Unveiling Fugro RAMMS Bathymetric Lidar

Leading the way in coastal charting & ecosystem discovery

Jose Martinez Diaz
Product Supervisor –
Hydrography Americas

Global challenges affect us all

Population growth

2.0B

Additional people between now and 2050

Urbanisation

2.5B

People move to cities between now and 2050

Climate change

2.8-3.2°C

Predicted temperature rise by 2100

IPCC, *'Climate Change 2023: Synthesis Report'*

Biodiversity

69%

Decline of 69% in species populations since 1970

WWF, 'Living Planet Report 2022'

Engaged society

92%

Population expect ESG-inclusive company behaviour

Climate change and risk to the coastal communities

Extreme weather events are deadly and expensive.

250 million people globally are vulnerable to storm surge events every year.

If the world does nothing to mitigate sea level rise, coastal flooding could cost the global economy **$14.2 trillion** in lost or damaged assets by 2100.

Coastlines are eroding, ecosystems are in trouble.

24% of the world's shoreline is eroding away at more than half a meter per year, costing **$500 million** in property loss annually.

50% of live coral cover and **85%** of wetlands have been lost already.

Blue carbon and biodiversity are declining.

The total value of ocean assets (natural capital) is estimated at **$24 trillion**. Only **10-25%** of marine species have been described globally.

The global wealth generated by carbon sequestration in coastal blue carbon ecosystems amounts to **$191 billion** per year. Coastal ecosystems can store up to **5 times** as much carbon as upland forests.

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Climate change risks and economic opportunities

By 2050

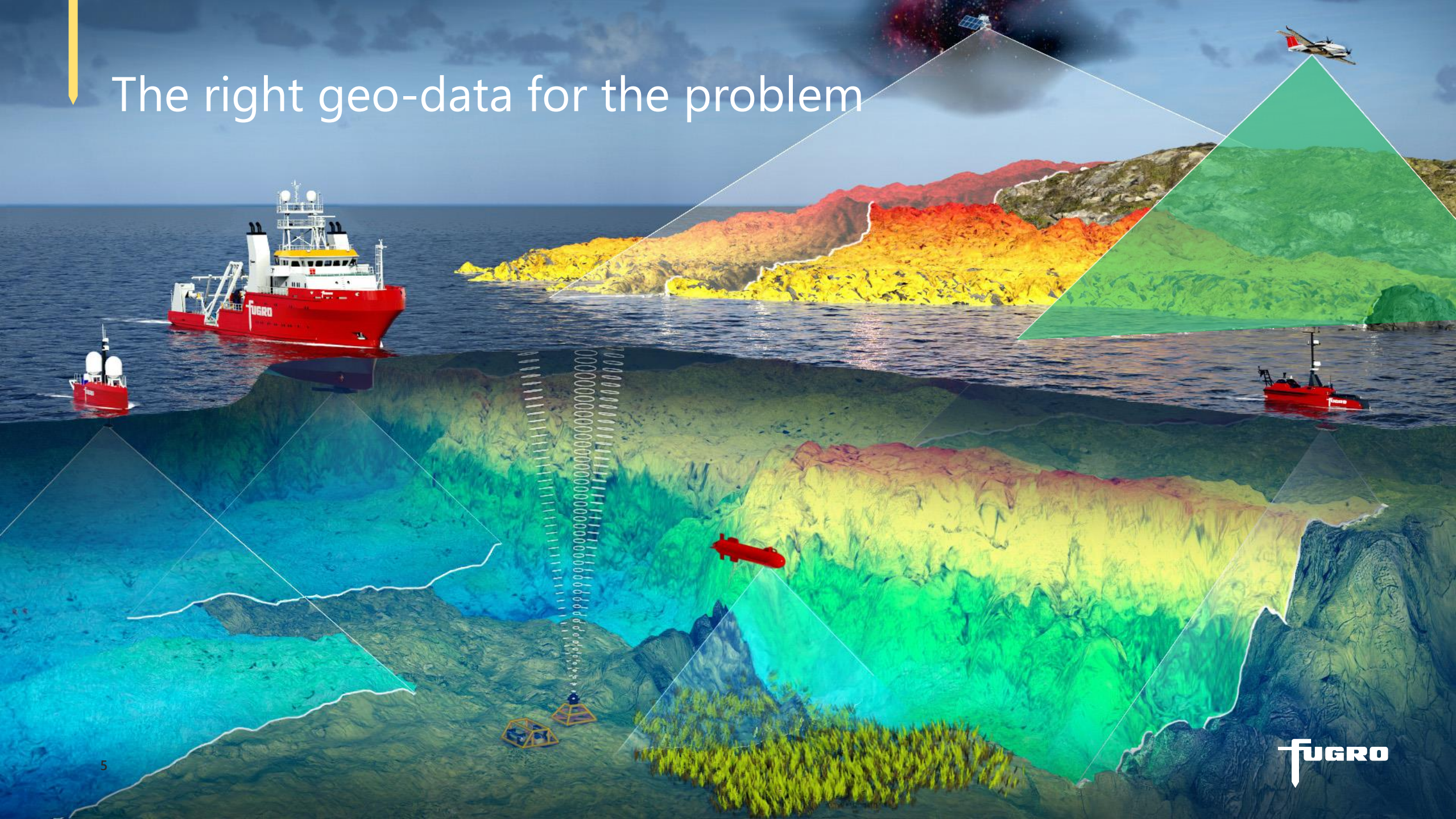
- **Global community of 9 billion people**
- **40% lives at or near a coastline**

Change is eminent

- **Sea-level rise**
- **Climate**
- **Energy transition**
- **Resilience to extreme events**

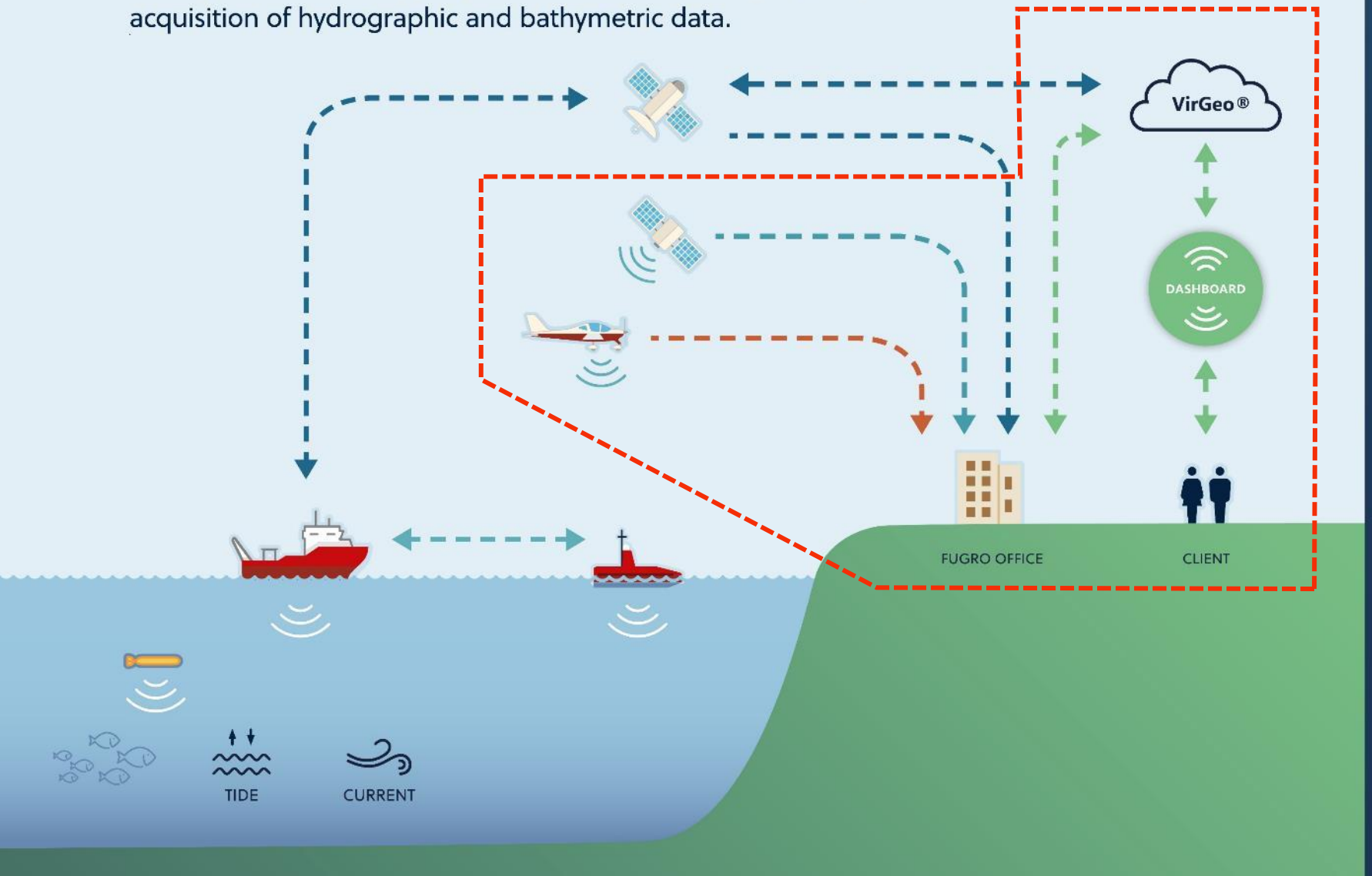
Geo-Data is key to provide knowledge and insight to support economic opportunities, promote coastal resilience, disaster preparedness, sustainable coastal development, and preserve environments.

The right geo-data for the problem



Hydrographic Solutions

A range of seabed mapping services for fast and high-quality acquisition of hydrographic and bathymetric data.



BENEFITS

Satellite imagery analysis supports bathymetry and environmental mapping of nearshore environments

Airborne lidar bathymetry captures **fast and high-quality** shallow water bathymetry over large areas

Vessel based multi beam echo sounder acquires **accurate hydrographic data** reaching all ocean depths

Integrated **metocean observations** for accurate vertical datum reduction and charting applications

Autonomous underwater vehicles capture **precise** and **reliable** data for seabed surveys and environmental studies

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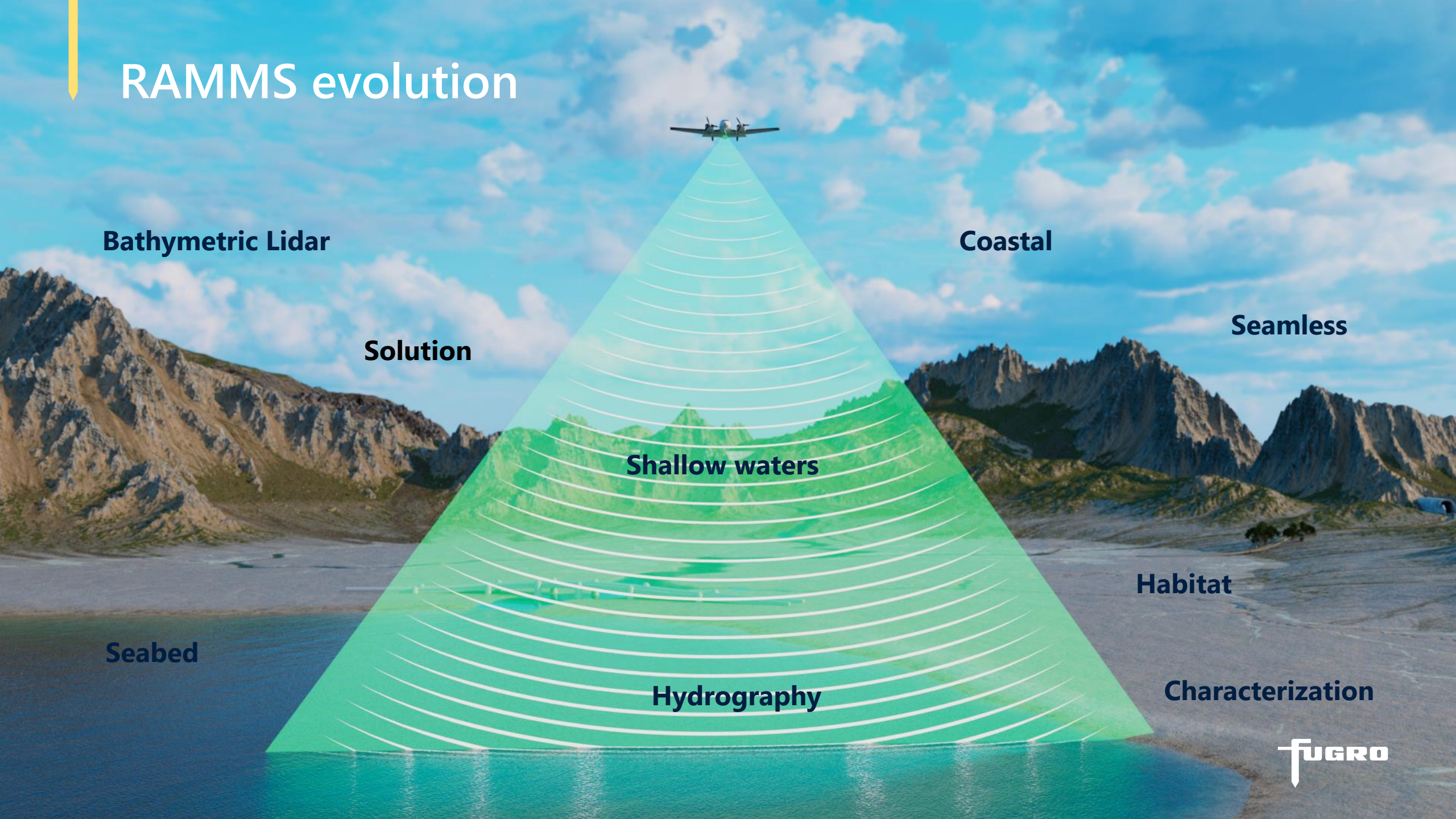
RAMMS evolution



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RAMMS lidar improvements

Increased point density: 2.5 pts/m^2

Low power consumption

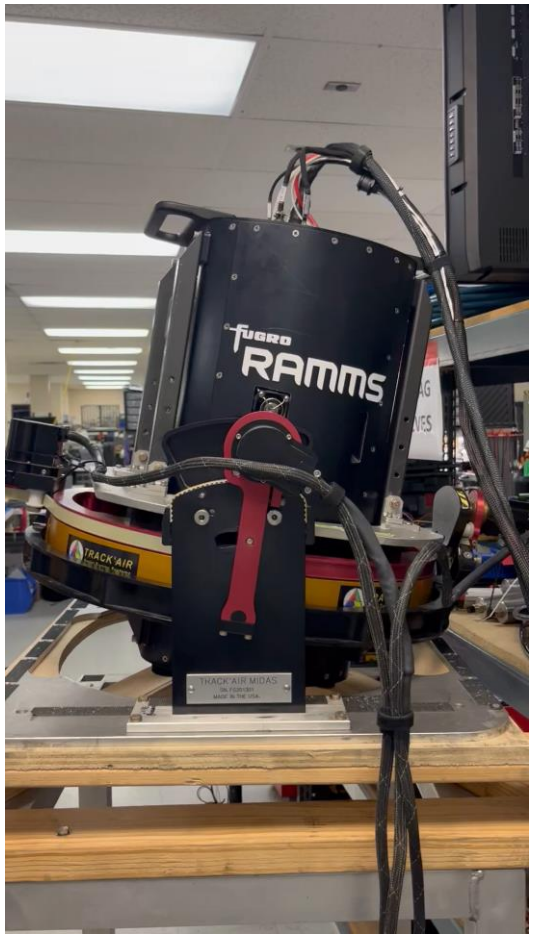
IHO target detection

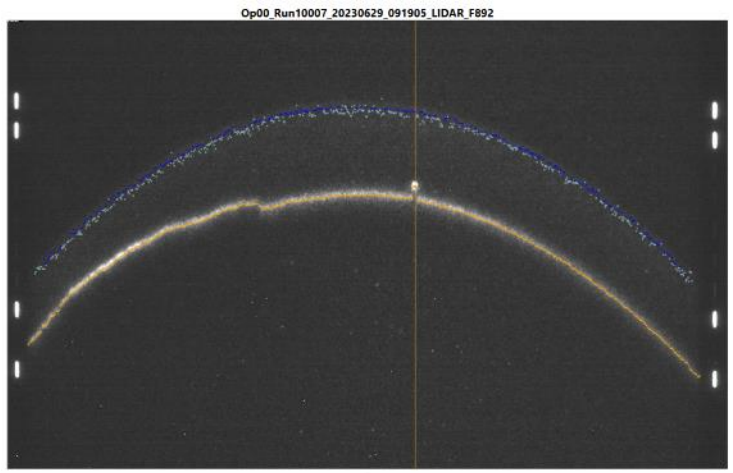
Small and portable size

Reduced environmental impact

Upright and pod form factor version

Motion compensated



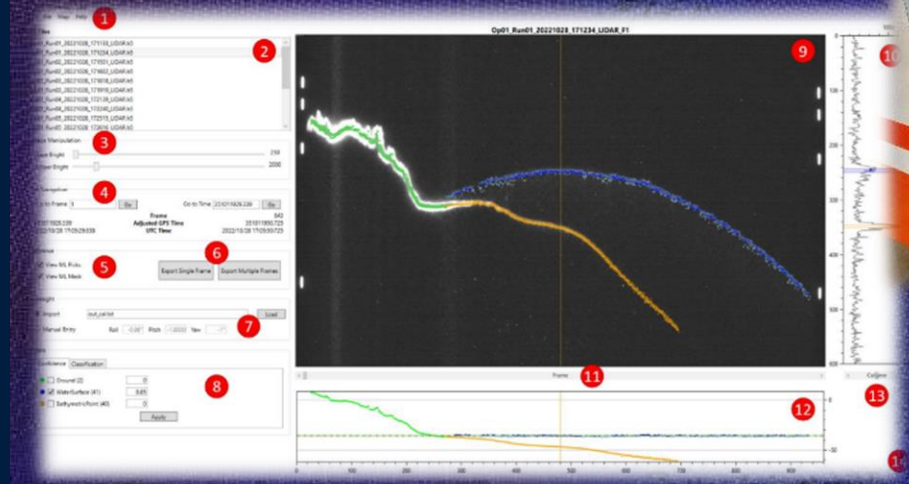


RAMMS Bathymetric Lidar Solution

- Aircrafts Compact and reliable
- Significant CO_2 emission reduction
- Riegl Topographic Lidar
- Imagery: PhaseOne 50 MPix (QA/QC)
- Machine learning processing
- Survey team on site: 3x staffs

Partenavia P-68

Pilatus PC-6 Porter



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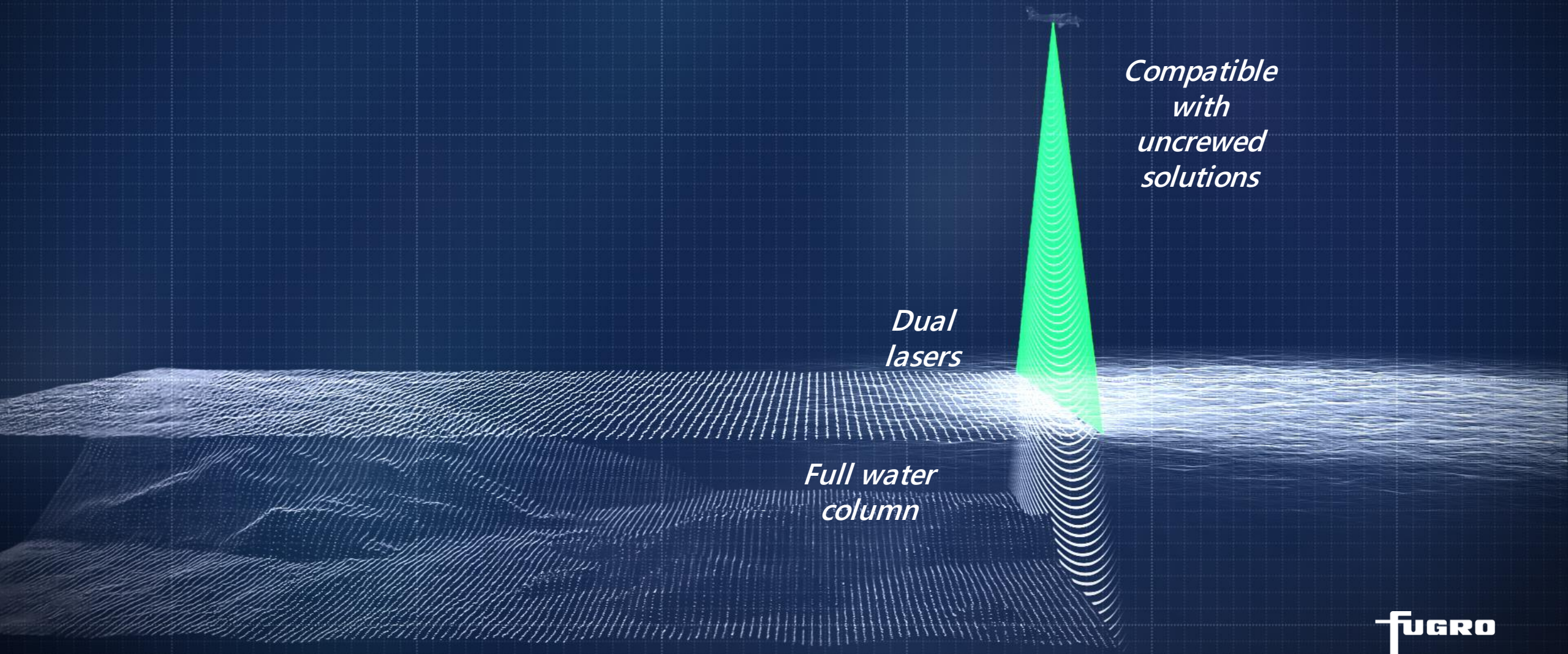
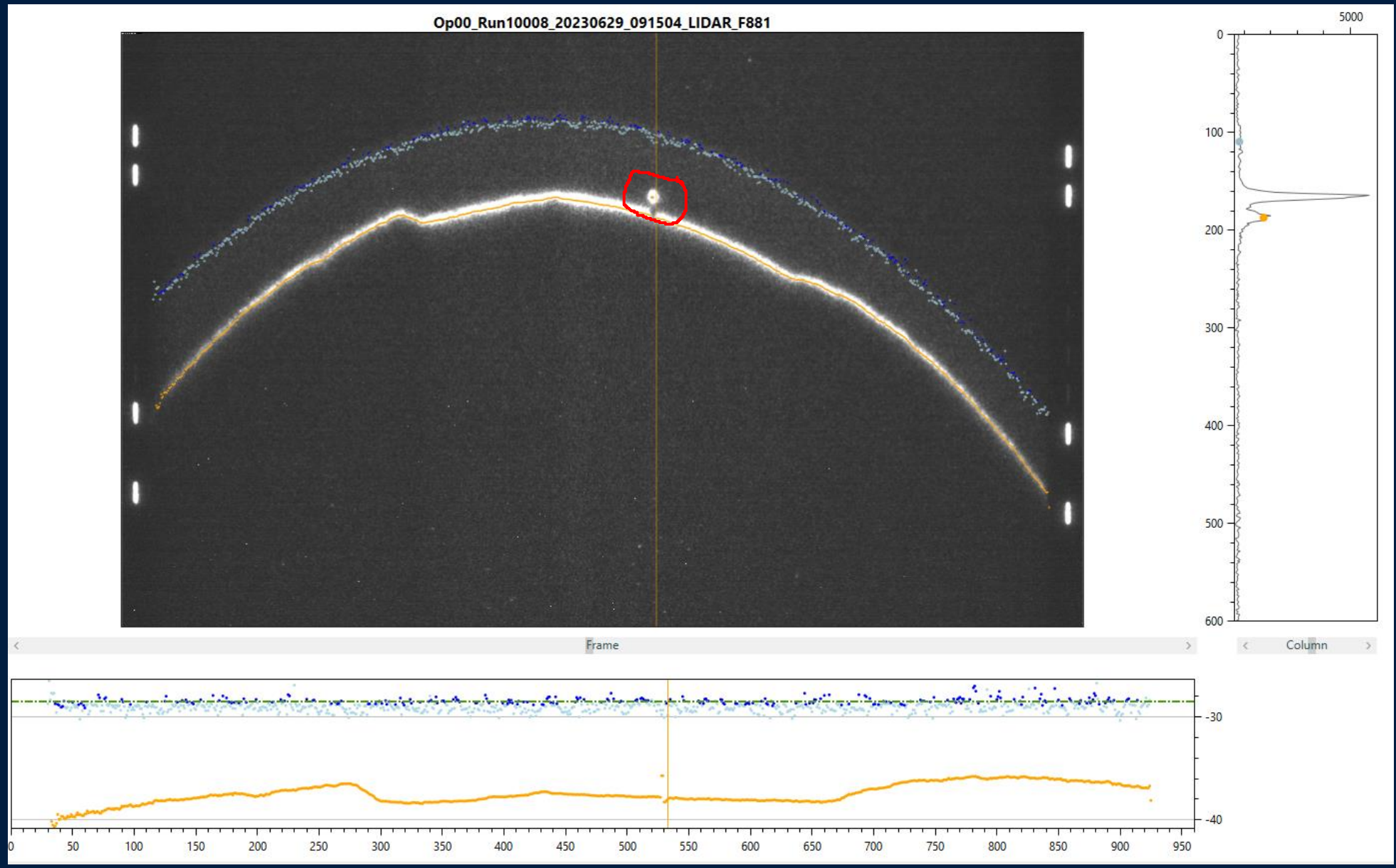
Ensuring hydrographic confidence

Full bottom coverage and target detection for IHO SP-44 standard

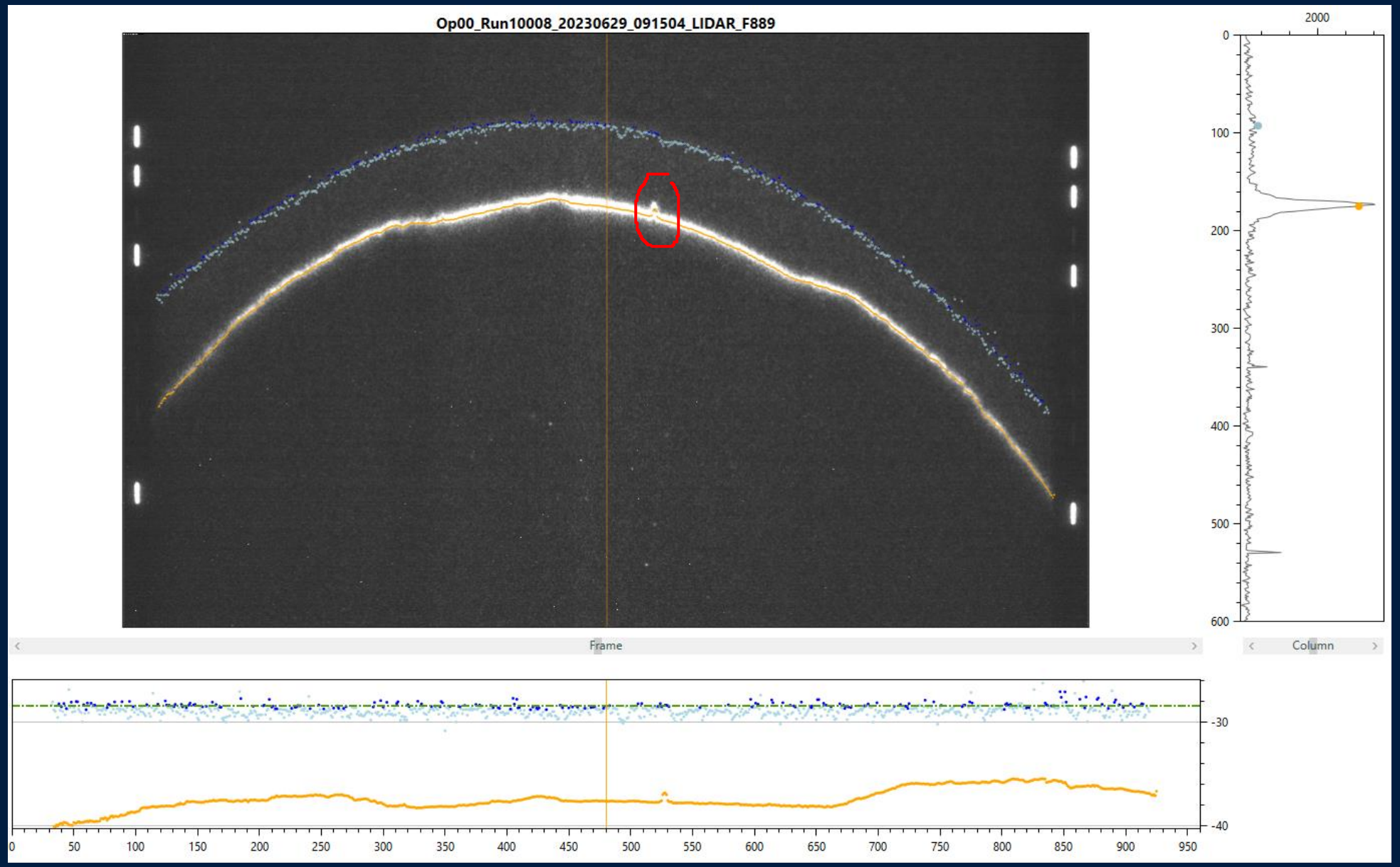


Target detection – 1 m and 2 m cubic features

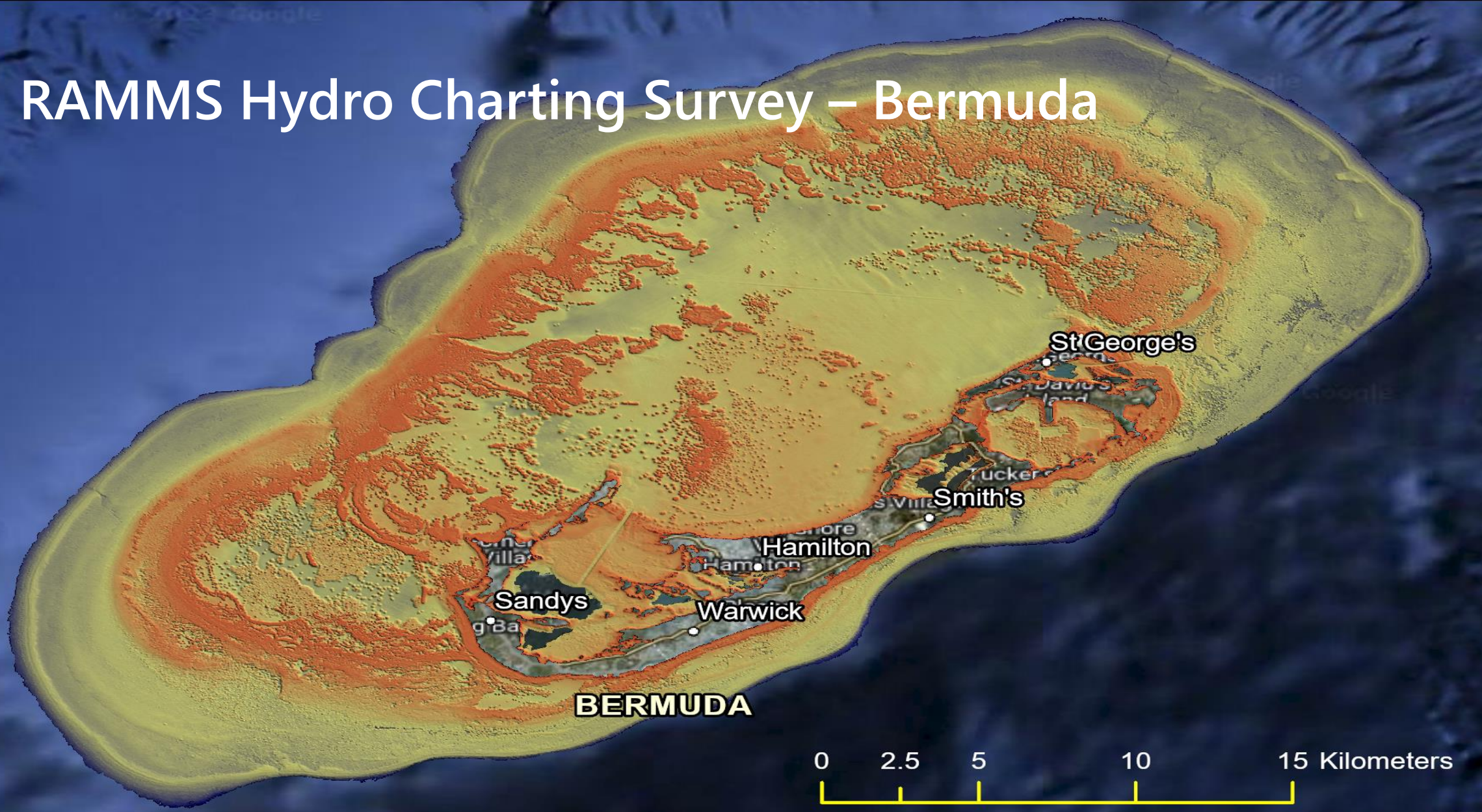
RAMMS - 2 m cubic feature at 15-m water depth



RAMMS - 1 m cubic feature at 10-m Water Depth



RAMMS Hydro Charting Survey – Bermuda



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RAMMS Hydro Charting Surveys

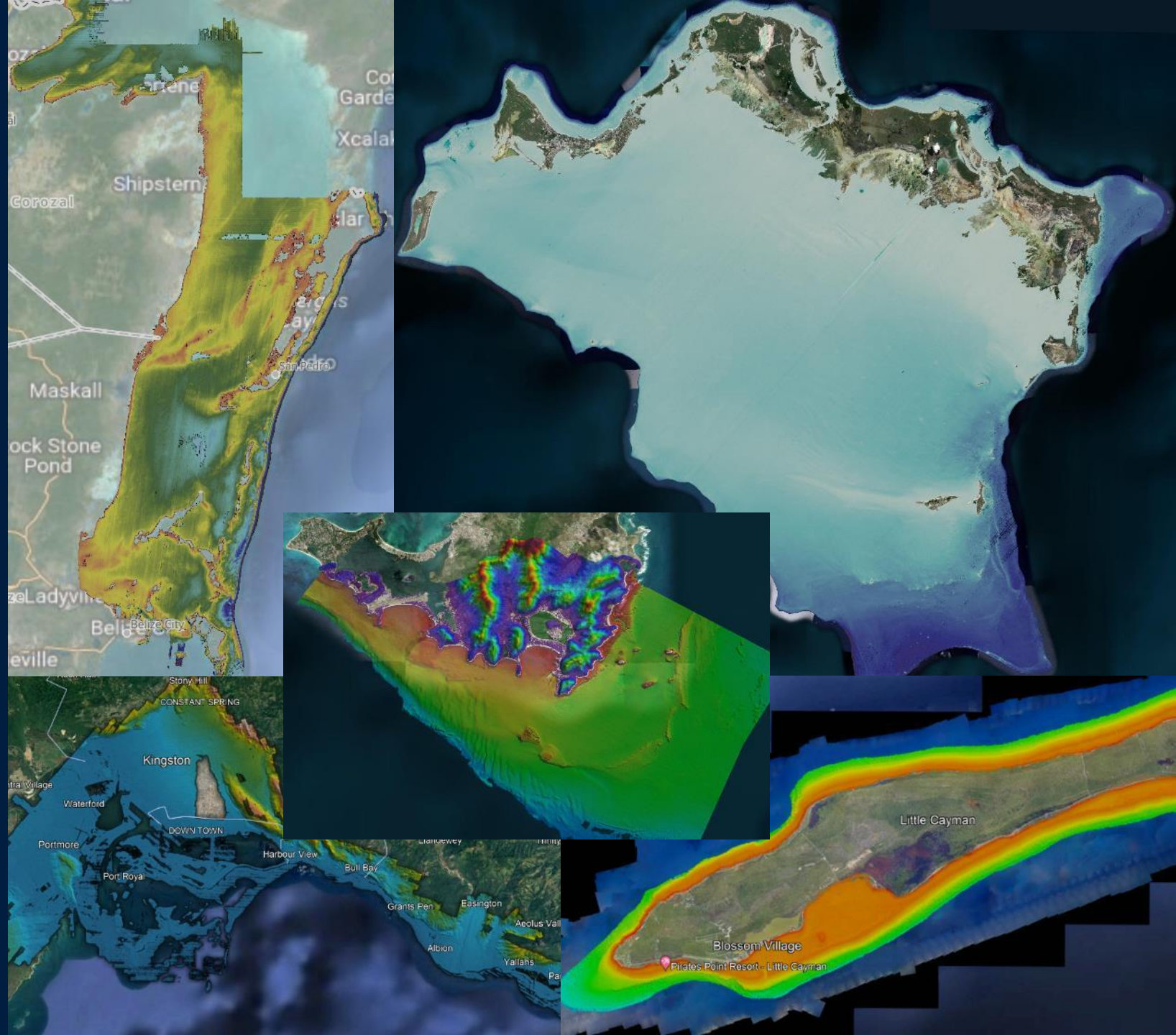
Belize

Turks and Caicos

Jamaica

Cayman Islands

Sint Maarten

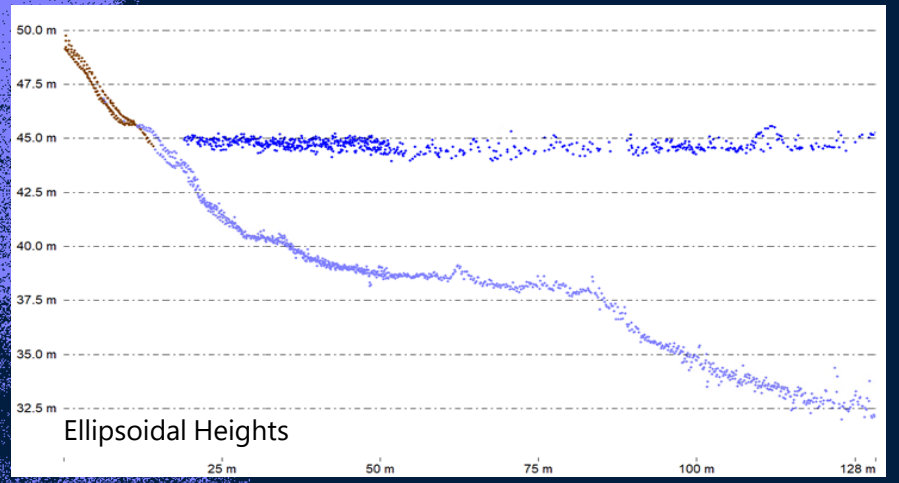


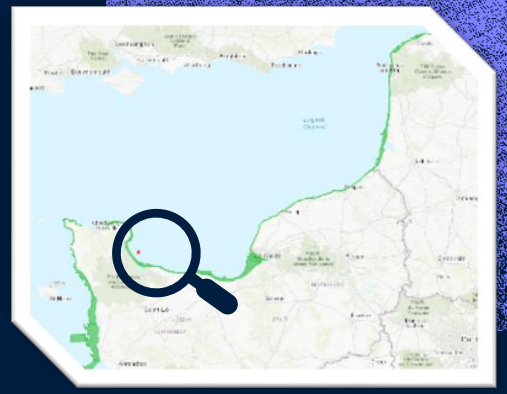
Seamless topo-bathy modeling

Max Depth ~12 m

200 m

- Topography
- Bathymetry
- Water Surface
- Noise





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

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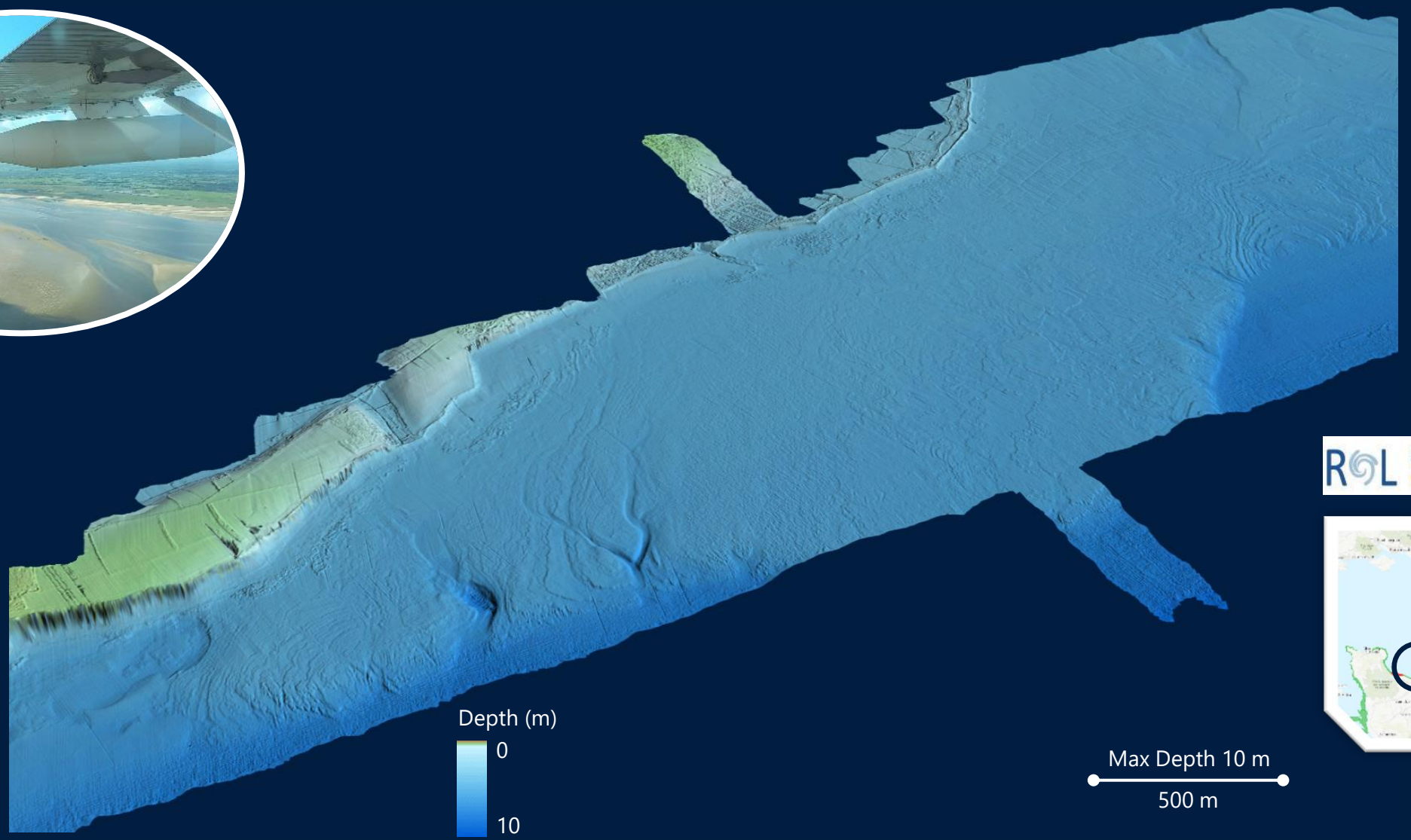
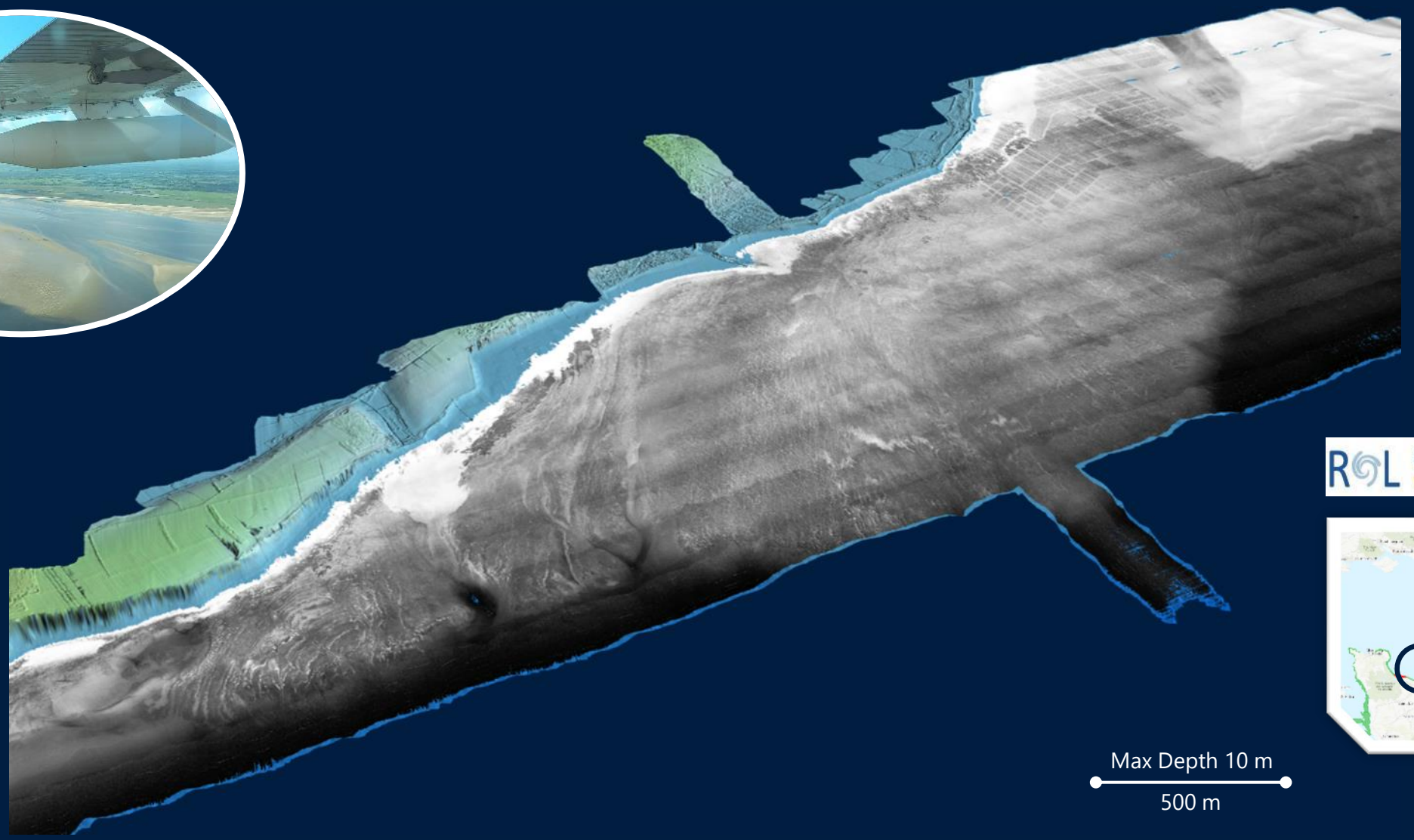
Coastal Monitoring – Normandy and Haute de France



Coastal Monitoring – Normandy and Haute de France



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

Max Depth 10 m

500 m

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Solutions for marine habitats with Bathymetric lidar

- Incredible ally in fighting climate change
- Captures carbon up to 35 times faster than tropical rainforests
- Accounts for more than 10% of the total ocean carbon storage despite covering only 0.2% of the seafloor
- Provides nutrition and is habitat for other marine life
- Only about 20% of global seagrass has been mapped

jmartinez@fugro.com
www.fugro.com