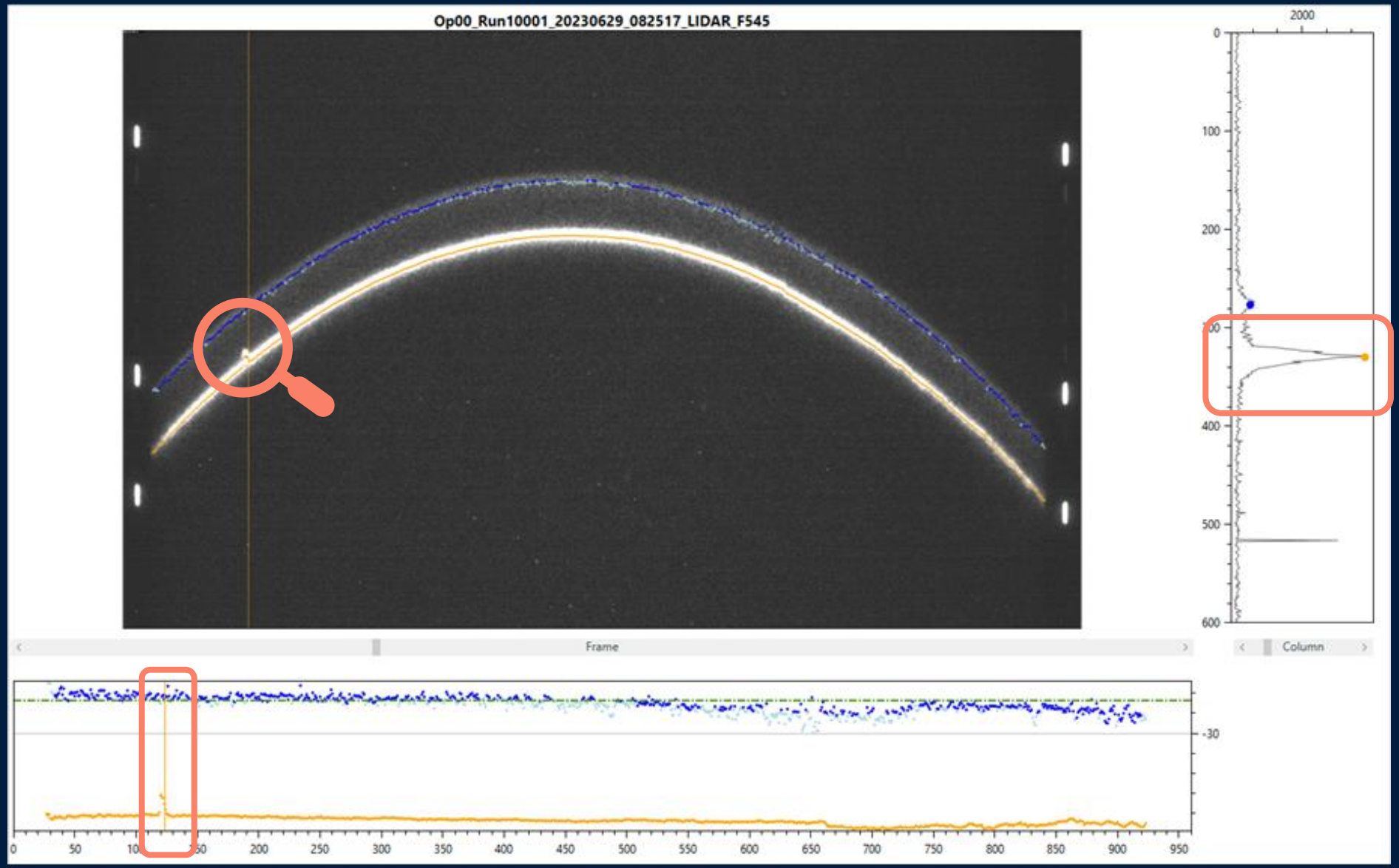
Feature automatic detection results (ext. depth @ 25 m)

Target size	Line #	Water depth	Feature detection (pass/fail)
Cube 1 m	10001	5.8 m	✓
	10019	5.8 m	✓
	10020	5.8 m	✓
Cube 1 m	10003	9.3 m	✓
	10008	9.3 m	✓
	10009	9.3 m	✓
	10019	9.3 m	✓
Cube 2 m	10002	9.3 m	✓
	10003	9.3 m	✓
	10008	9.3 m	✓
	10009	9.3 m	✓
	10019	9.3 m	✓
	10020	9.3 m	✓
Cube 1 m	10003	13.8 m	✓
	10007	13.8 m	✓
	10019	13.8 m	✓
Cube 2 m	10003	13.8 m	✓
	10007	13.8 m	✓
	10019	13.8 m	✓
	10020	13.8 m	✓
Cube 2 m	10019	19.8 m	✓
	10020	19.8 m	✓

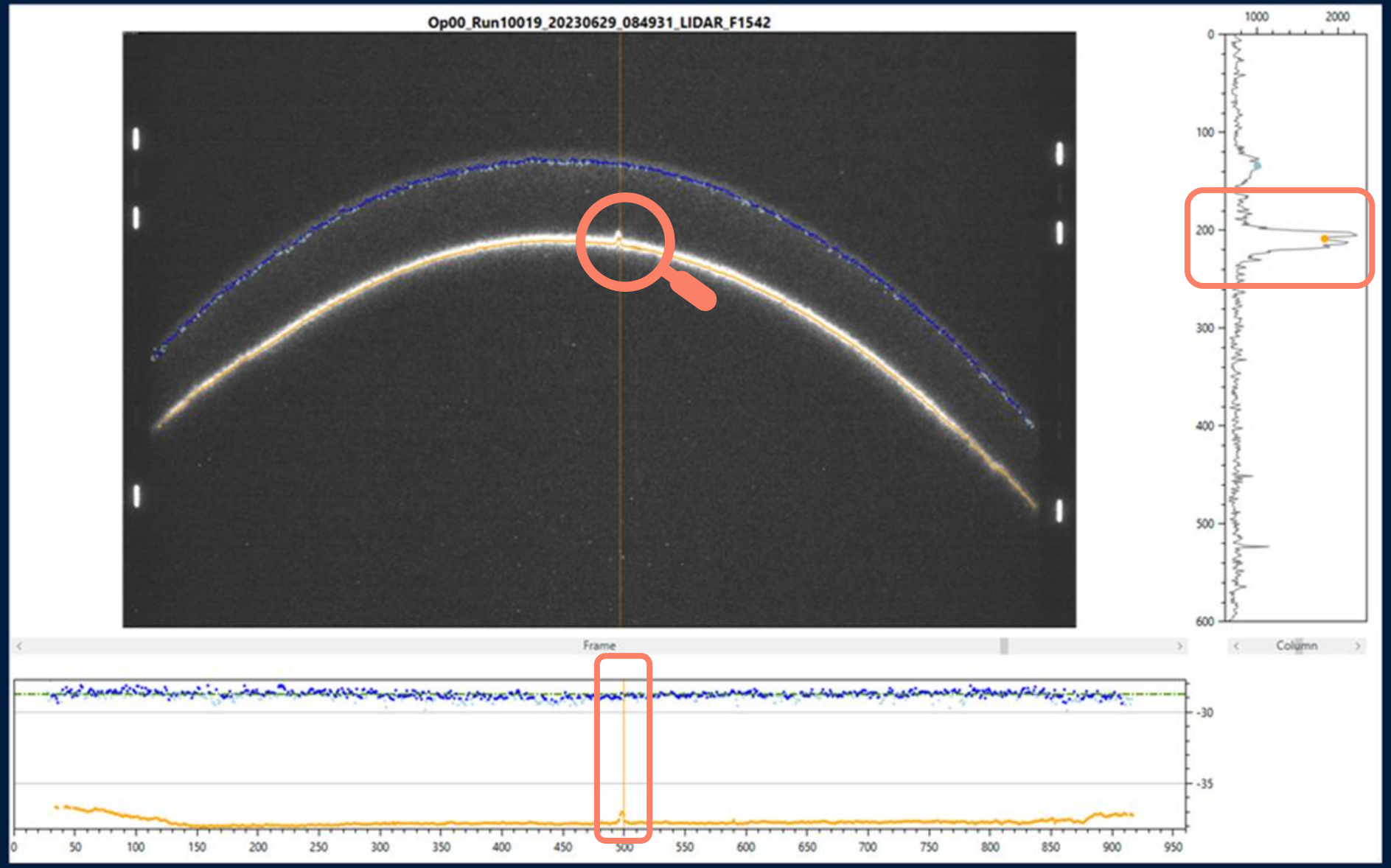


Survey speed: Varying between 110 and 140kts // Survey altitude: 325m AGL // Date: 29 June & 1 July 2023

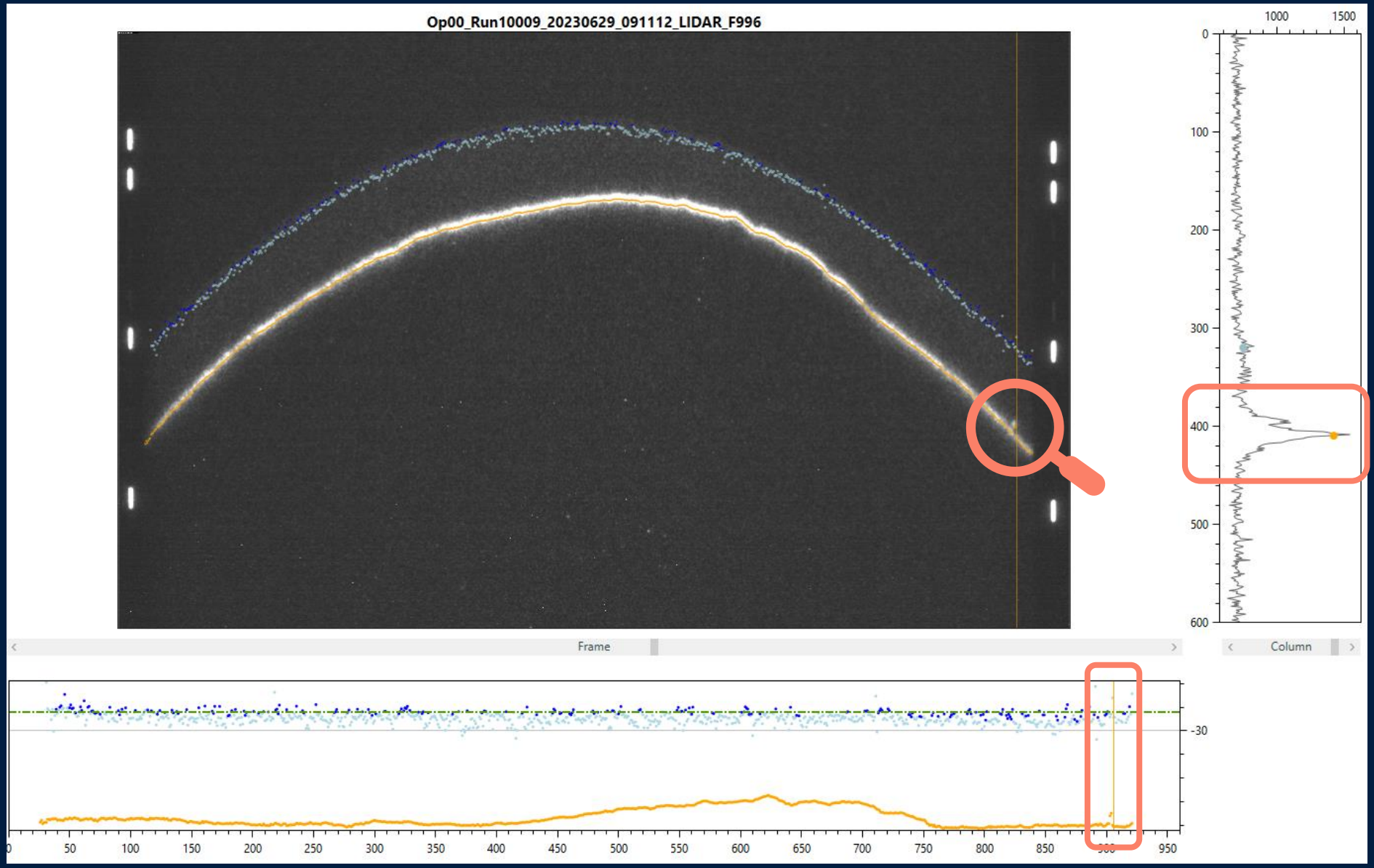
1 m cube at 5.8 m water depth, RAMMS view



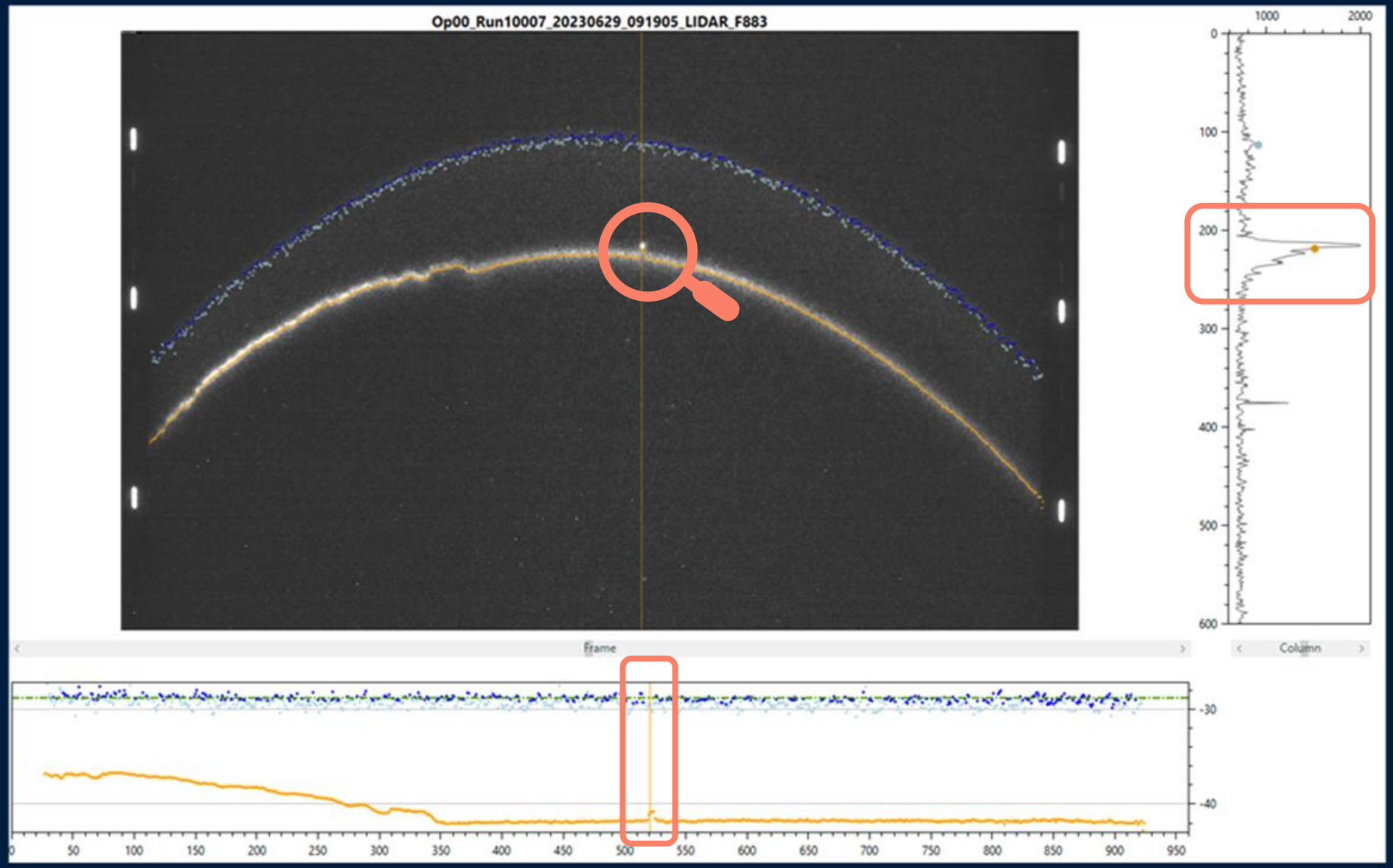
1 m cube at 9.3 m water depth, RAMMS view



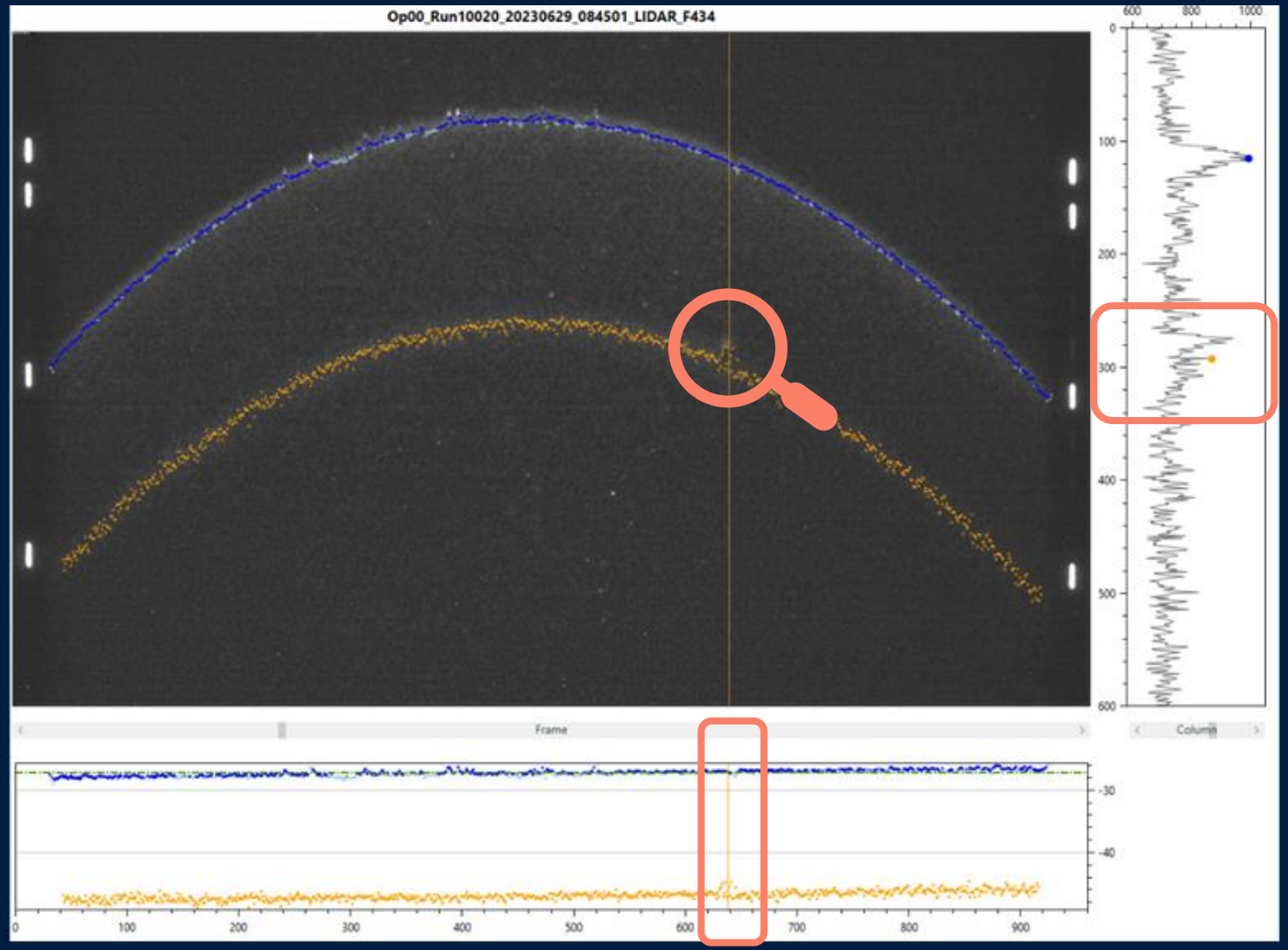
RAMMS - 1m cubic feature at 9.3 m (edge of swath)



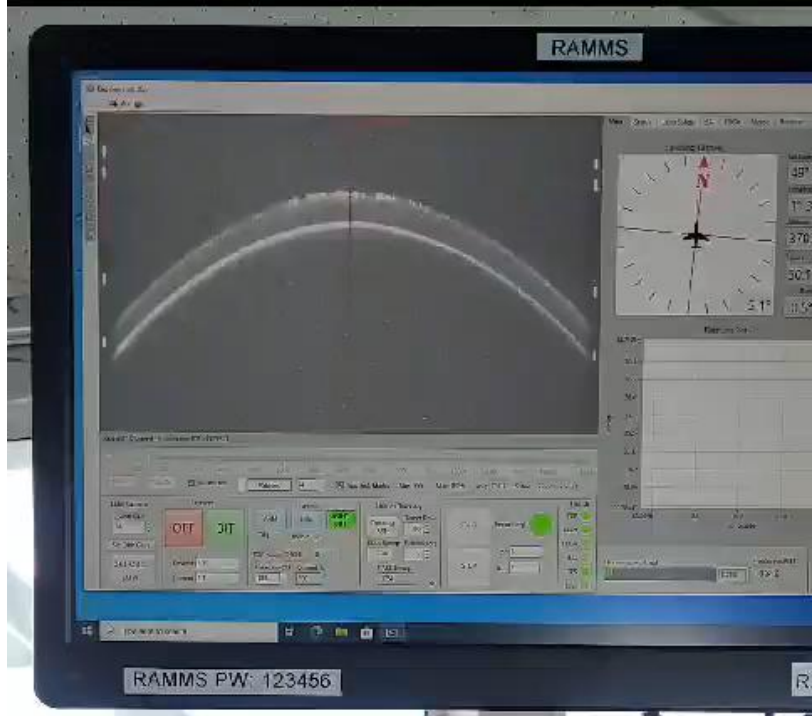
1 m cube at 13.8 m water depth, RAMMS view

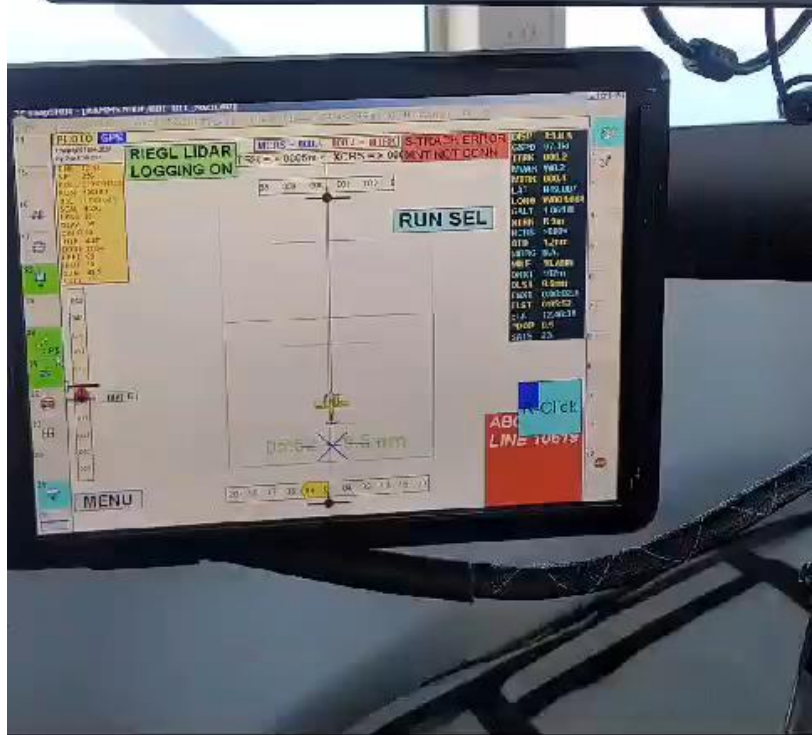


2 m cube at 19.8 m water depth, RAMMS view




RAMMS


RAMMS
RAMMS PW: 123456


RIEGL LIDAR
LOGGING ON
RUN SEL
MENU

Preliminary Results

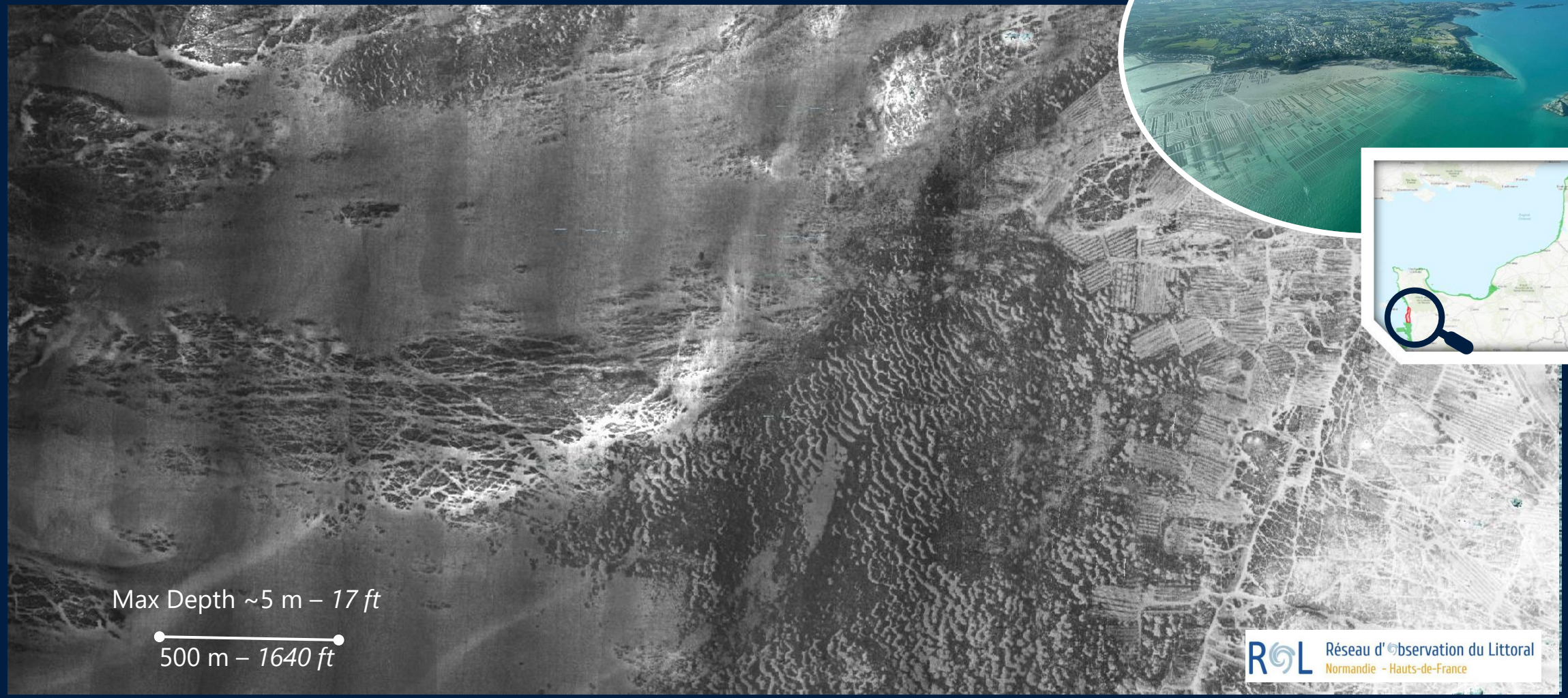
Max Depth 5 m – *17 ft*

500 m – *1640 ft*

RBL Réseau d'observation du Littoral Normandie - Hauts-de-France

FUGRO

Implementation: Preliminary Results



Implementation: Preliminary Results (Seamless topo-bathy)

RBL Réseau d'observation du Littoral Normandie - Hauts-de-France

FUGRO

Implementation: Preliminary Results

Depth (m)

0

10 (*32 ft*)

Max Depth 10 m – *32 ft*

500 m – *1650 ft*

ROL Réseau d'observation du Littoral Normandie - Hauts-de-France

FUGRO

Implementation: Preliminary Results

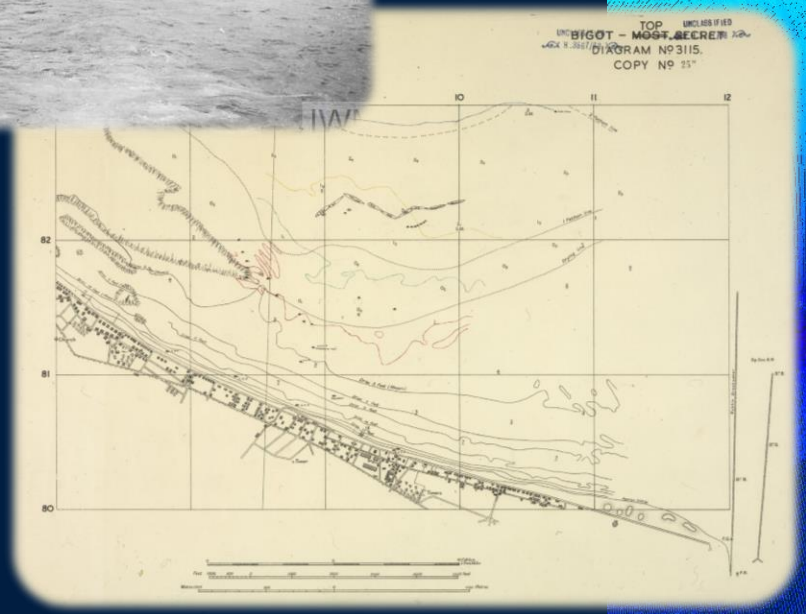
Max Depth 10 m – *32 ft*

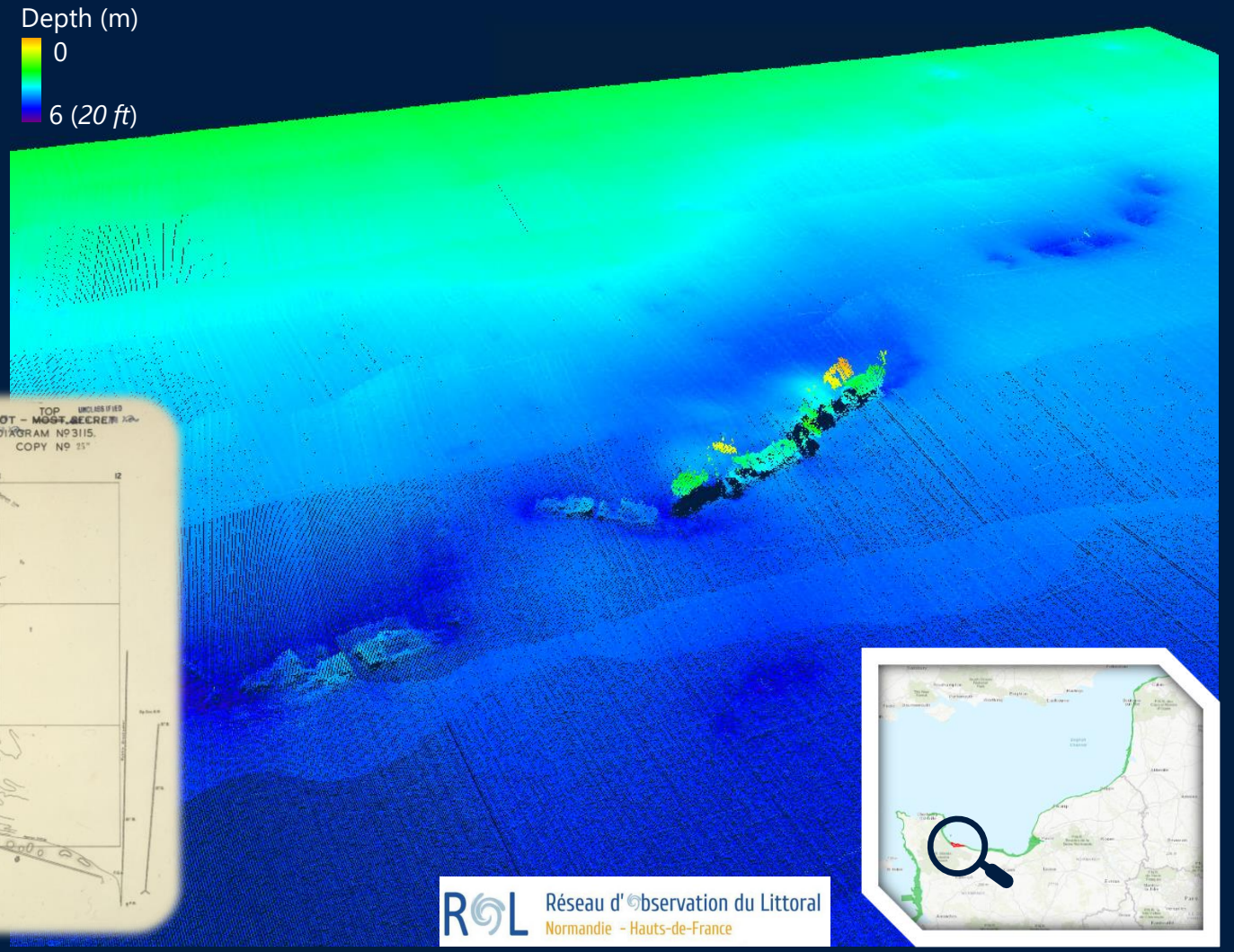
500 m – *1650 ft*

Réseau d'Observation du Littoral Normandie - Hauts-de-France

FUGRO

Implementation: Preliminary Results (Utah Beach)





MINISTÈRE DE LA CULTURE
Liberté
Égalité
Fraternité

MUSÉE D'ARCHÉOLOGIE NATIONALE
DOMAINE NATIONAL
Saint-Germain-en-Laye

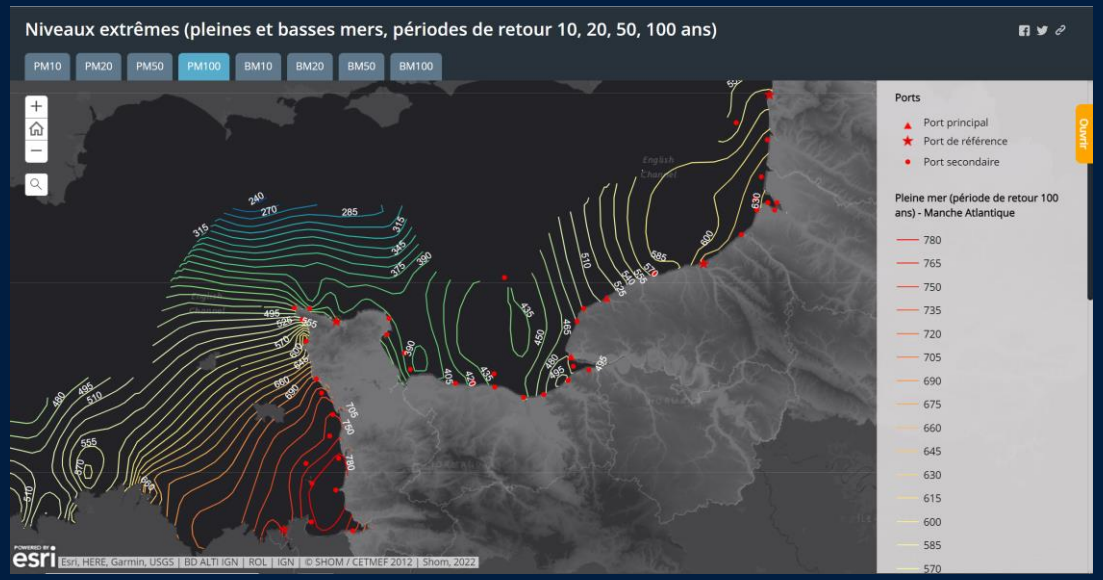
ROL Réseau d'observation du Littoral
Normandie - Hauts-de-France

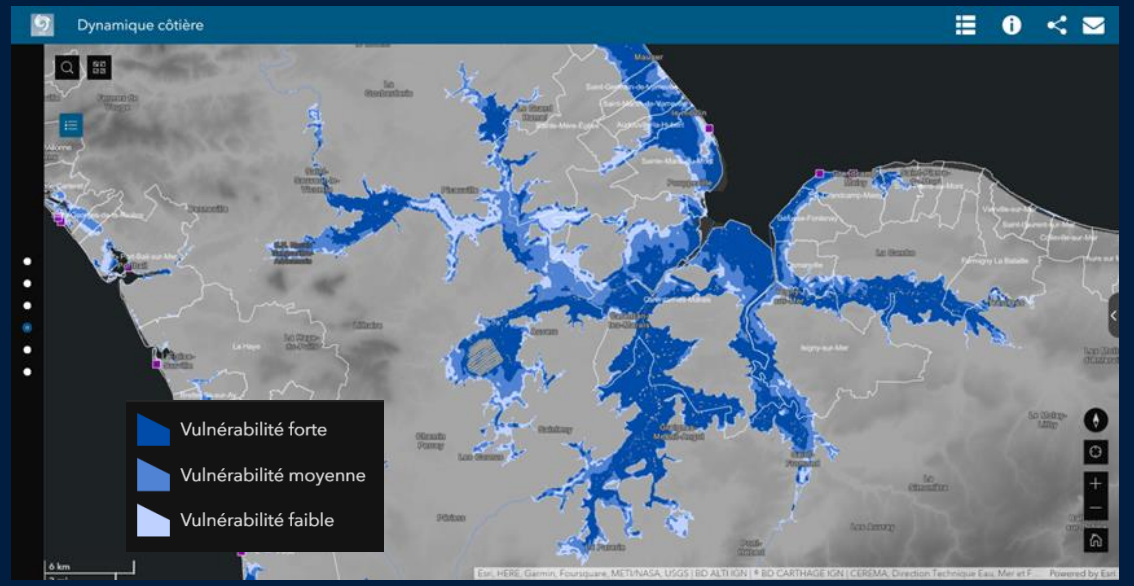
FUGRO

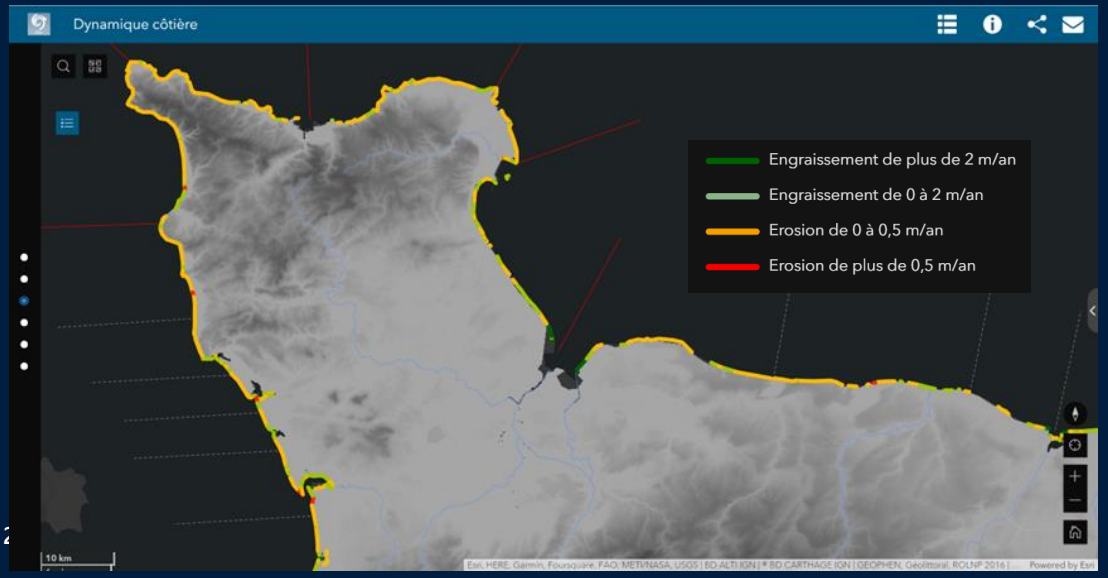
Fugro RAMMS Achievements

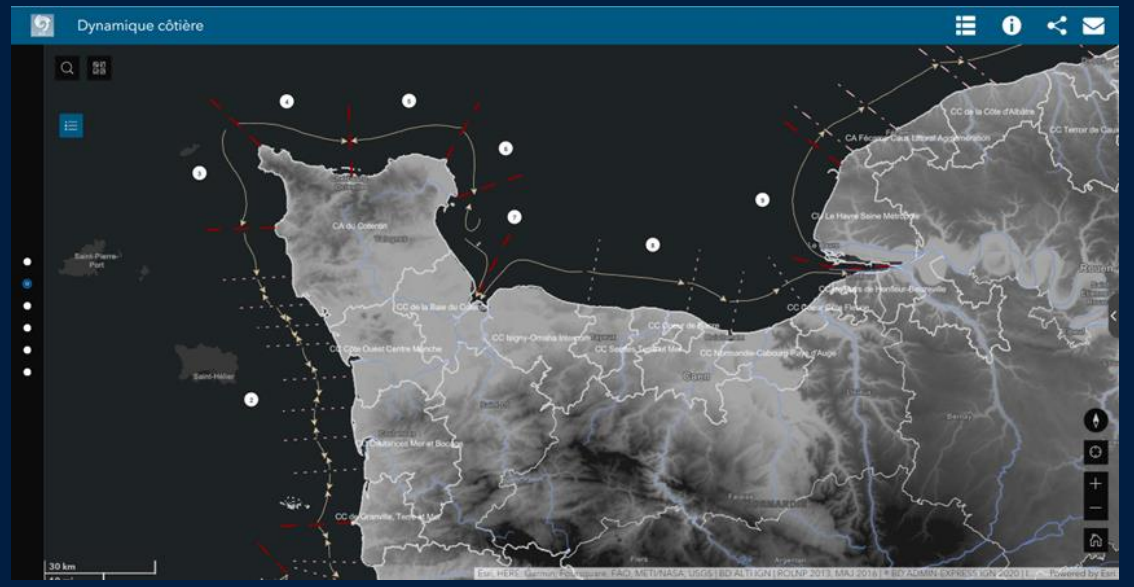
- Accuracy: IHO Order-1a
- Density: 2-3 pts/m^2 at all depths
- Imagery: PhaseOne 50MPix (QA/QC)
- Data Fusion with Topographic Lidar
- Final products: DTM, point cloud, waveforms

What are Fugro data enabling?









FUGRO

Unlocking **Insights**
from **Geo-data**