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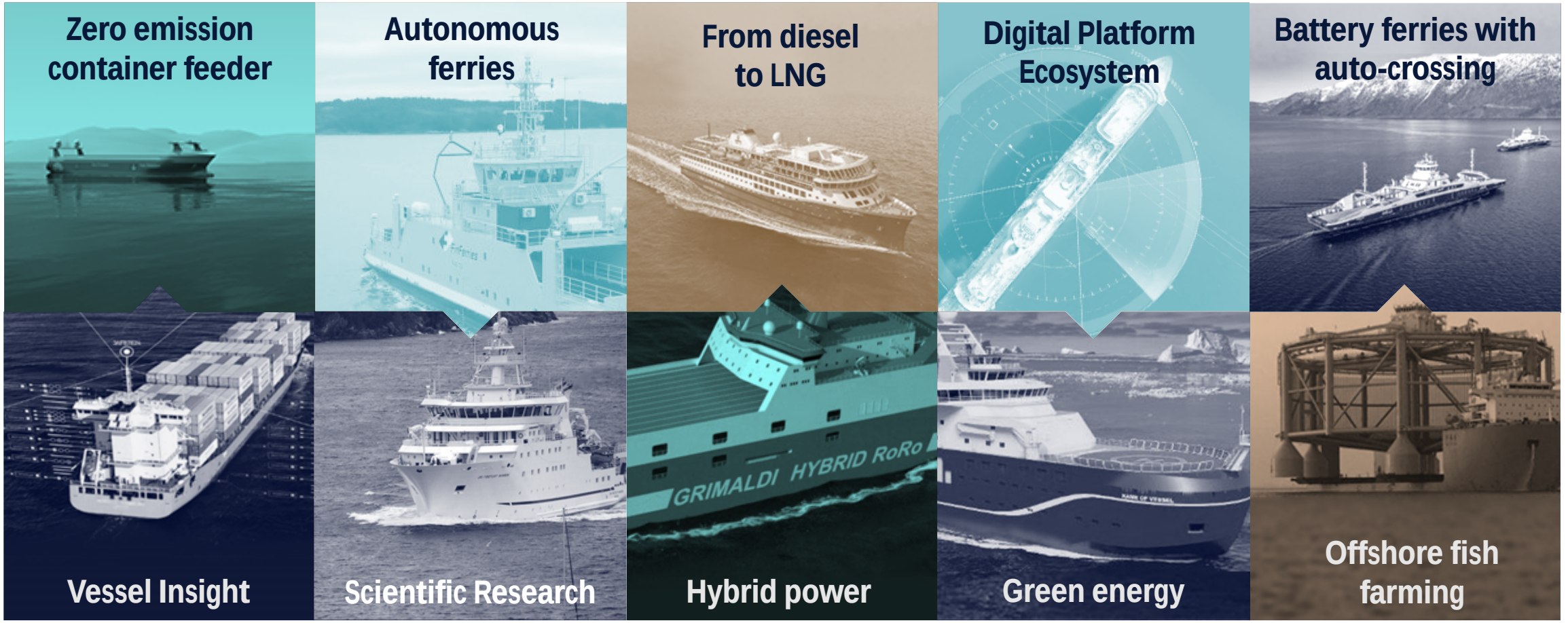
Ports and Technology: Now What?

20/02/2023

Konrad Mech, Sales Director Coasts, Ports, Inland Waterways

New technology brings new benefits

KONGSBERG'S digital vision in practice



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Characteristics – Global Ports and Waterways

- Infrastructure upgrades
- Cycling droughts and floods
- Workforce demographics
- Environmental stewardship

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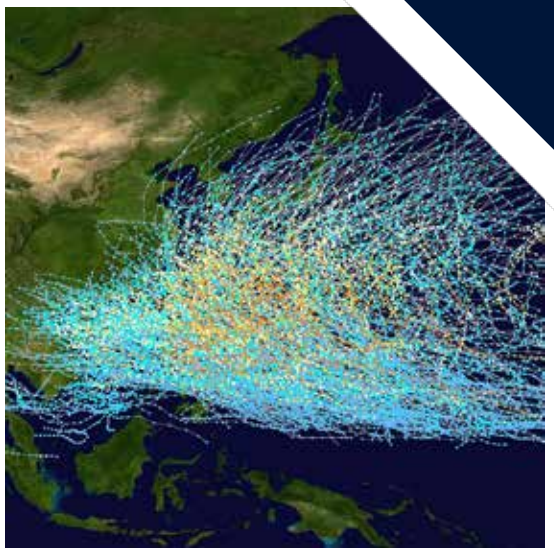
Characteristics of Pacific Ports



- Ring of Fire
- Typhoons
- Tsunami
- Big vs Small Ports

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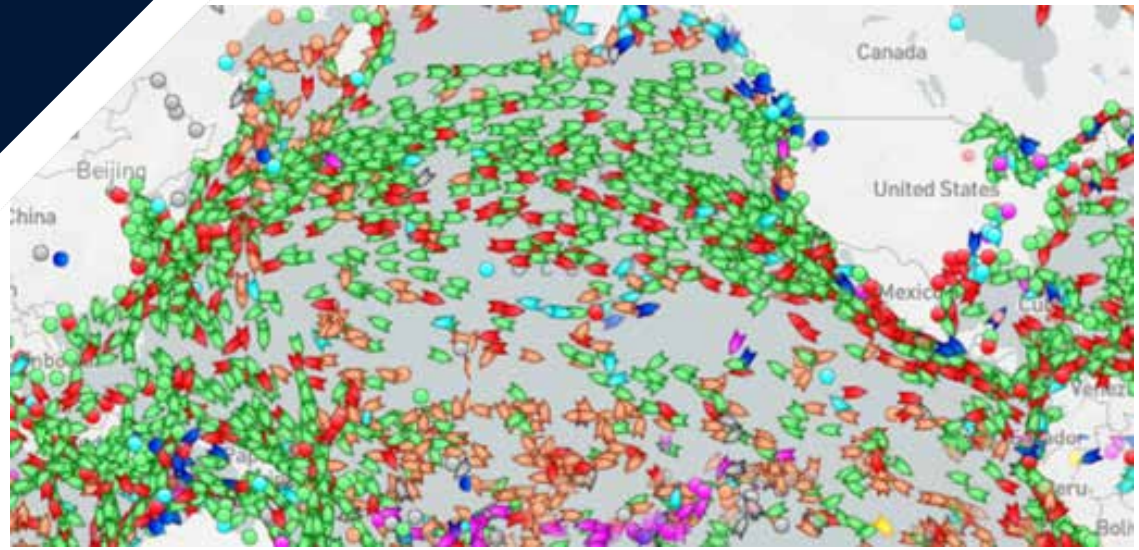
Trends impacting Port Operations

Empty Containers

JIT Vessel Management

Digitization



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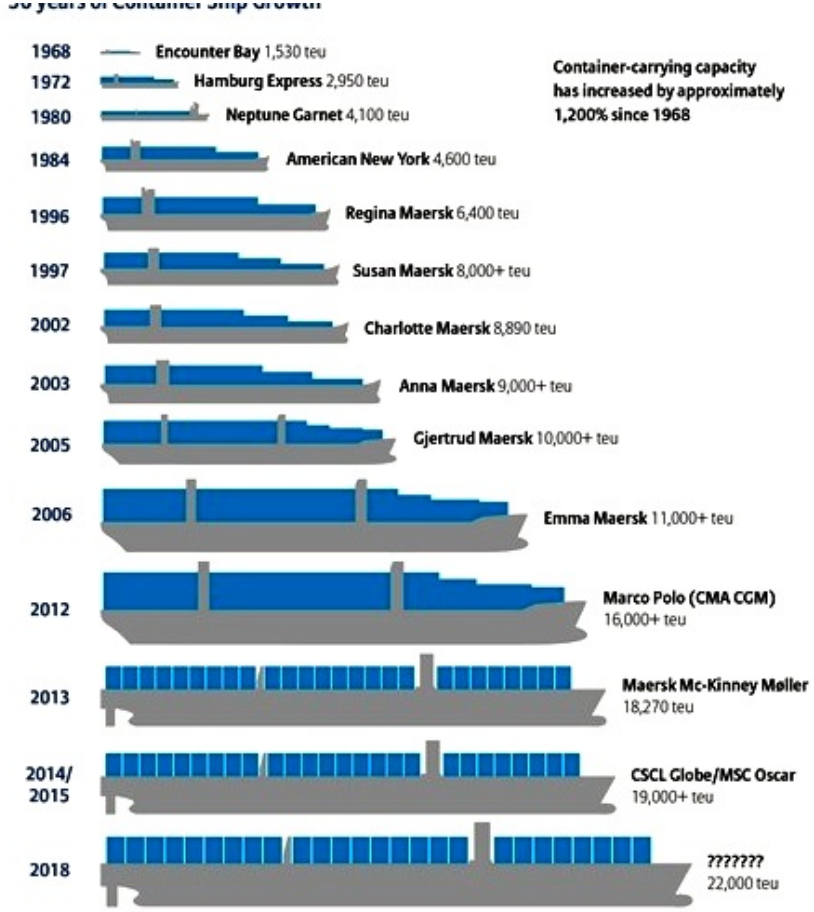
MARAD Town Hall 2021

Vessel Congestion

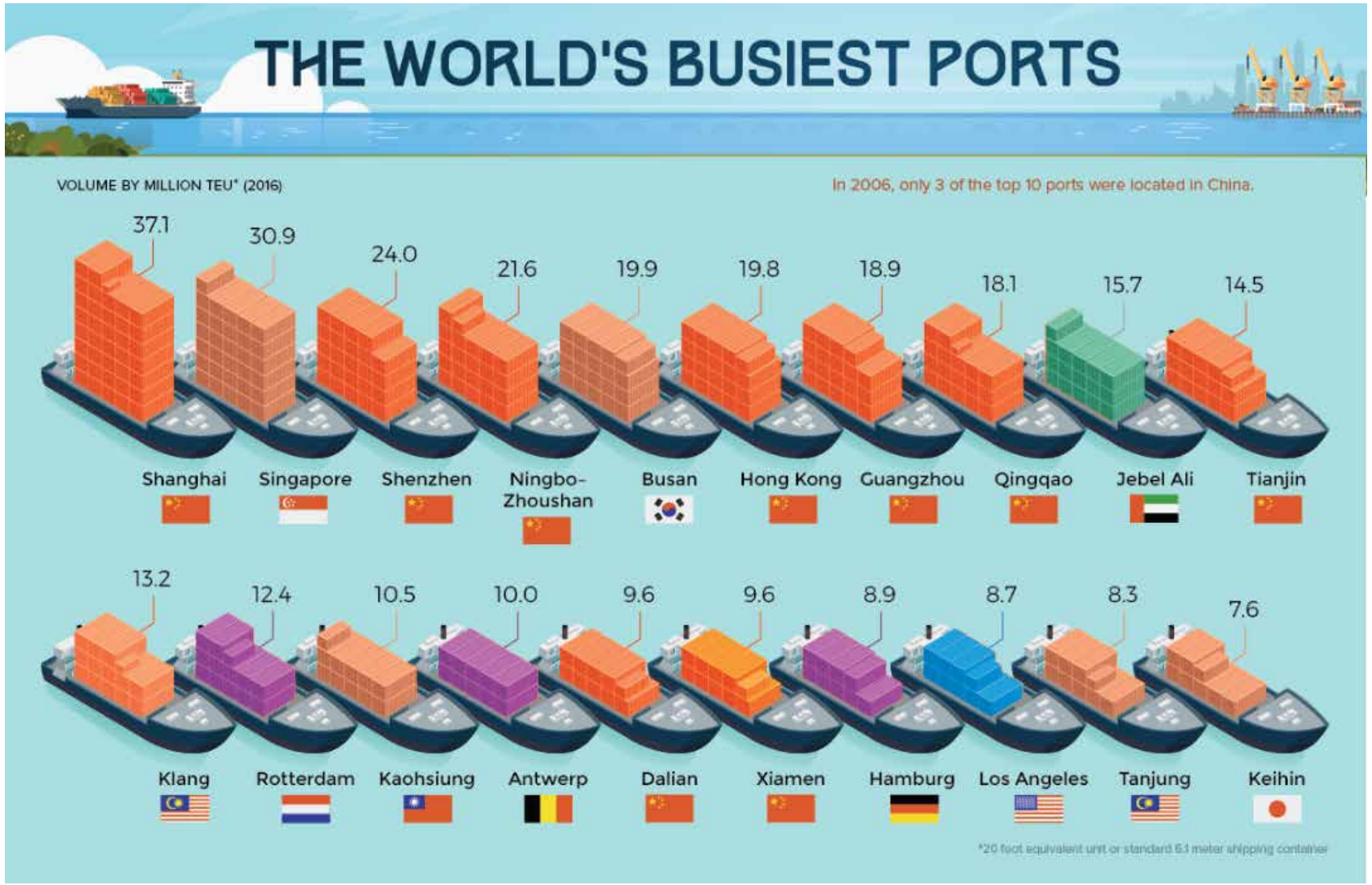
Road, Rail congestion

COVID Carrier Diversion

Trends Impacting Port Investment Decisions



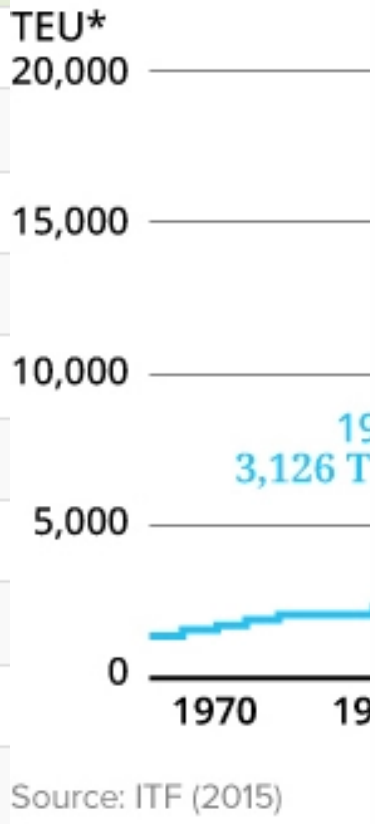
Changes to Vessel Visits?



Largest firms; largest ships

Development

Rank
1
1
3
4
5
6
7
8
9
10

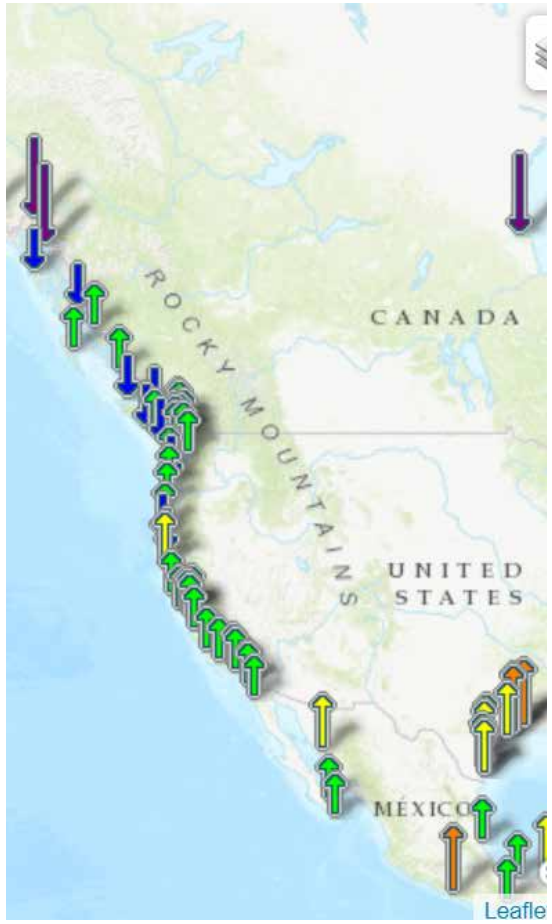


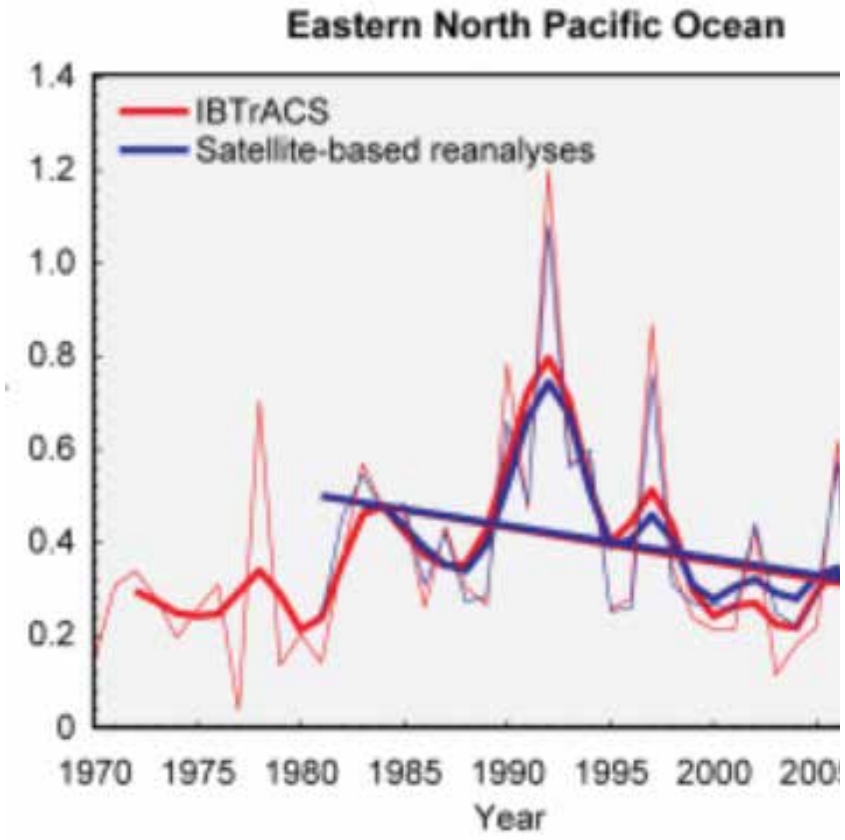
A 35,000 TEU Container Ship?

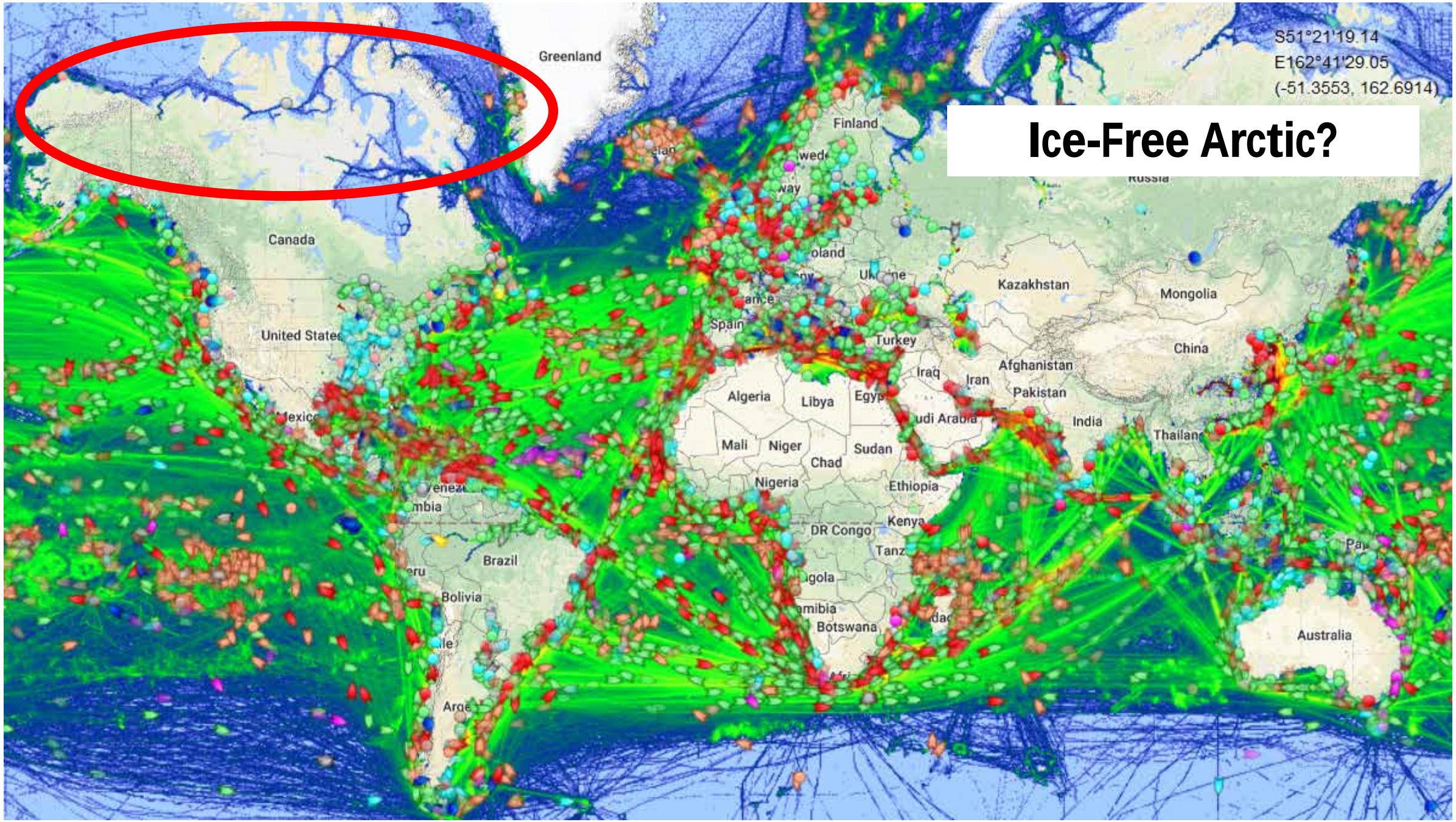
PUBLISHED NOV 6, 2015 6:11 PM BY **HARRY VALENTINE**

Climate Change Impacts?

https://tidesandcurrents.noaa.gov/sltrends/






S51°21'19.14
E162°41'29.05
(-51.3553, 162.6914)
Ice-Free Arctic?
Greenland
Canada
United States
Finland
Spain
Turkey
Kazakhstan
Mongolia
China
Afghanistan
Iraq
Iran
Pakistan
India
Algeria
Libya
Egypt
Mali
Niger
Chad
Sudan
Nigeria
Ethiopia
Kenya
DR Congo
Brazil
Bolivia
Botswana
Australia

Staffing?

Aging wor

Decr

nature

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nature > book reviews > article

BOOK REVIEW | 04 April 2022 | Correction 07 April 2022

Global population is crashing, soaring and moving

From Japan to Yemen, India to Ukraine, rates of births, deaths and displacement are reshaping nations.

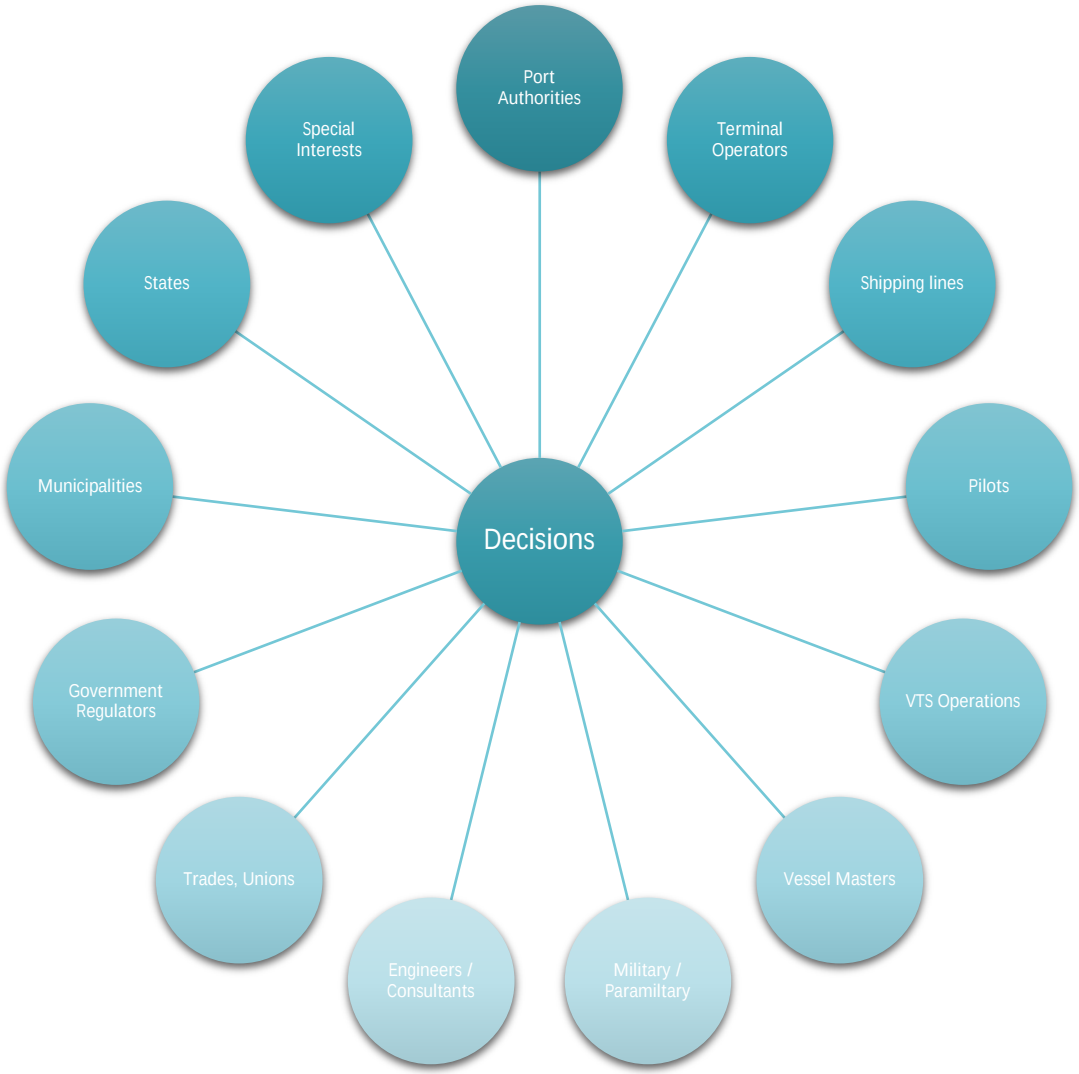
Big Ships, Big Challenges:

The Impact of Mega Container vessels on U.S. Port Authorities (Noel Hacegaba, POLB)

- Access channels width and depth
- Air draft
- Depth alongside
- Quay length
- STS height, outreach and width
- Increased exchanges of containers from each ship
- Landside capacity
- Yard equipment and TOS
- Road, rail and barge access
- Hinterland connections
- Capacity to expand

Source: Rothberg, 2013

Complex Stakeholder Environment



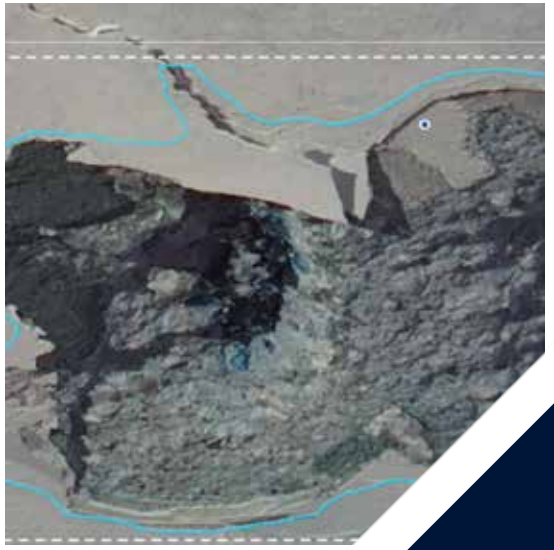
Discrete Bilateral Communication paths:

(13*12)/2 = 78

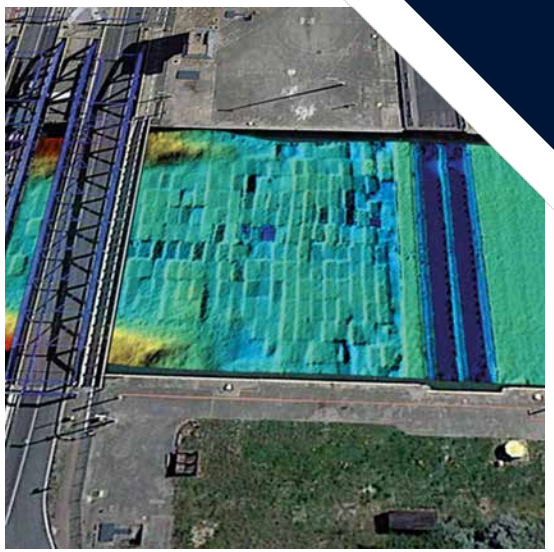
Sales reality:

- **Cautious**
- **Conservative**
- **Slow to act**

Many competing project priorities



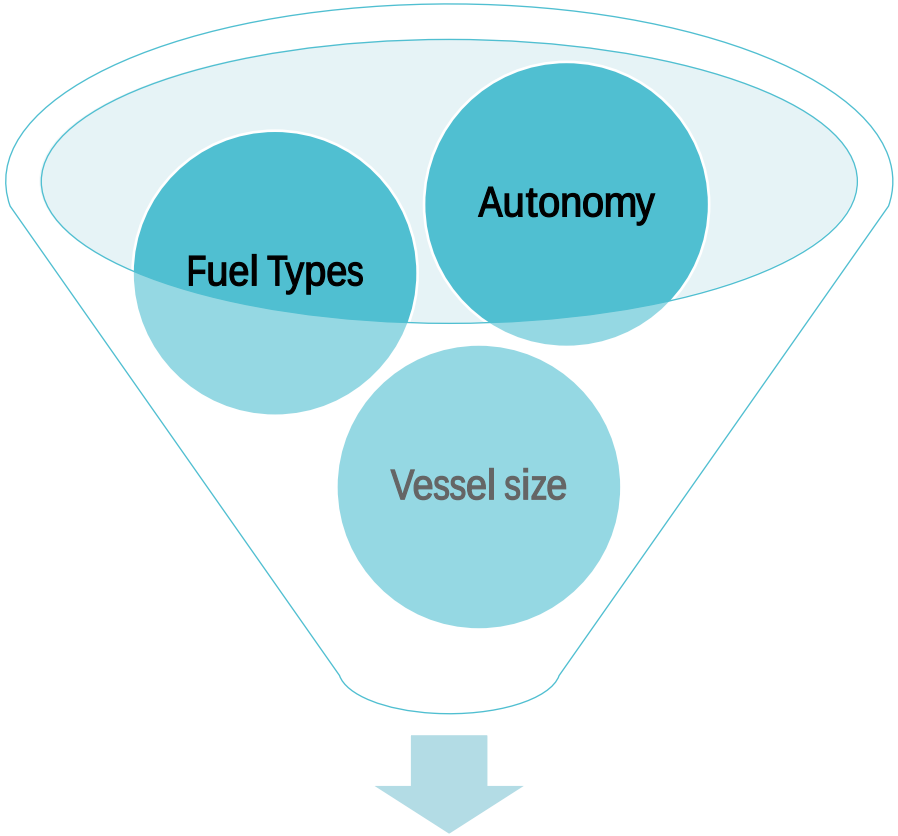
- Channel, berth survey
- Dredging
- Deck repair, replacement
- Pier element inspection, assessment
- STS / gantry cranes



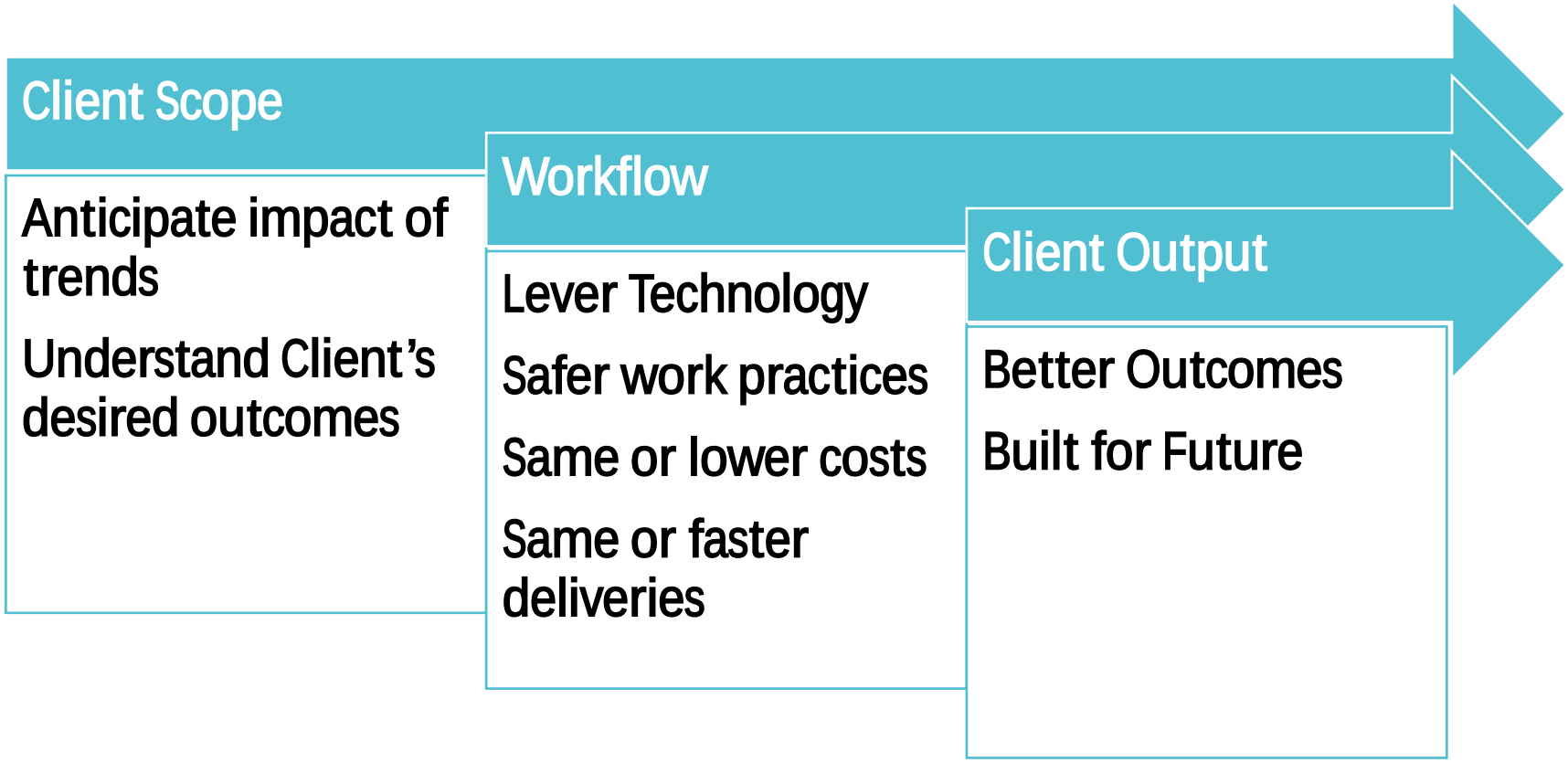
Implications: Anticipating Change; Risks

Risks are Bets – You can win and you can lose

How to make the <u>best</u> decisions?



It’s All About Workflow



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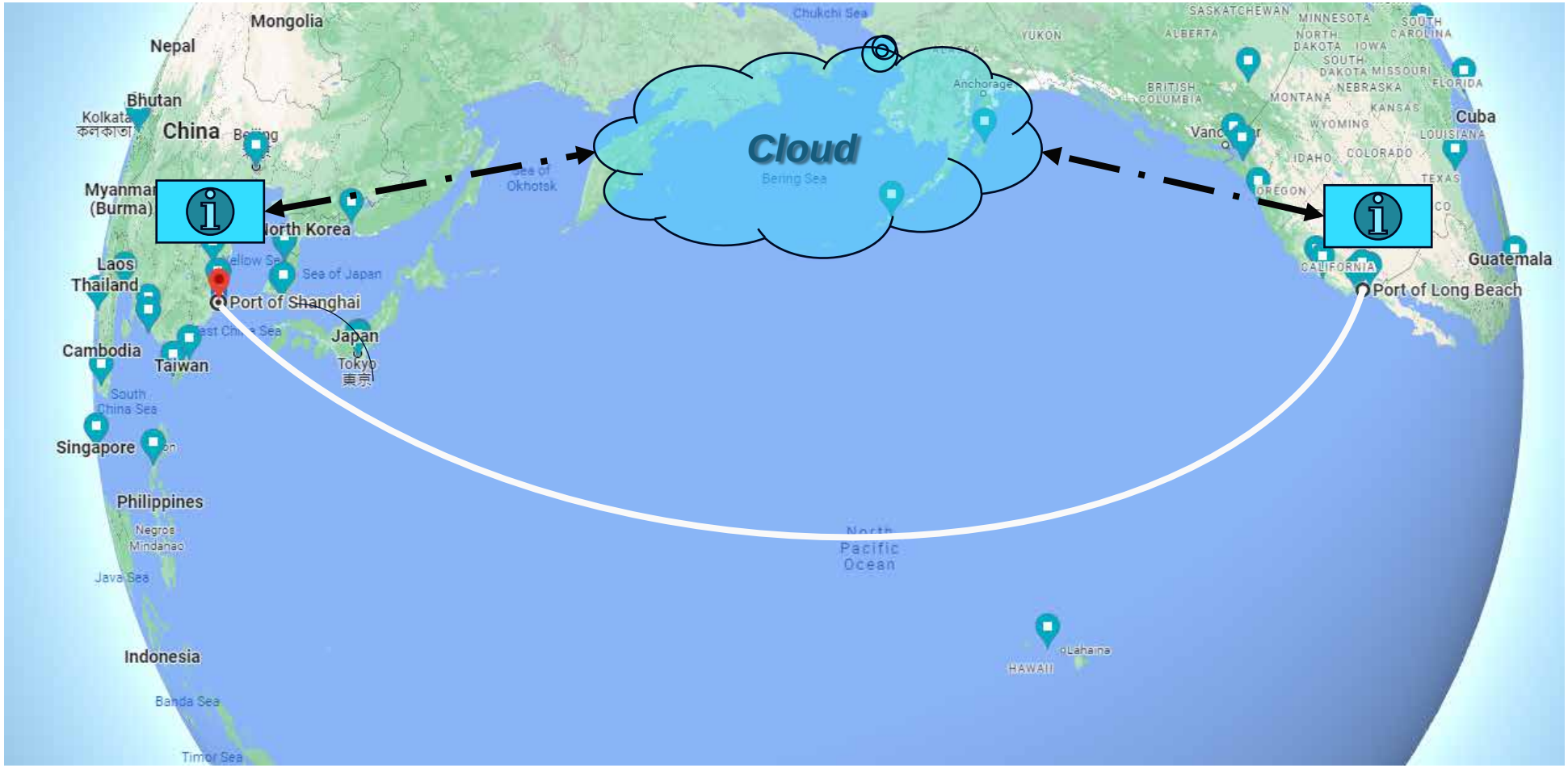
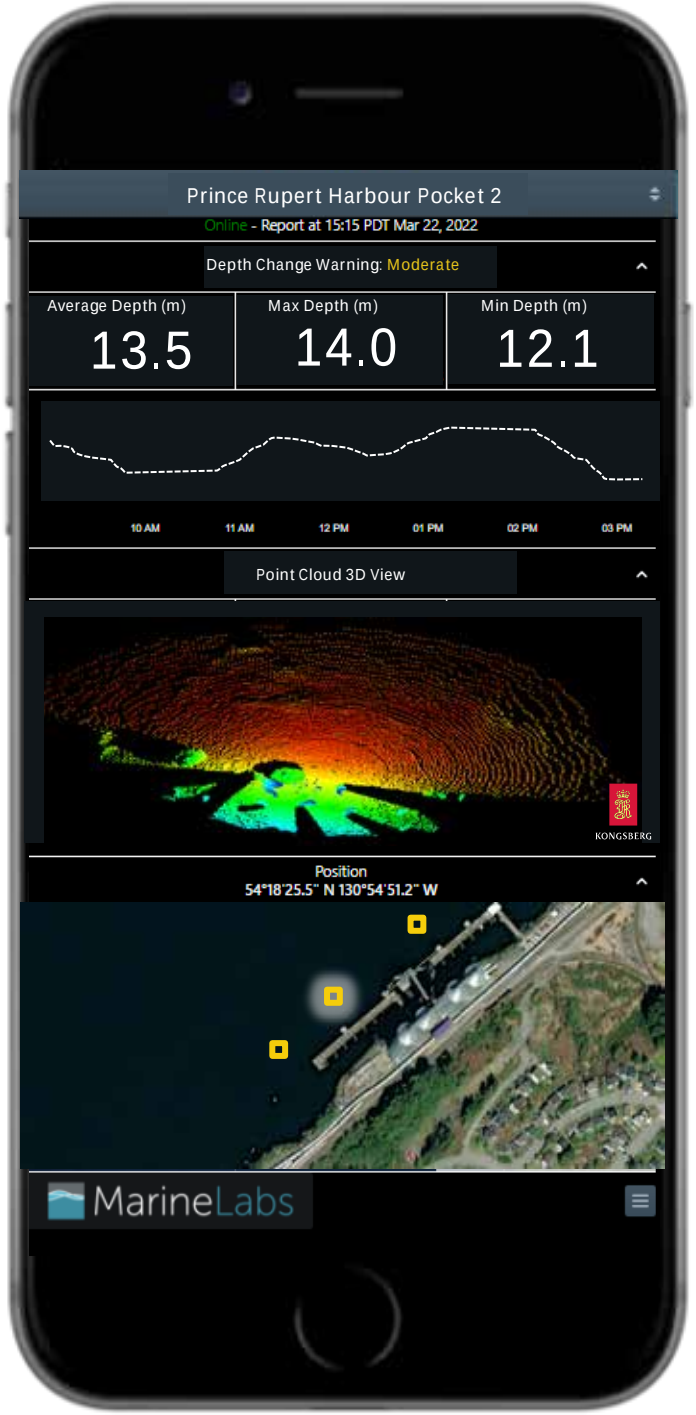
Example: Green Shipping Corridors

Multiple Stakeholders – How to turn concept to reality?

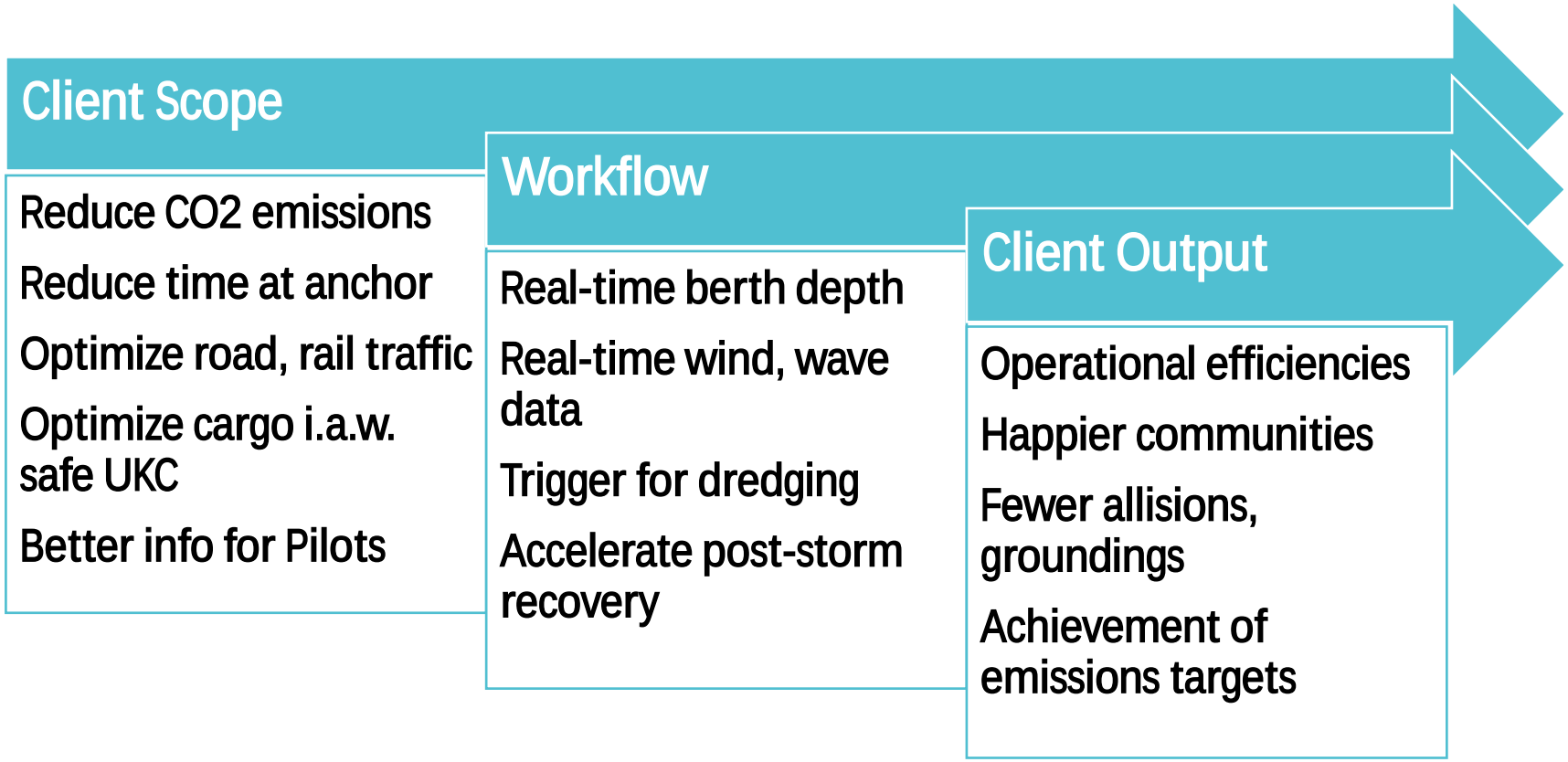


BerthWatch – Dashboard

- Select berth pocket
- Check for Δ warnings
- View latest pocket depth summary
- 3d pan rotate point cloud
- Check another berth pocket



Green Shipping Corridor Workflow

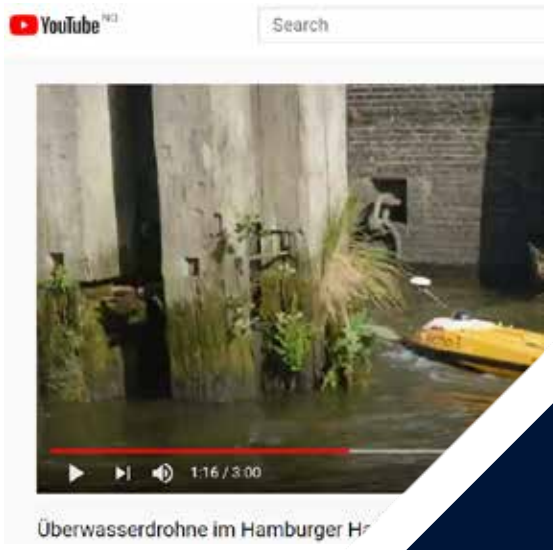


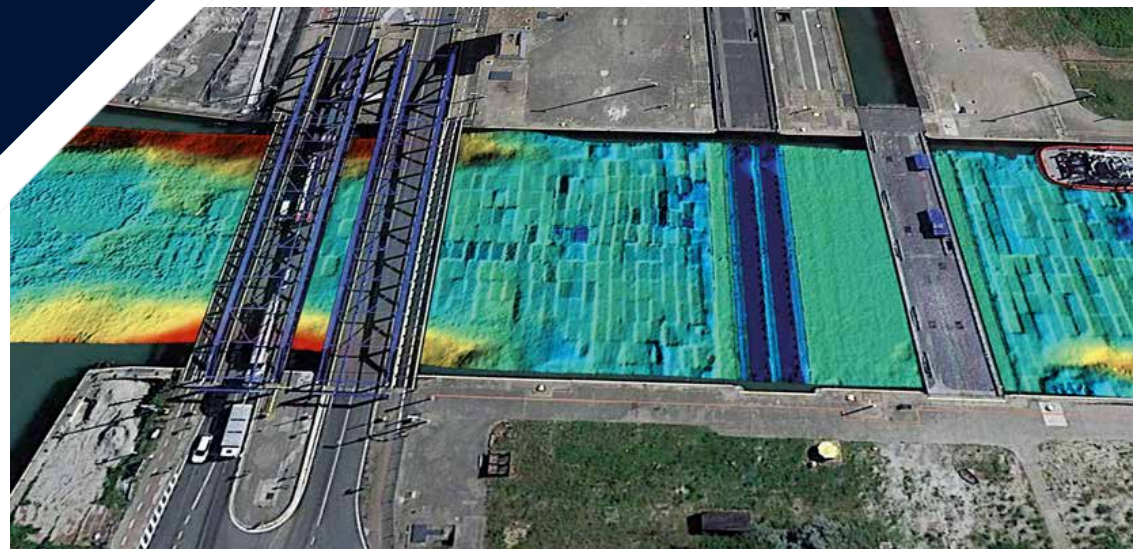
Shallow Survey

Customer Focus: Shallow Survey and Inspection

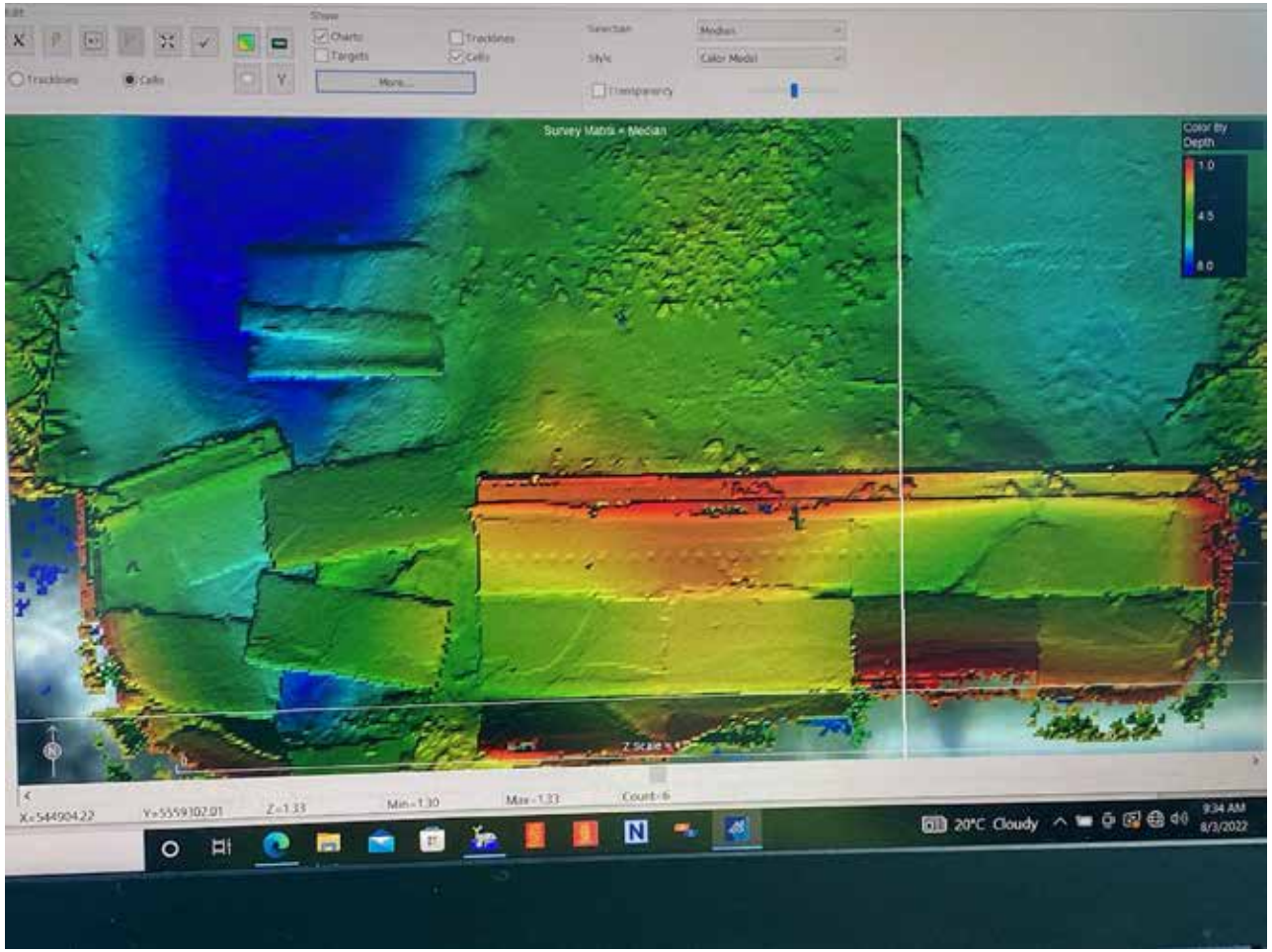
Customer Benefits:

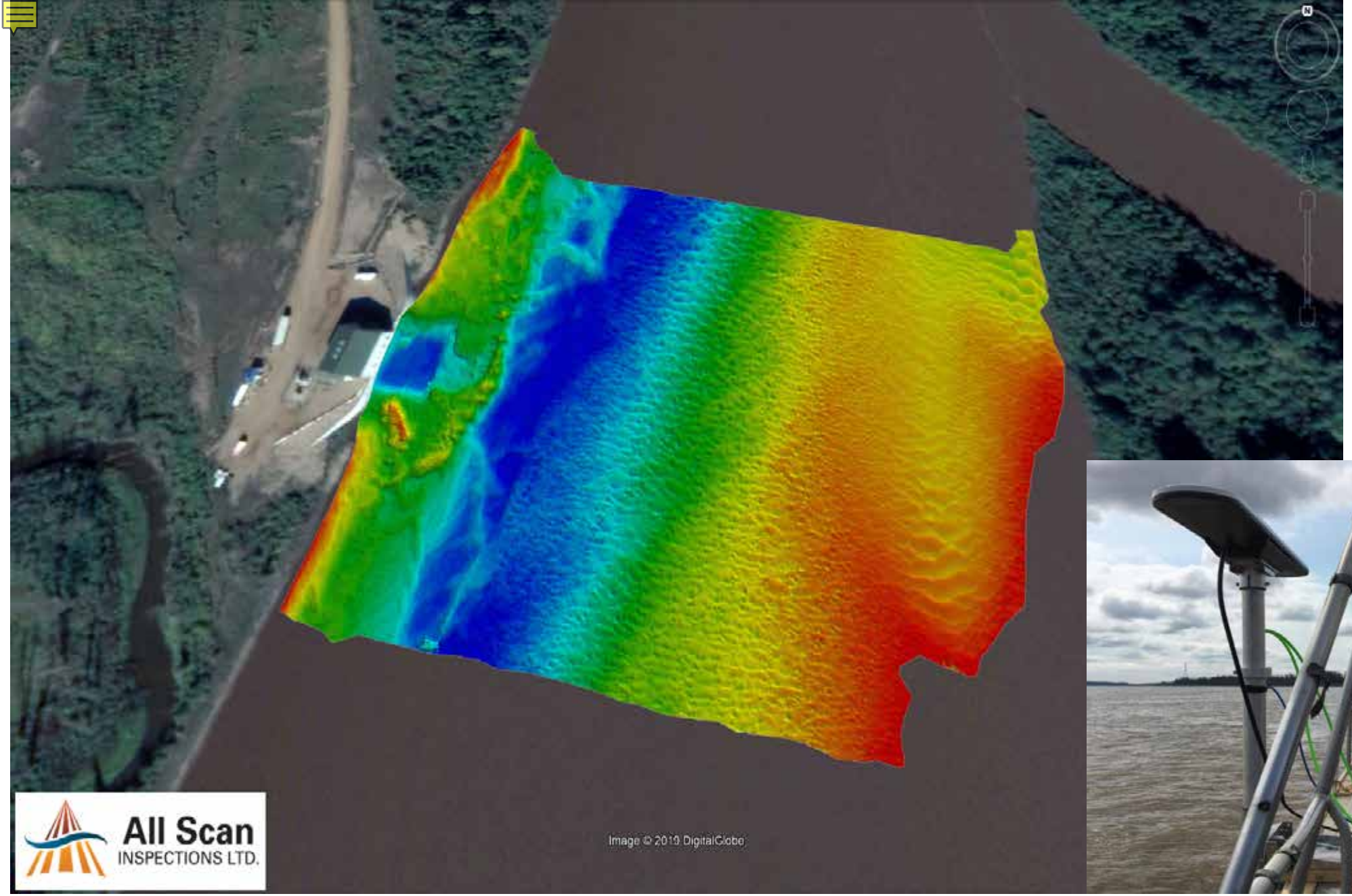
- Small form factor
- High performance for Low Price
- Integrated with Hypack, EIVA, Qinsy, Sonarwiz





3 HF Sonar for Bottom Scans




All Scan
INSPECTIONS LTD.
Image © 2019 DigitalGlobe

USV/ASVs already integrated with the M3 Sonar

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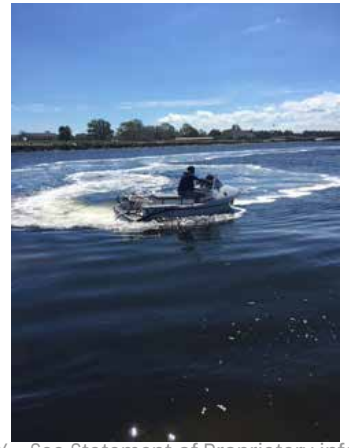
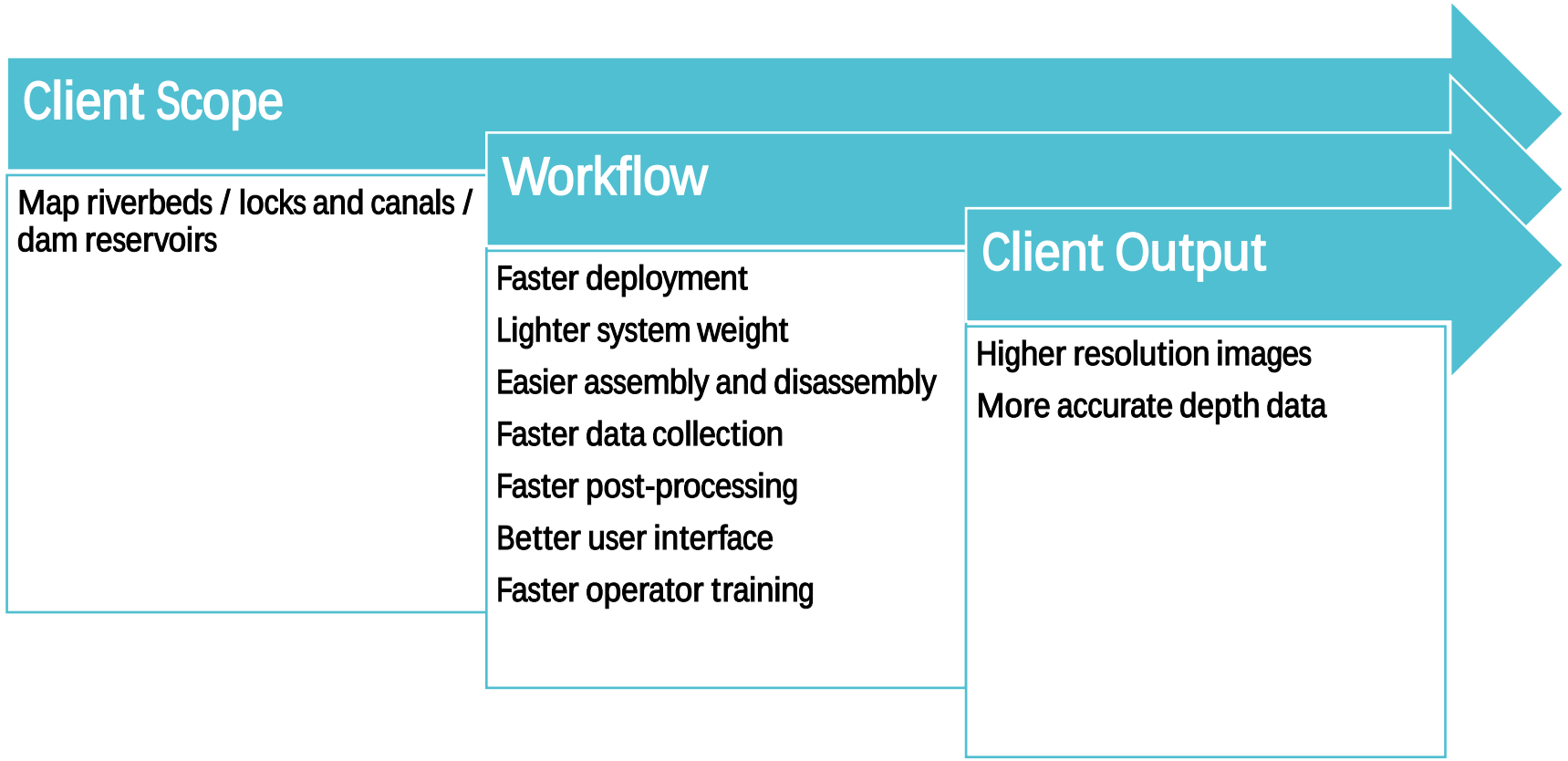


Mapping Workflow



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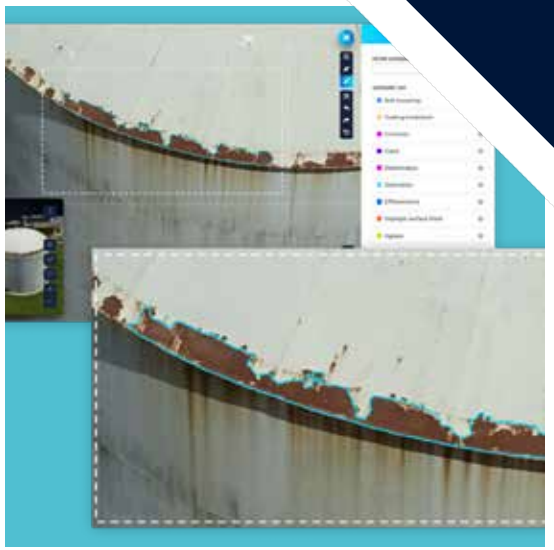
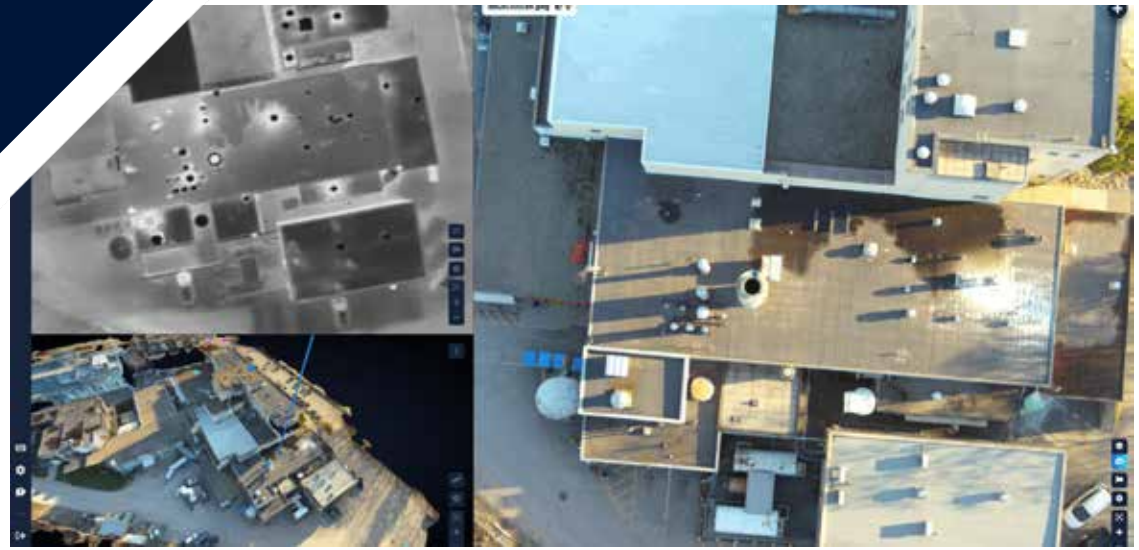
Infrastructure Survey



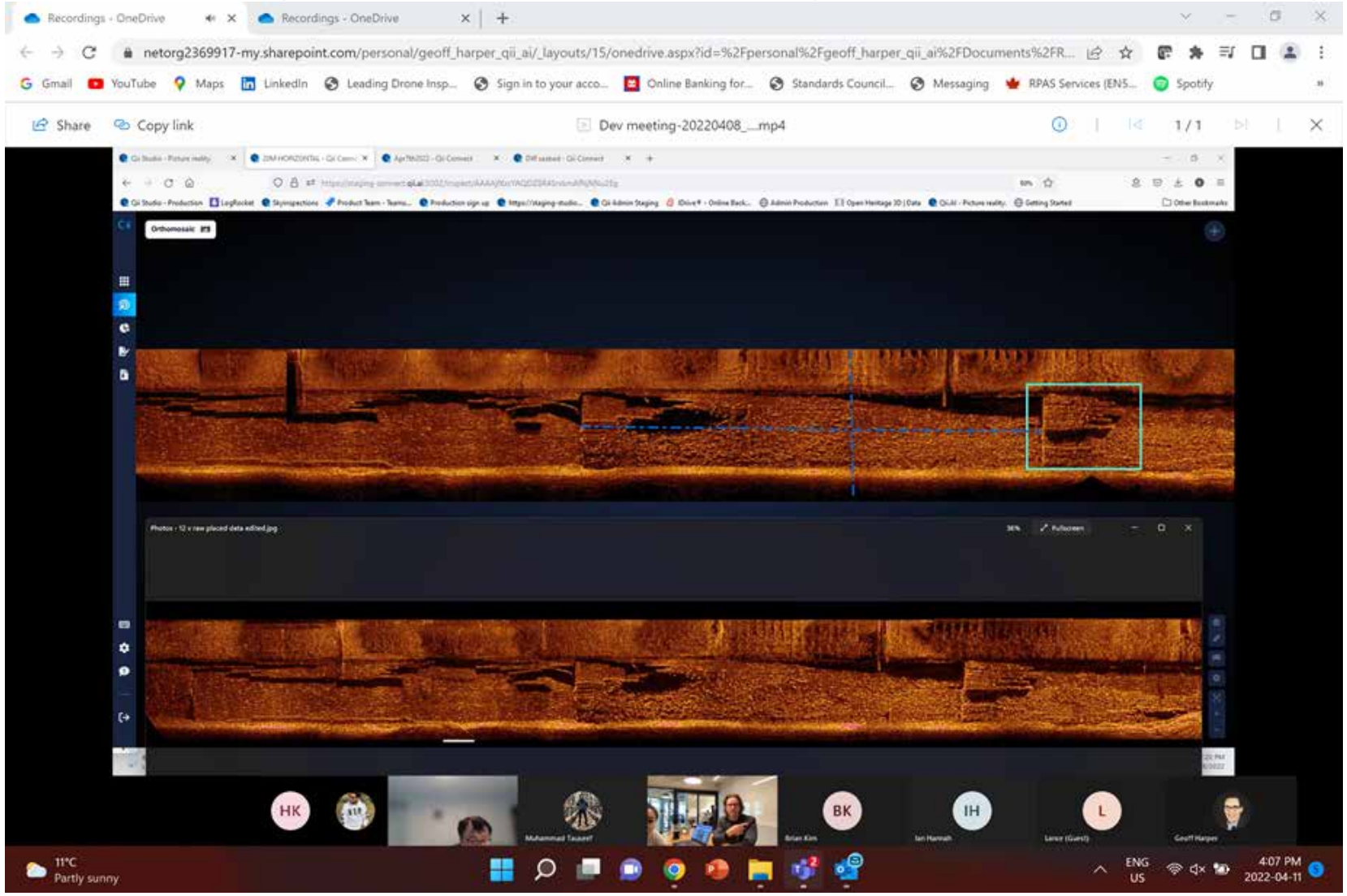


Customer Focus: Civil Engineers

Customer Benefits:

- Faster image processing
- Better mosaics
- Feature I.D.

Top image: AI. Bottom image: manual splicing



Adding Arial Drone Data

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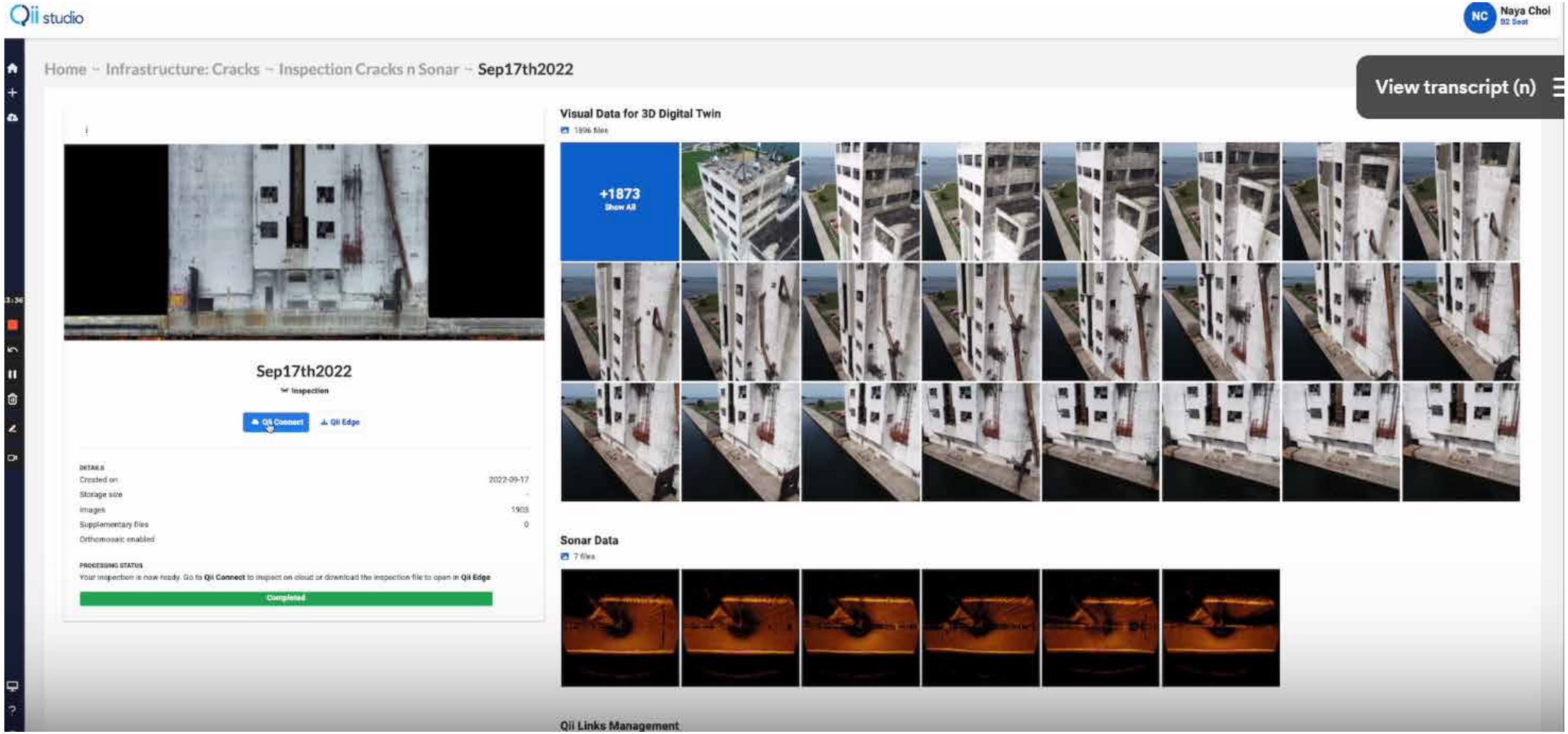
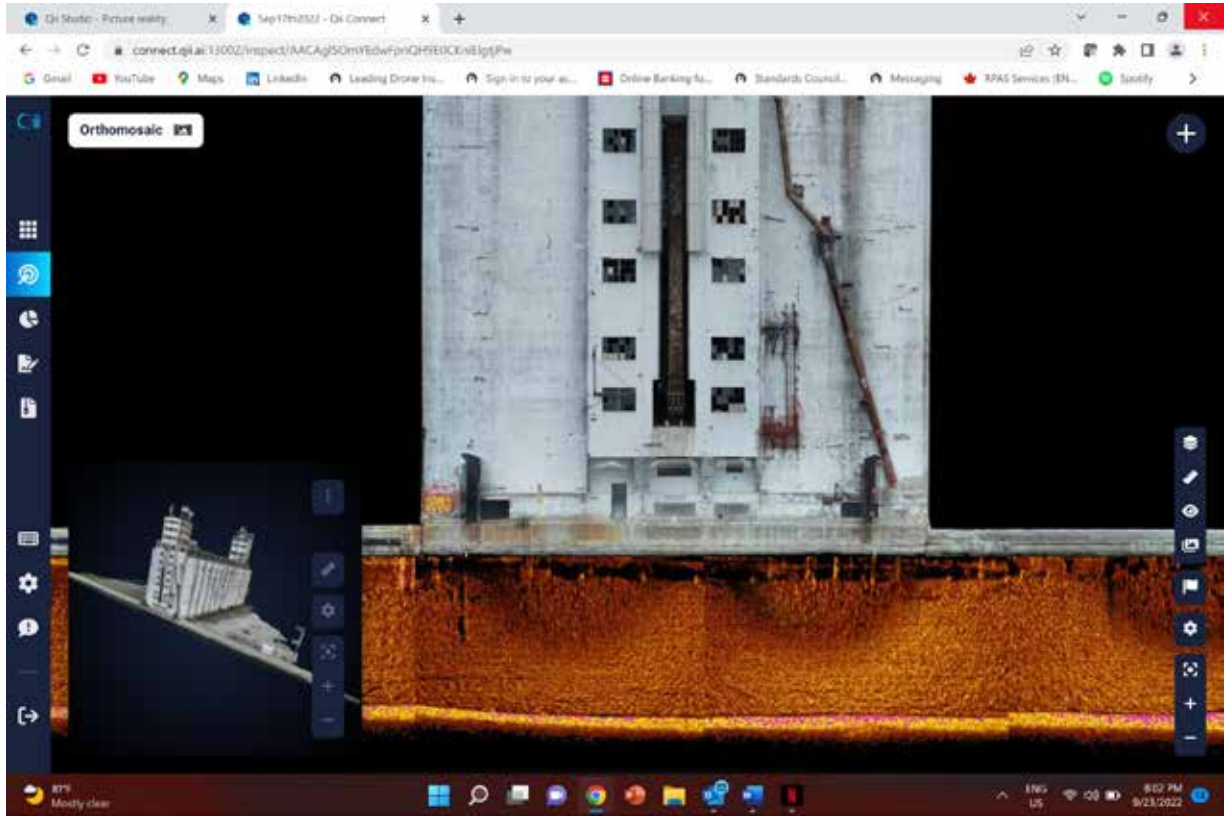
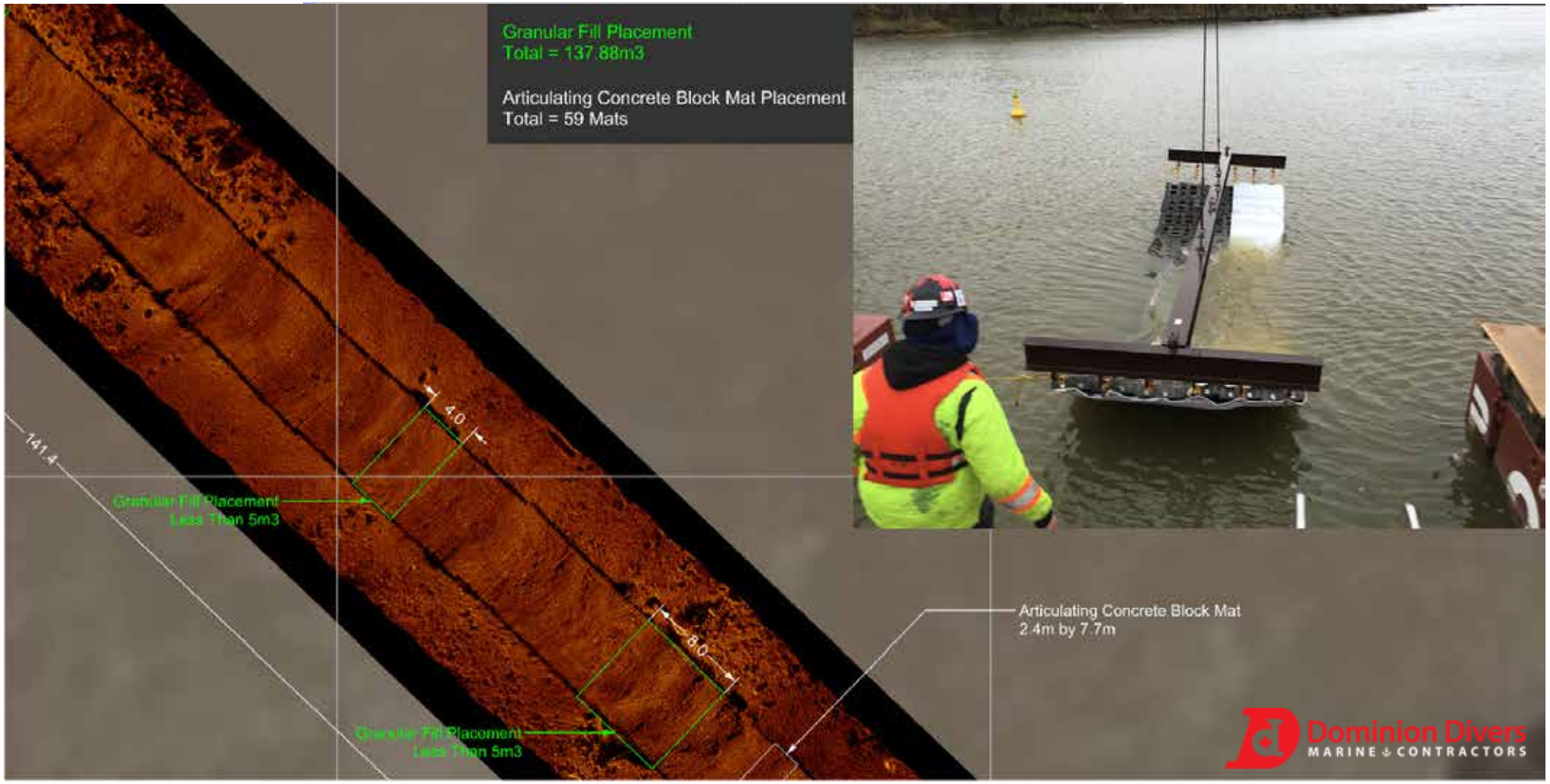


Data collection and GIS information storage



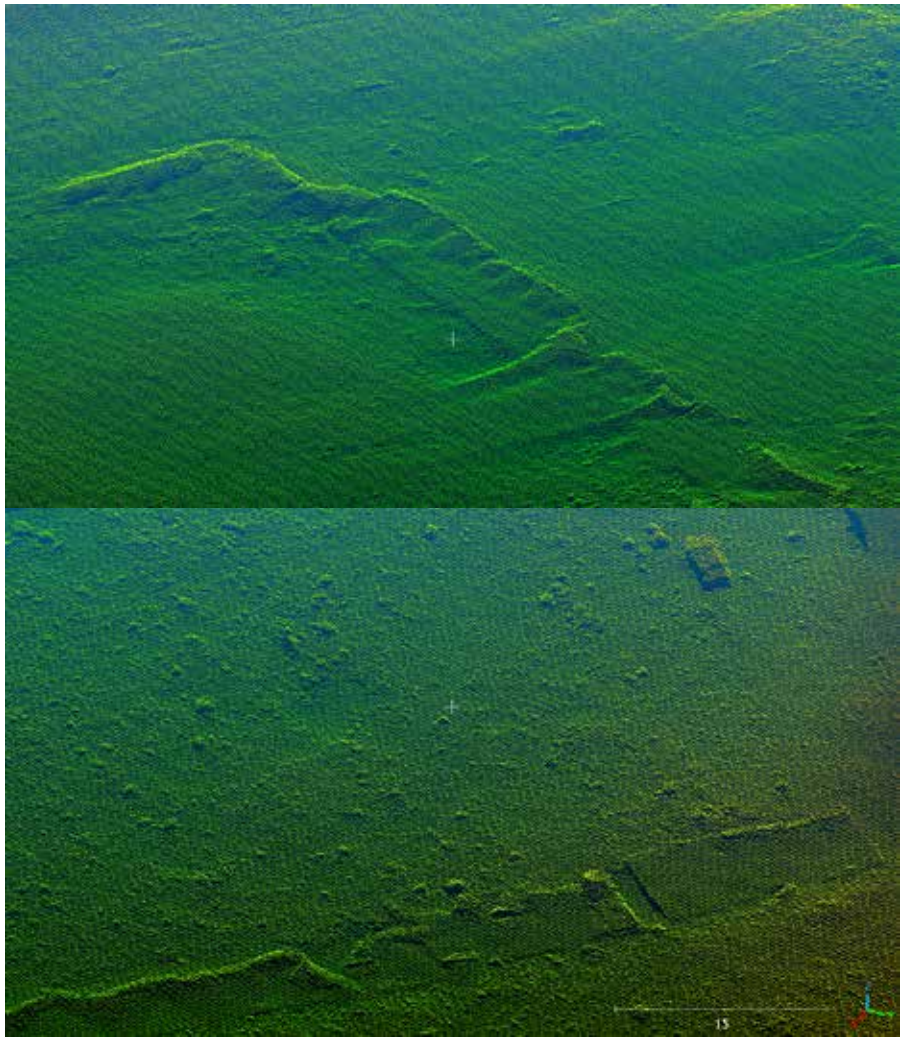
Mat installation

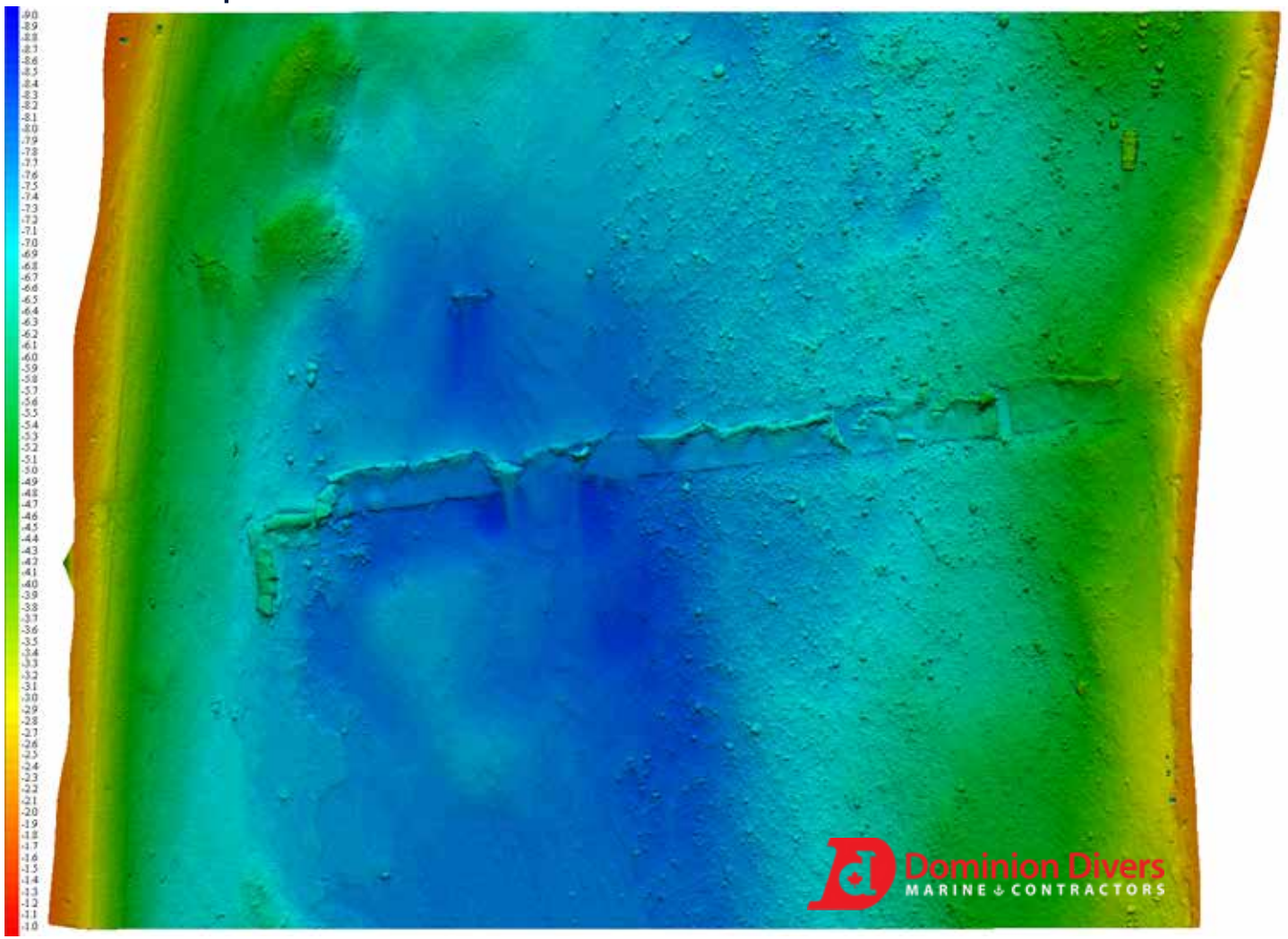
1171 High Resolution Scanning Sonar – As-Built



M3 Sonar HF

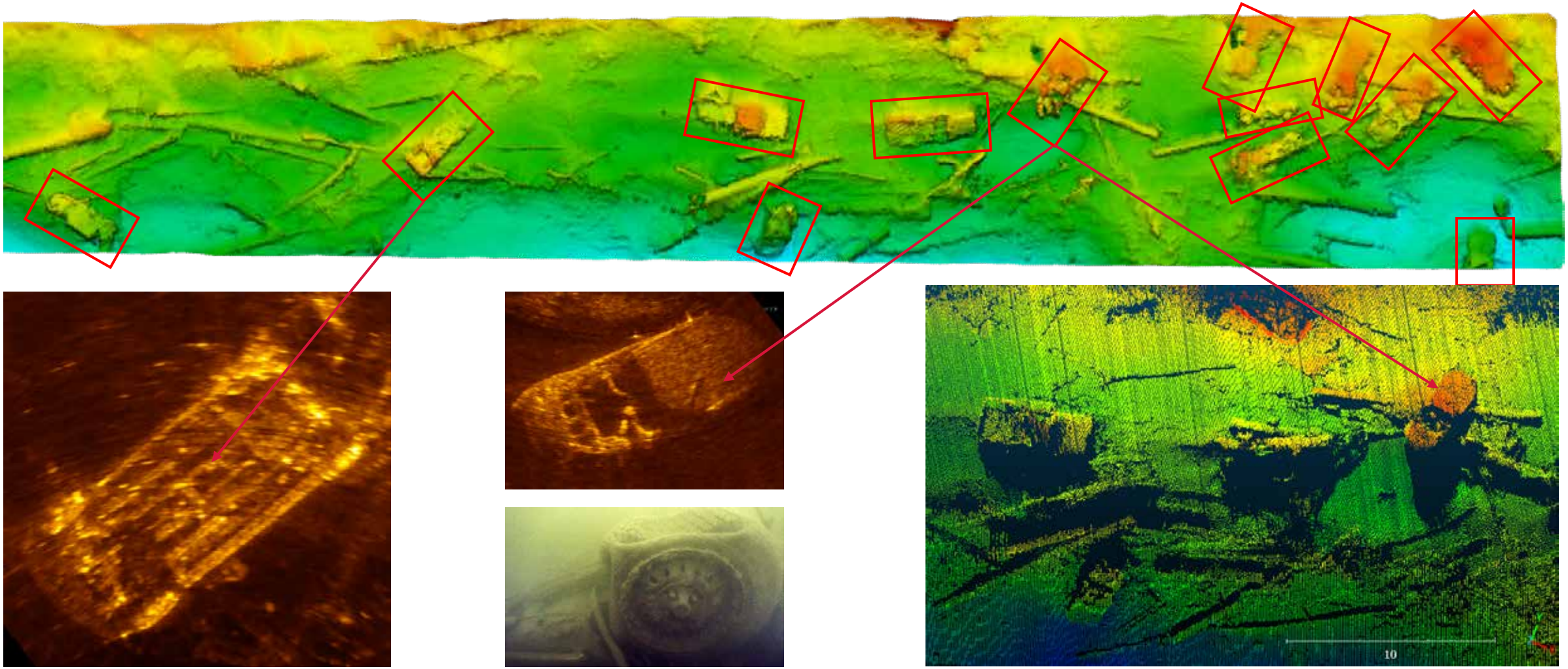
Mat inspection





M3 Sonar HF

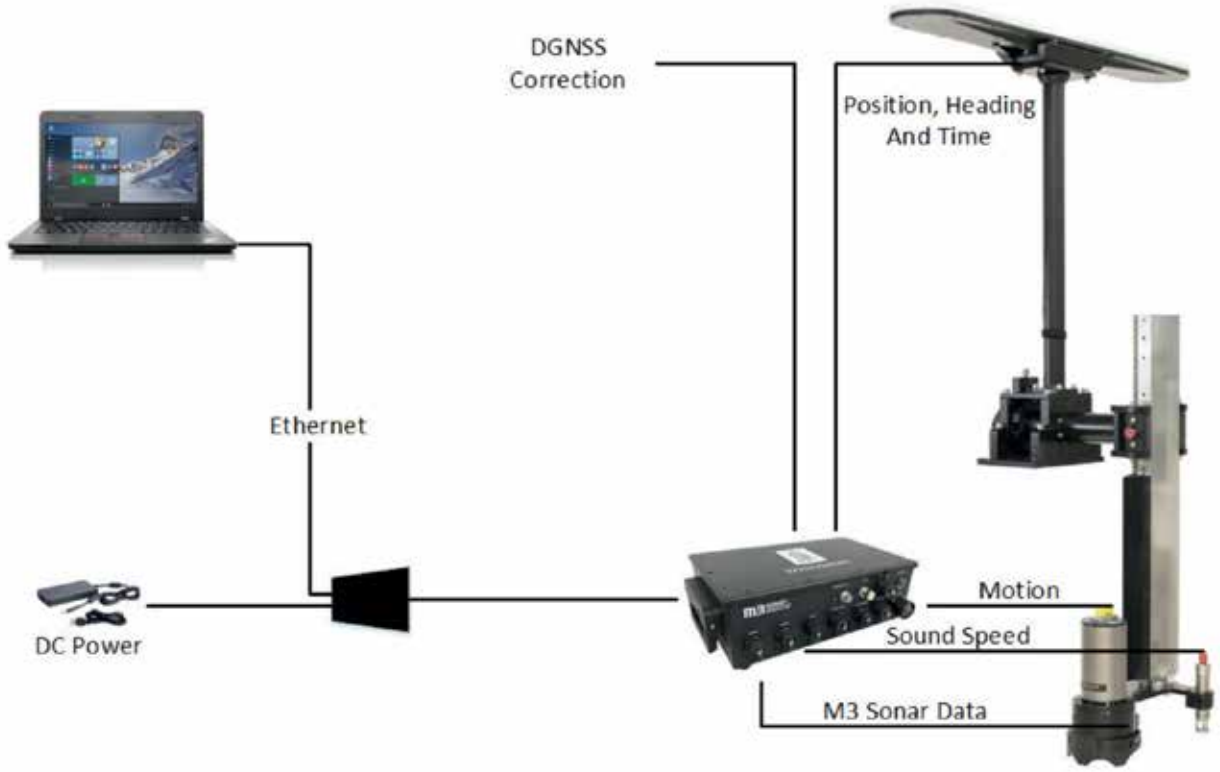
Abandoned Car Search



M3 Sonar HF

Surface Vessel Interface

- Telemetry: **Ethernet 100Mbps**
- Synchronization: **PPS & PRI_SYNC**
- Power: **12 – 36 VDC @ 50W** (average)
- Connector: **SEA CON MINK-10-FCRL**

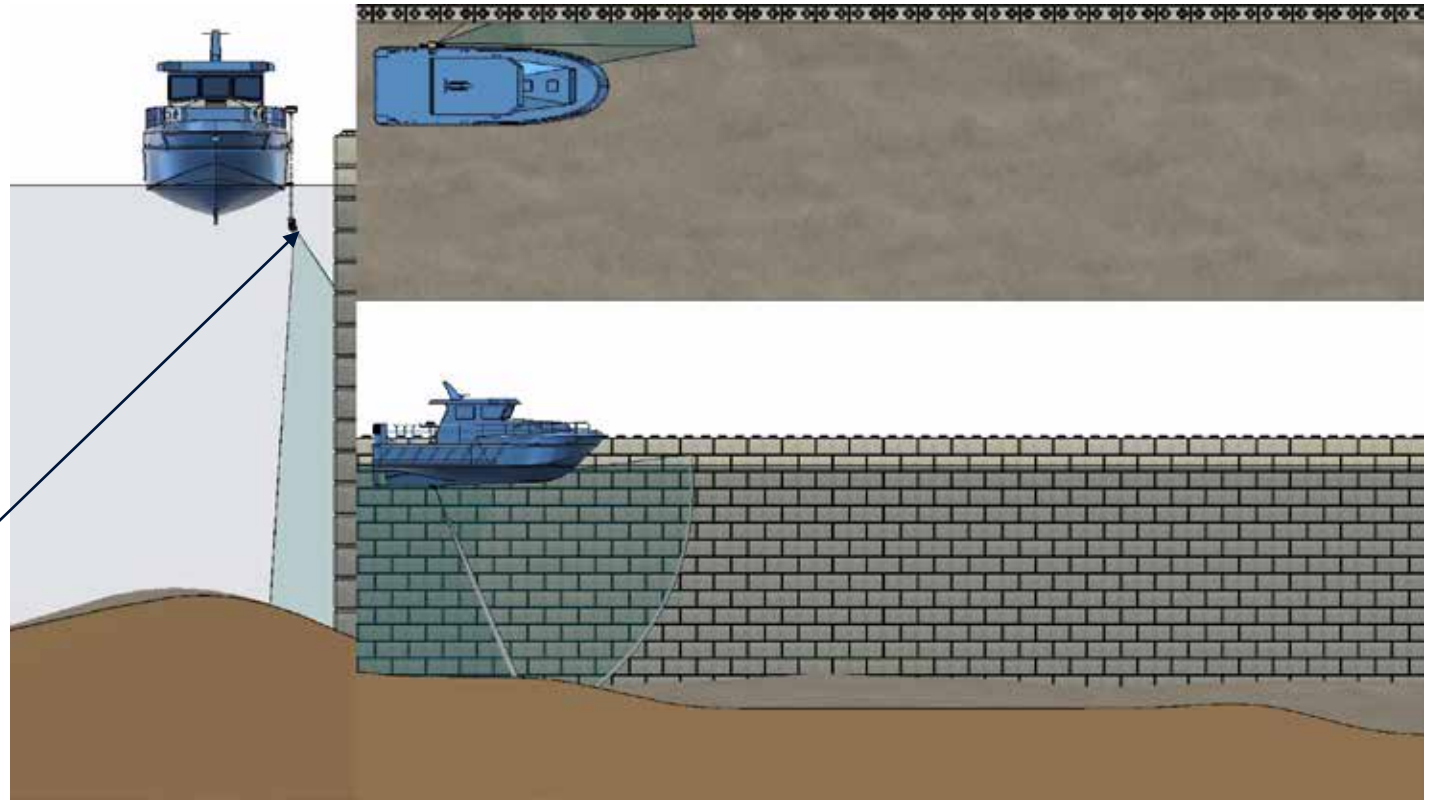


Mosaic – Elevation View

Forward looking

Tilt the sonar toward the seawall to minimize the blind zone near the top of the seawall.

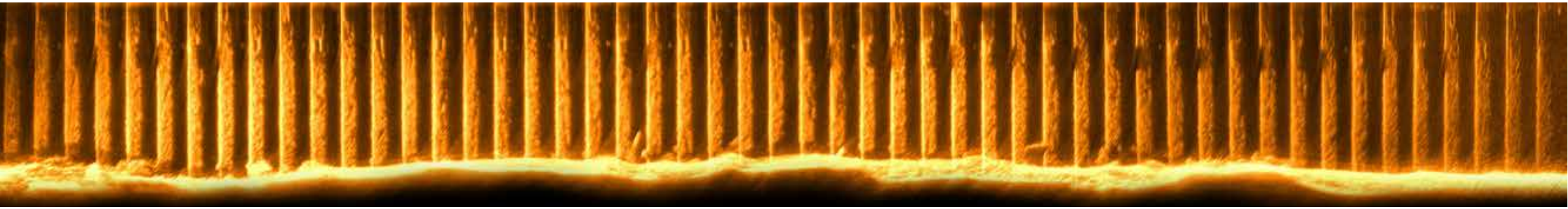
Blind zone on the seawall will get lower as the boat moves further away or higher as the boat gets closer to the seawall.



Frequency: 1200kHz
Beam: 75° x 21°
Yaw = -10° (toward wall)
Pitch = -30° (tilt down)
Roll = 90° (vertical)
Range = ~1.2 x depth

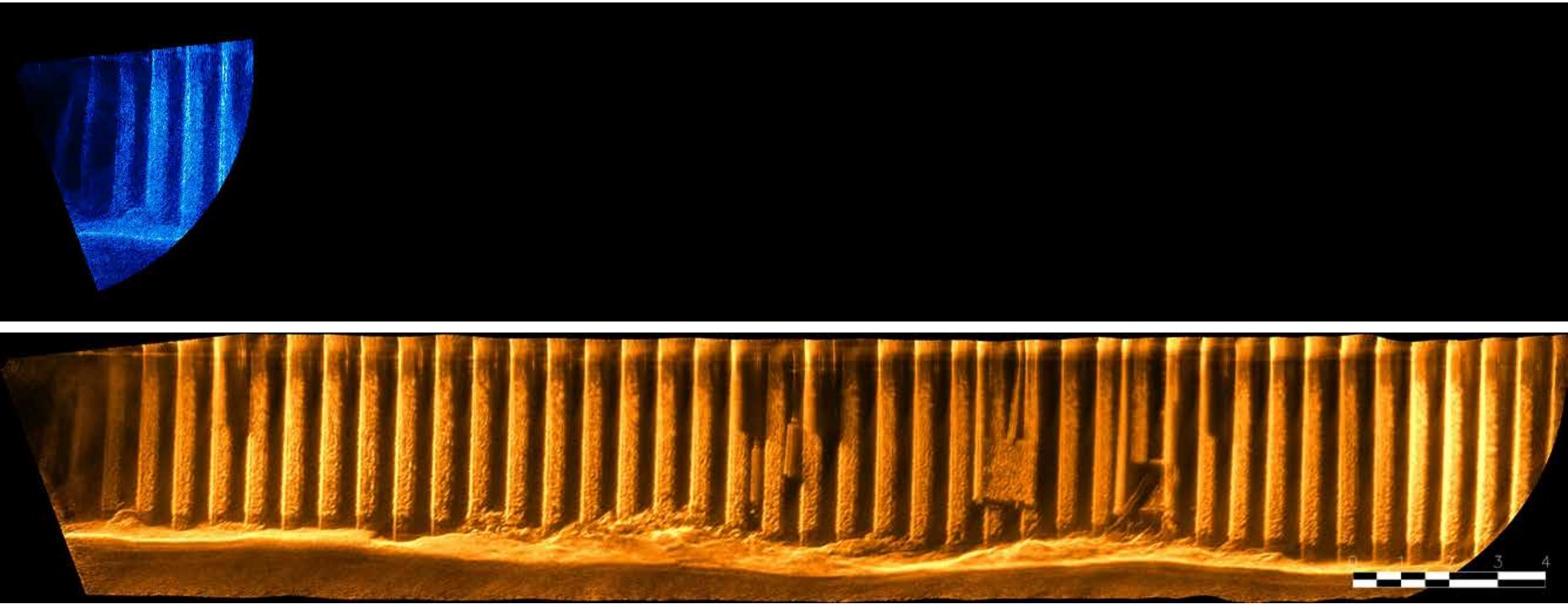
M3 Sonar HF

Sheet Pile Wall



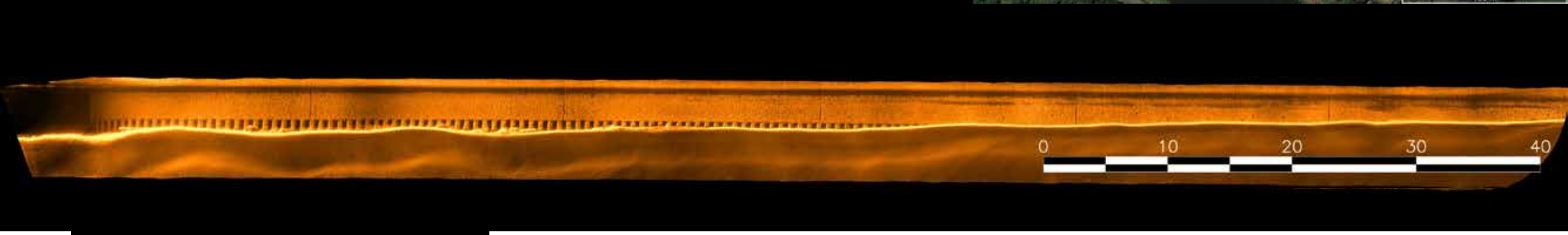
M3 Sonar HF

Sheet Pile Wall



M3 Sonar HF

Stuw Borgharen – Meuse Canal



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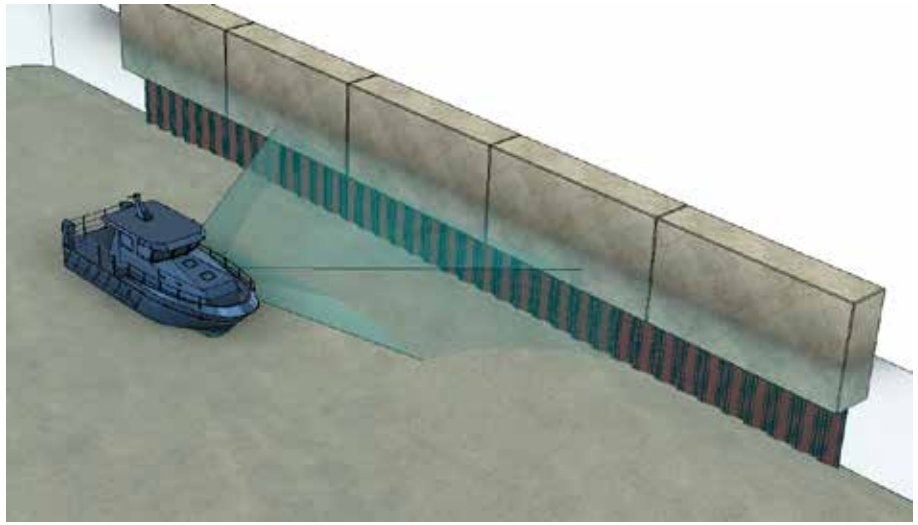
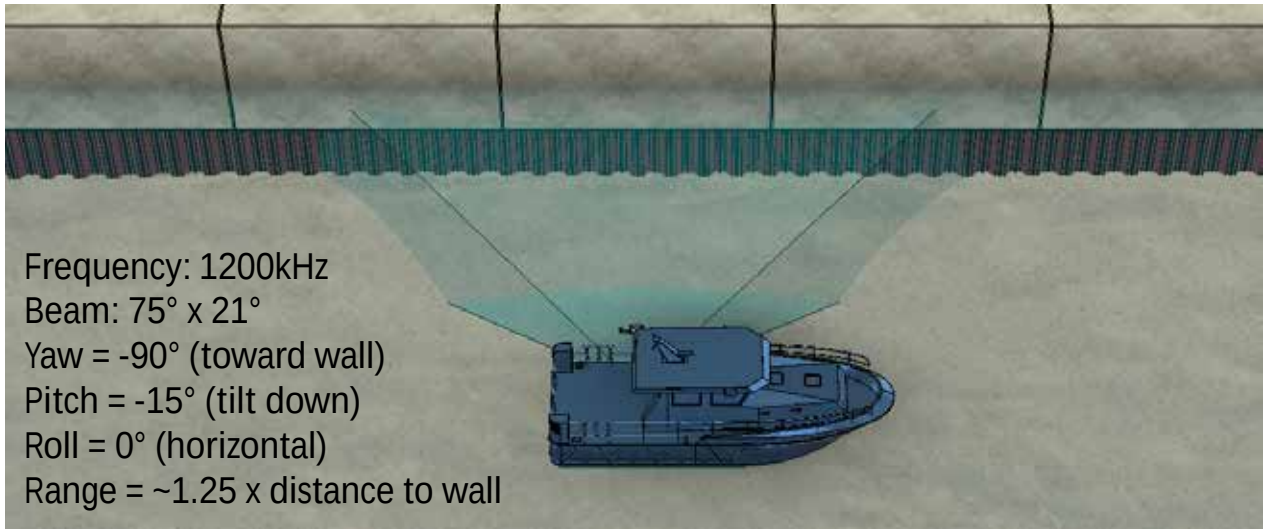
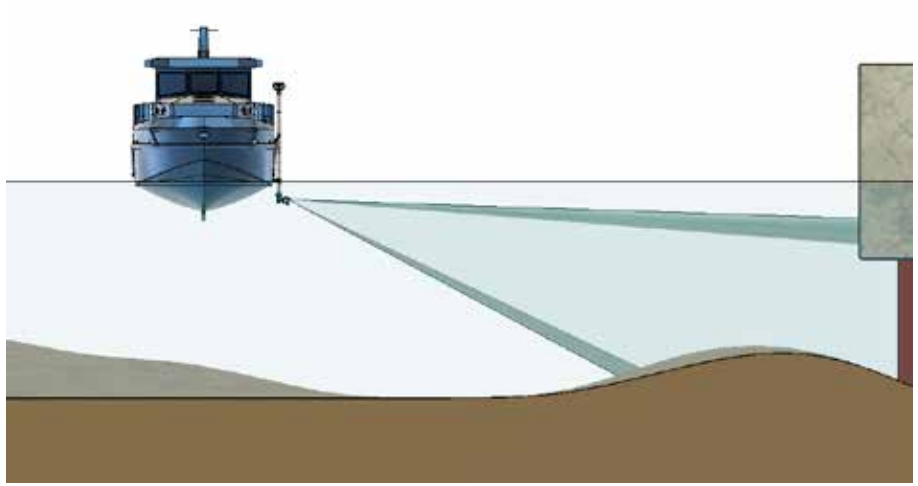
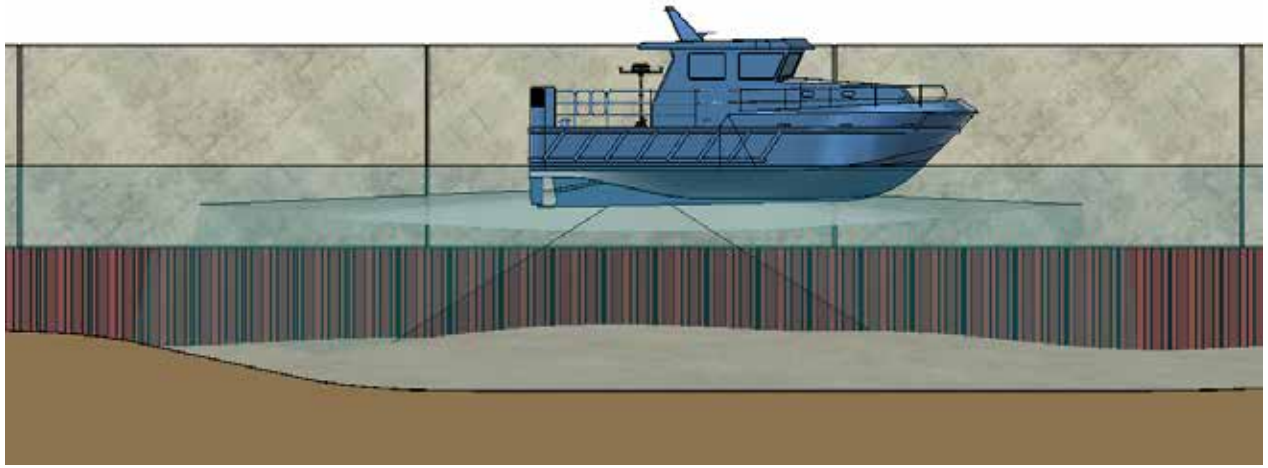
Mosaic – Plan View

Side Looking



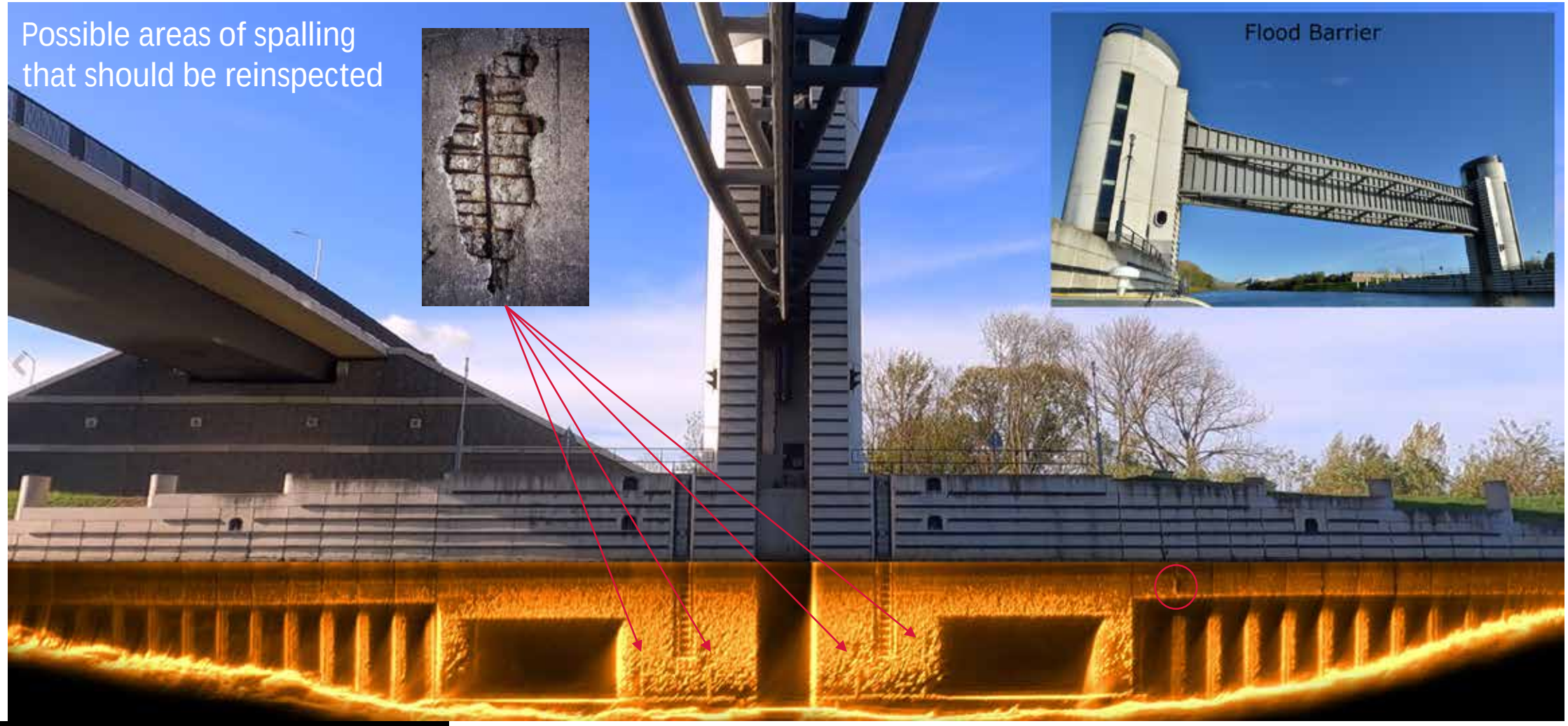






M3 Sonar HF

Keersluis Limmel – West Side Elevation View



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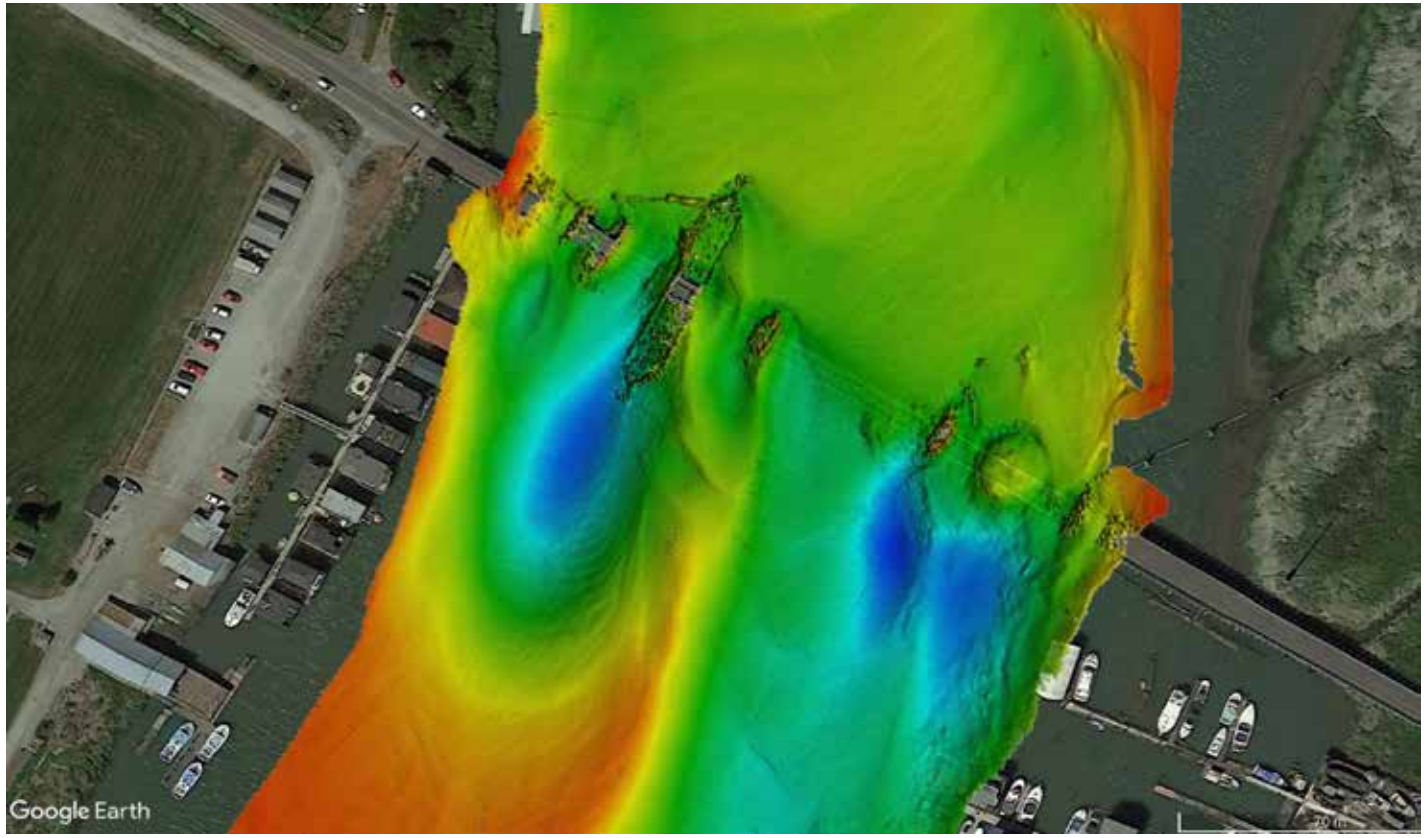
Bridges



- Bridge Pier scour
  - Real-time monitoring with DAS with K-Observer
  - Periodic inspection with Hi-res sonar
- Bridge structural inspection
  - High Res Sonar; Multibeam sonar
  - ScanFuse powered by Qii.AI

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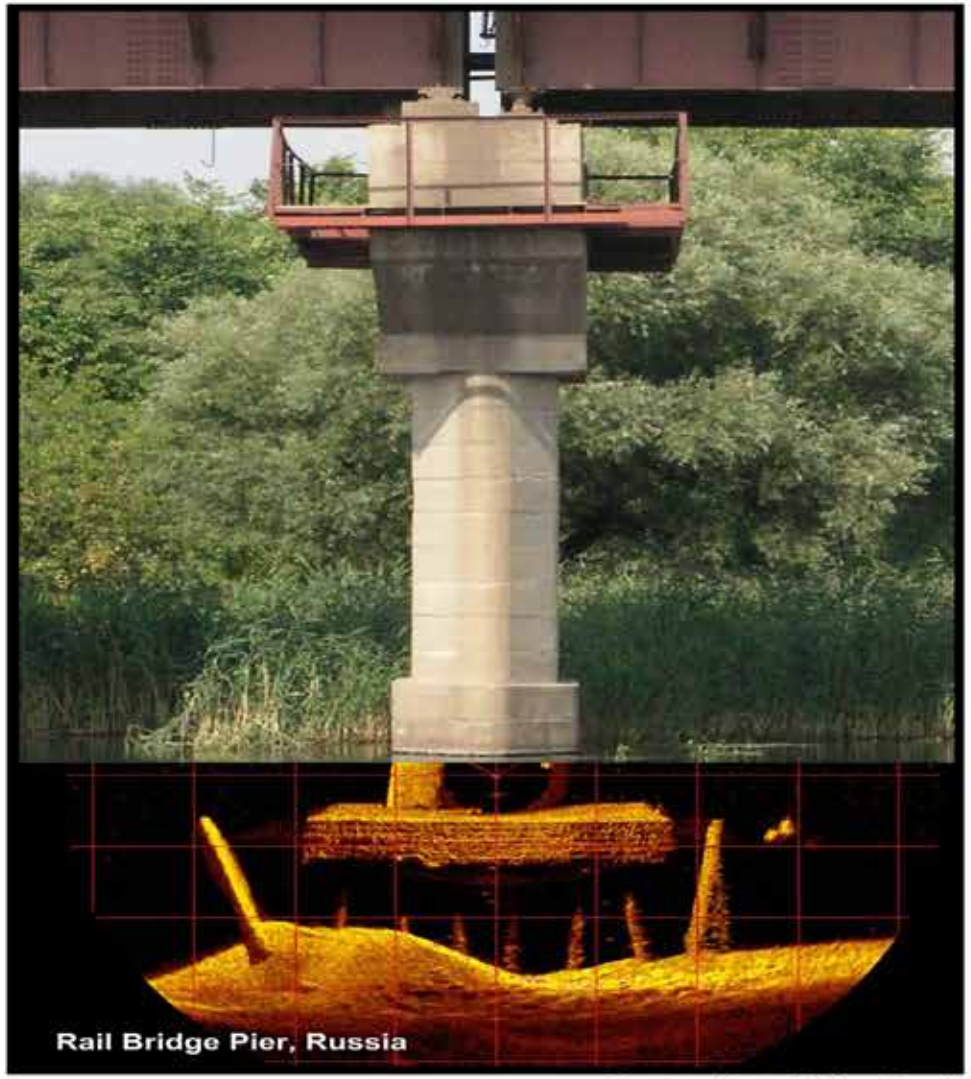
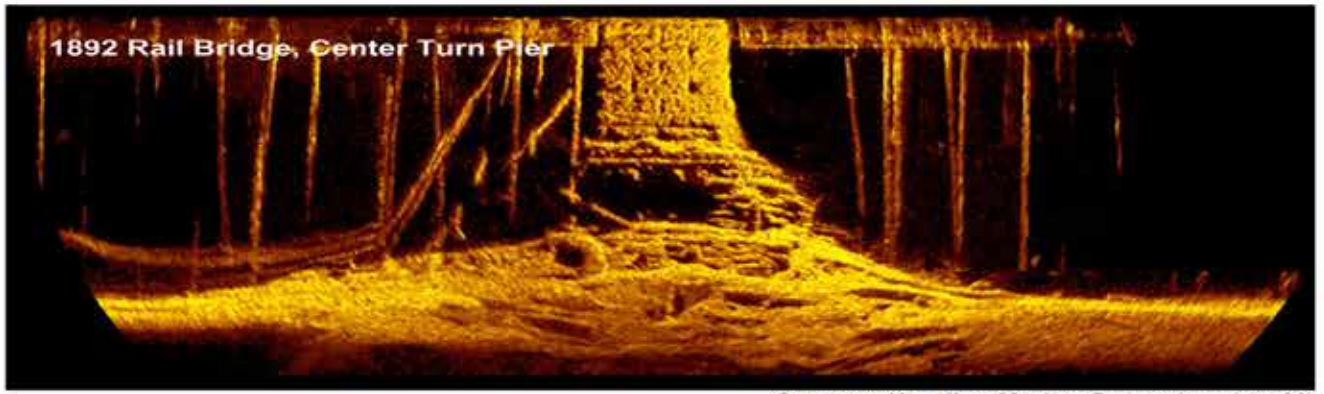
Scanning Sonar Used to Identify Scour, and Structural Deterioration of Bridge Piers and Docks

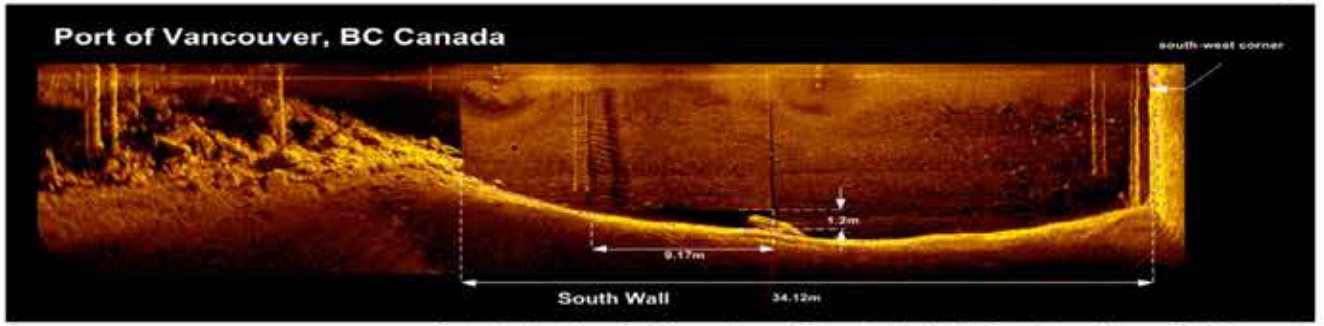


Courtesy ***Peter Diving***, Russia



Courtesy ***Nautilus Marine Group***, Lansing, MI

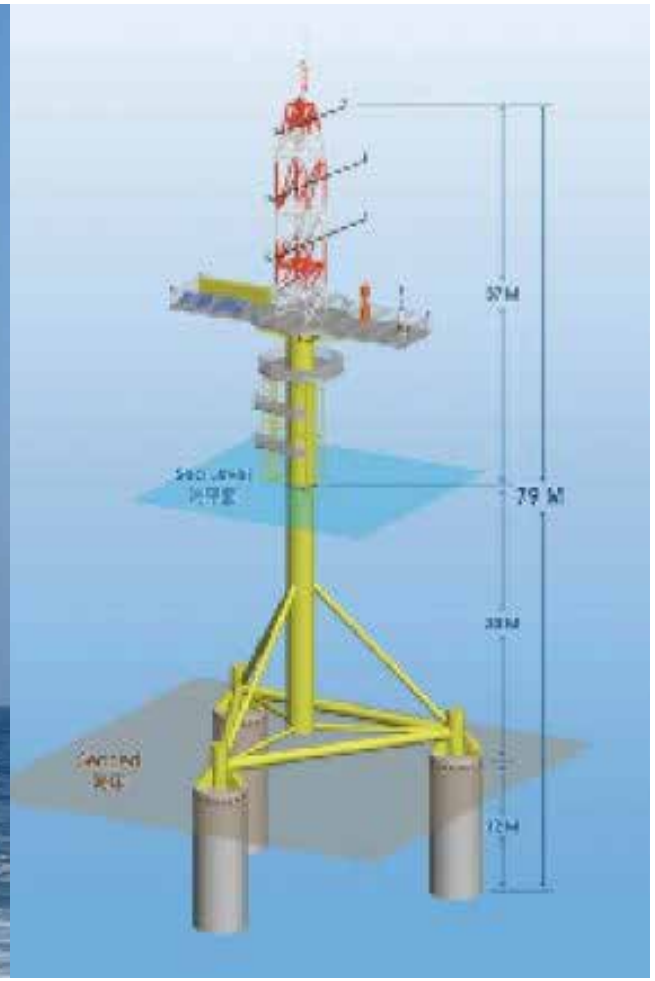
Courtesy ***3P-Consultores***, Portugal



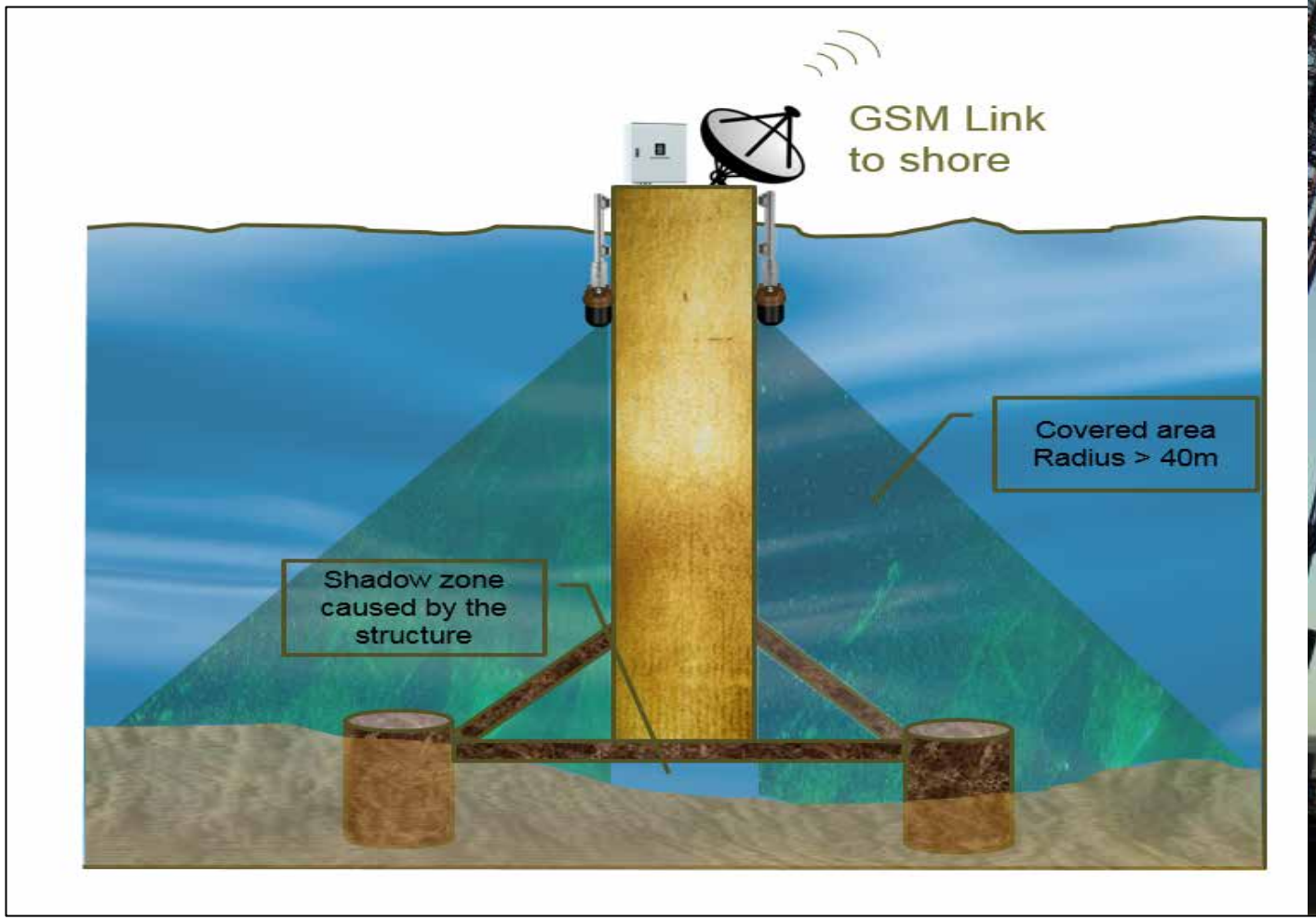
Data Collection by ***Kongsberg Mesotech Ltd.***, Port Coquitlam, BC, Canada

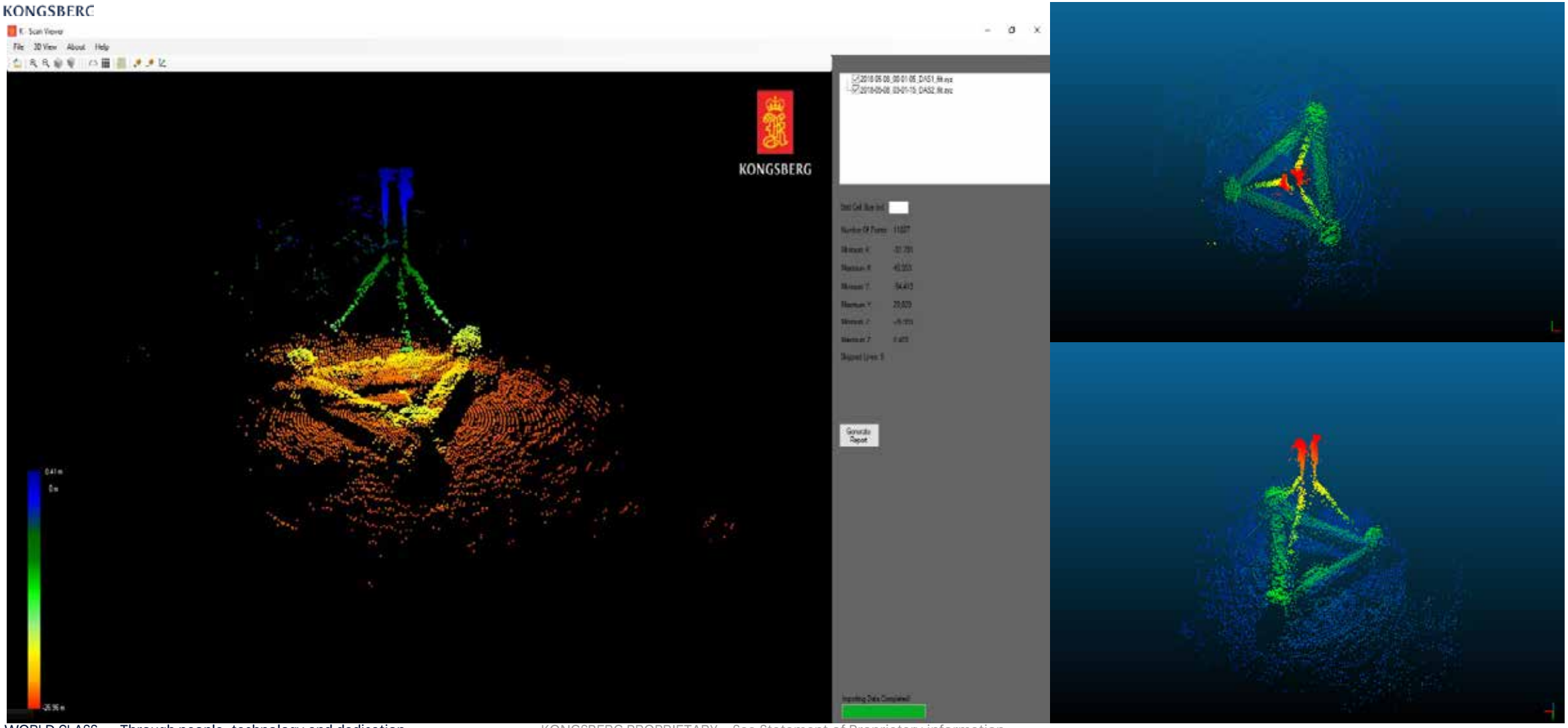
Data Collected Using MS 1000 and 675 kHz High Resolution Scanning Sonar Head with 30 Degree Fan Beam Transducer

Scour Monitoring System

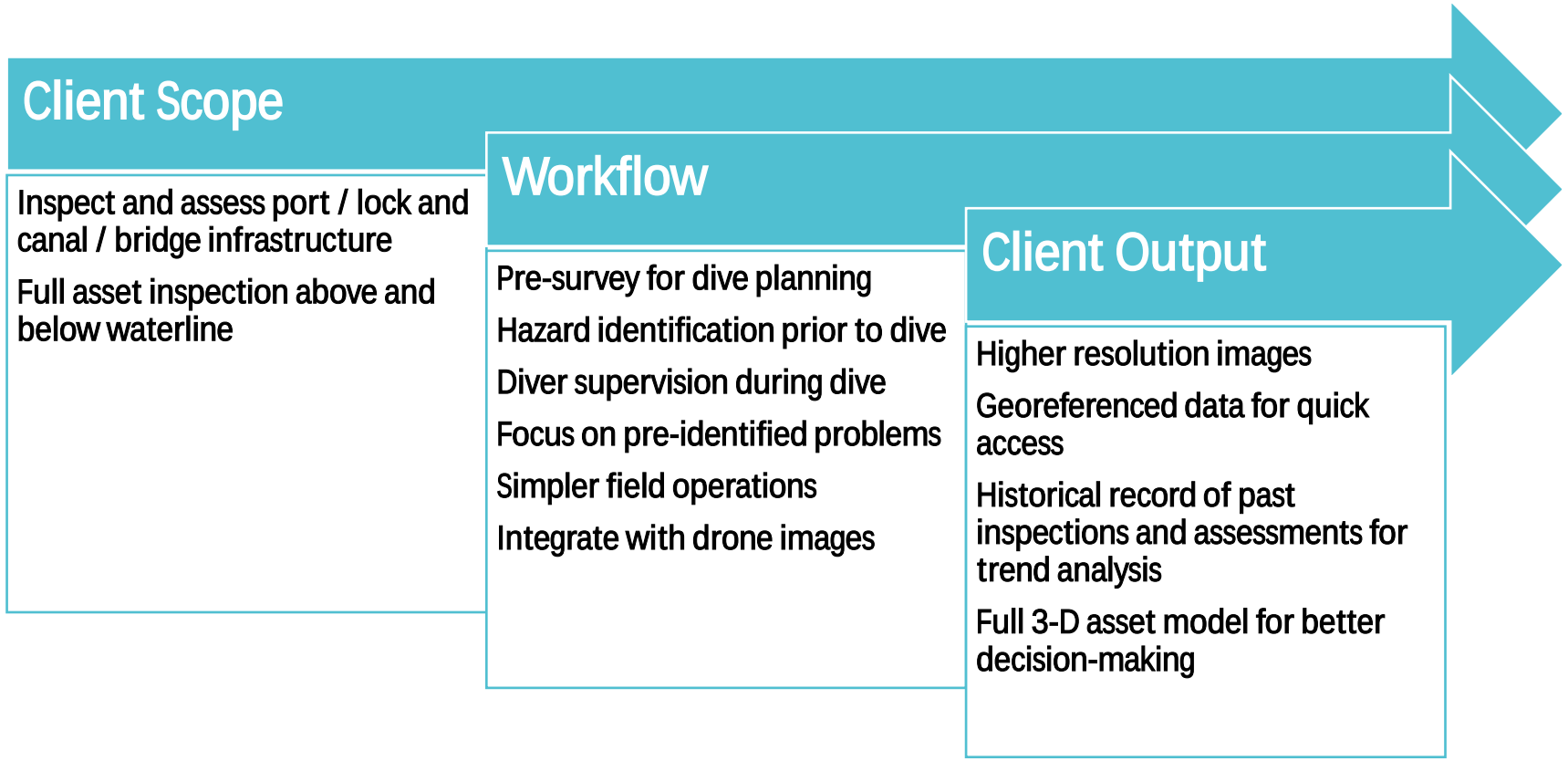


Set-up with 2 Dual Axis Scanning Sonars




K-Scan Viewer
File
3D View
About
Help
KONGSBERG
Generate Report

Infrastructure Inspection Workflow

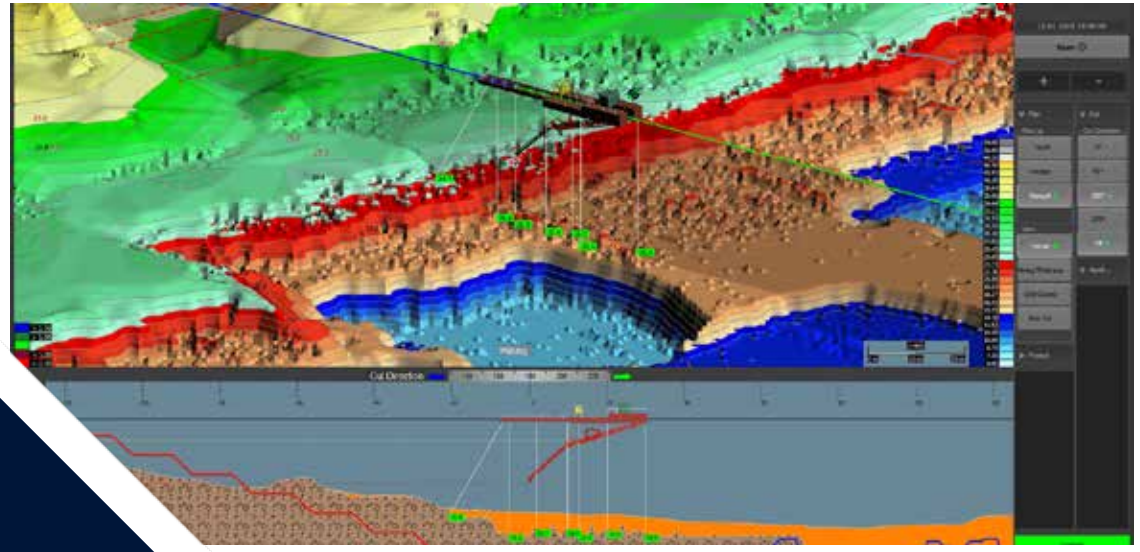


Real-Time Dredge Monitoring

Customer Focus: Dredge Operators

Customer Benefits:

- Contract Compliance
- Time Savings
- Eliminate Excess Dredging



Example – dredging risk

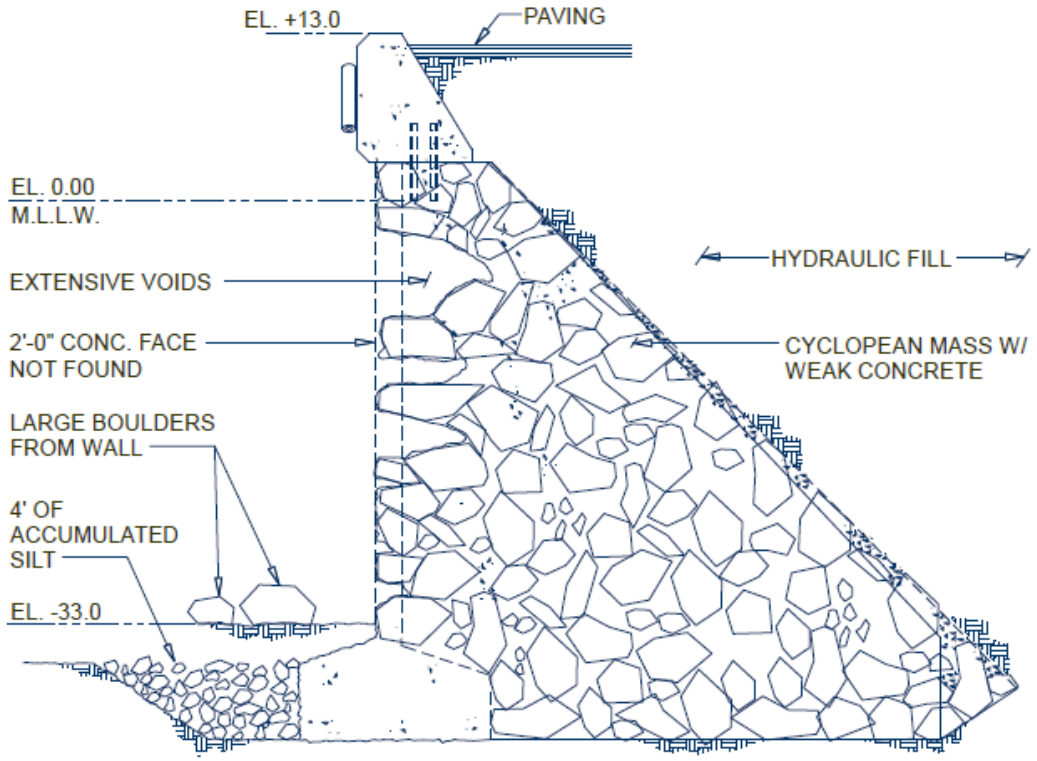
Mega-ships - Harwich Harbour will be able to make way for huge ships Picture: Stephen Waller

By Lewis Adams
Reporter
@lewis_adams

Share

A CONTRACTOR has been appointed in a project worth £120 million which will deepen Harwich Harbour to make room for mega ships.

Destabilizing Cyclopean Wall Foundation

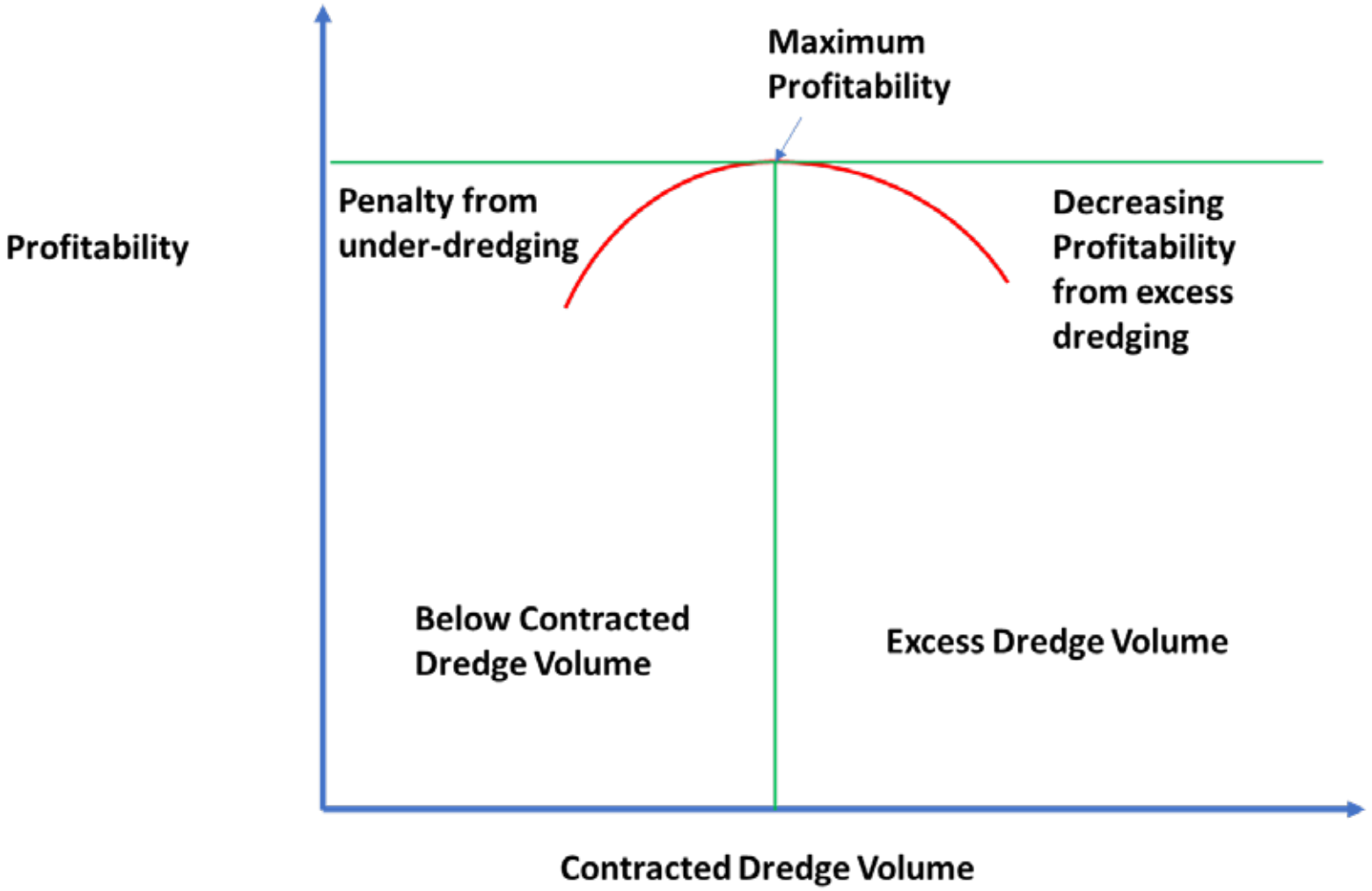


DAMEN

HOW DOES IT WORK?

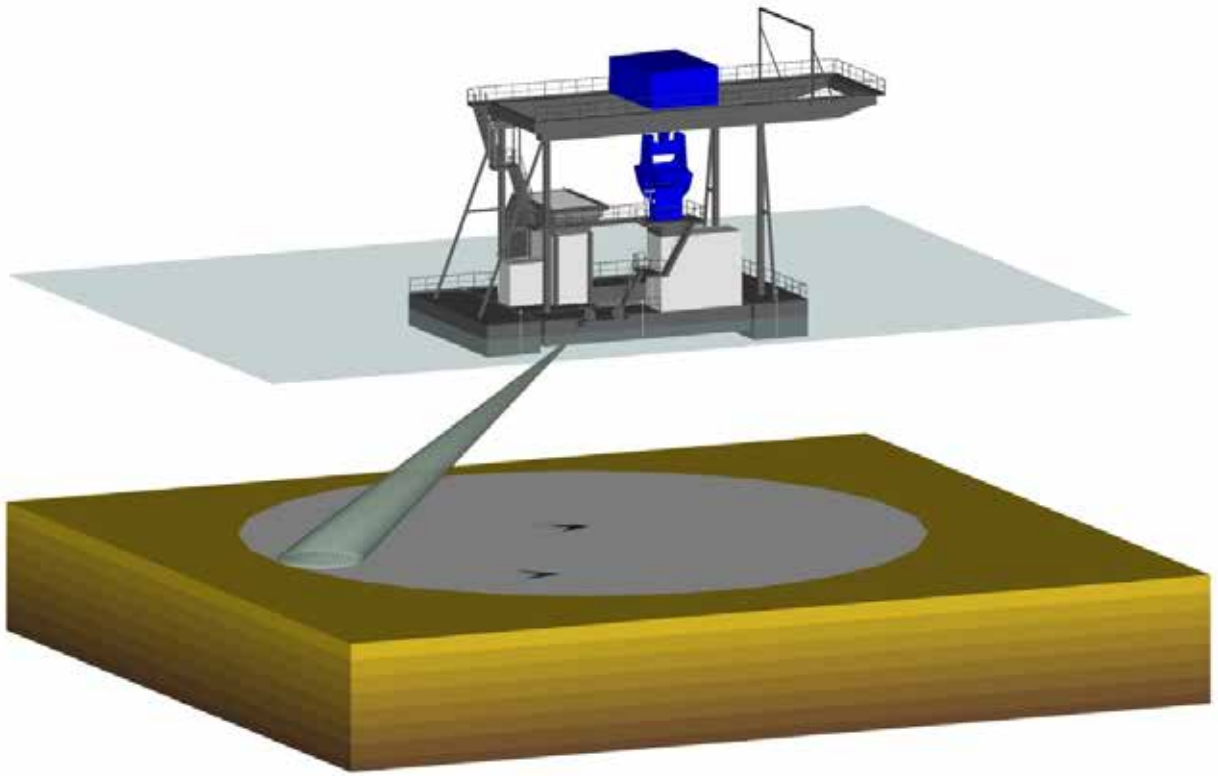
Cutter Suction Dredging

Challenges for Dredge Operator

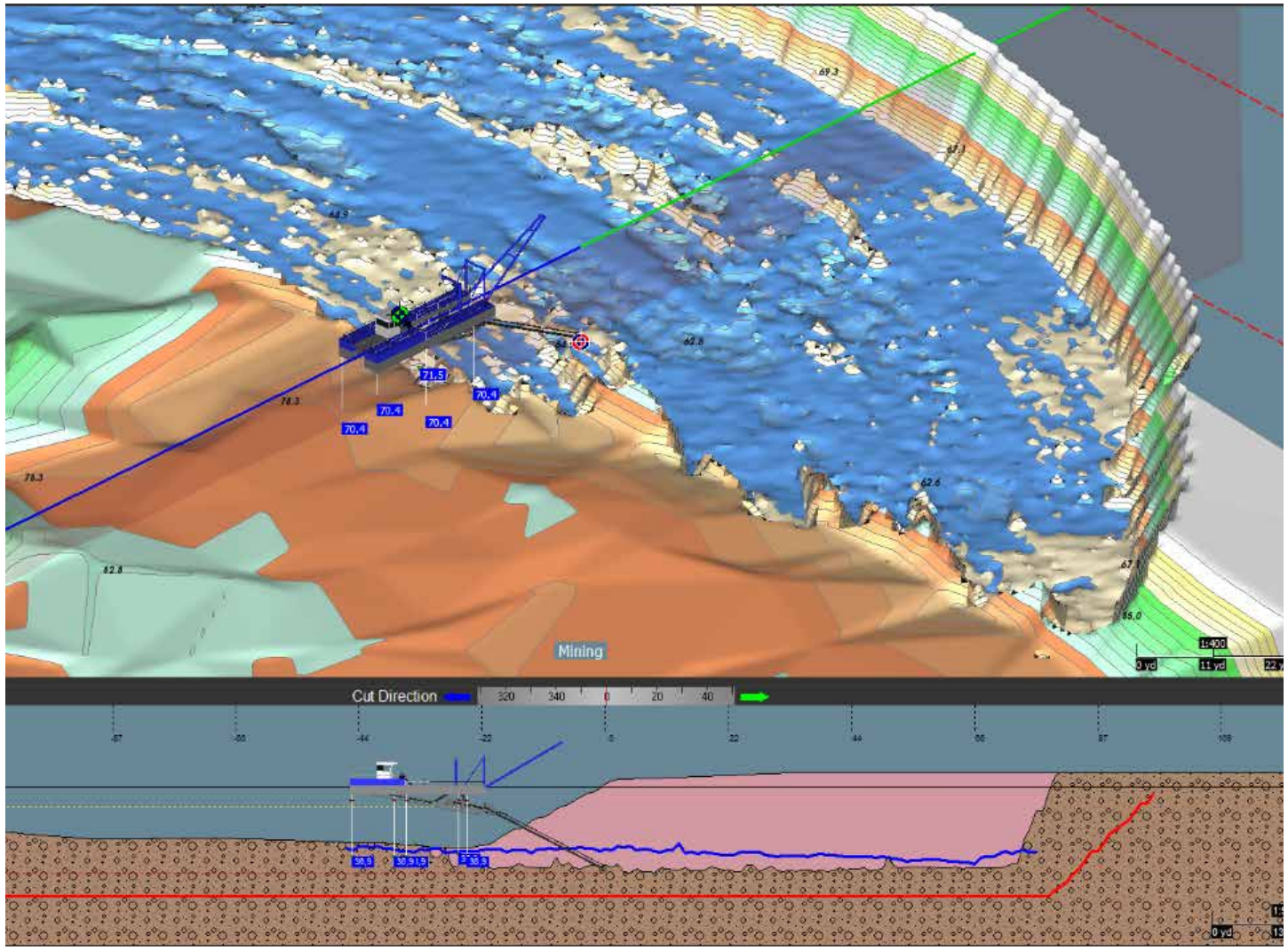


360° DAS scan

Scans the bottom of the work site and provides a high-resolution three-dimensional terrain model.



Making the Dredging Operation Visible



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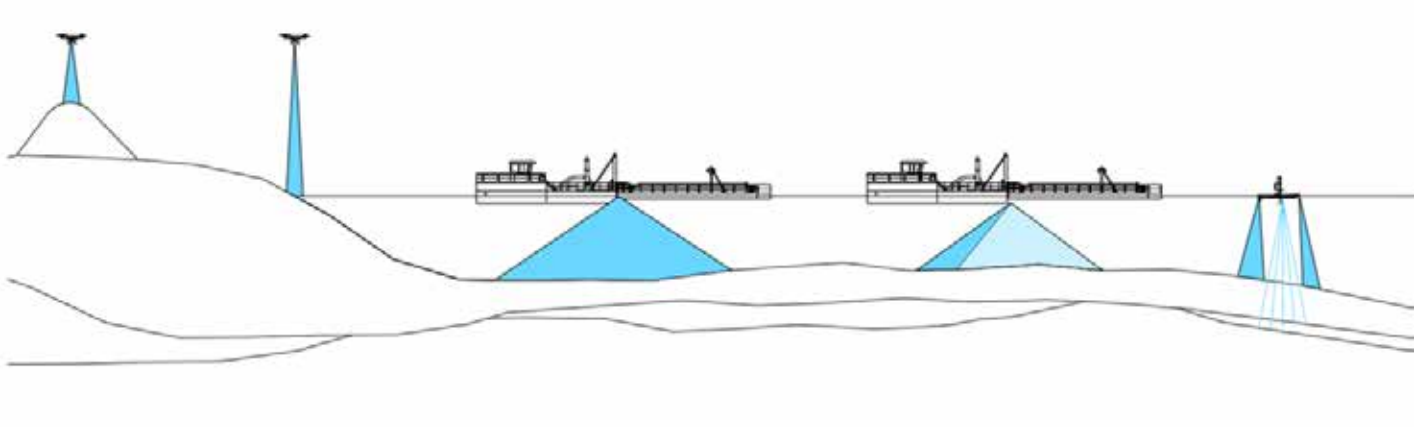
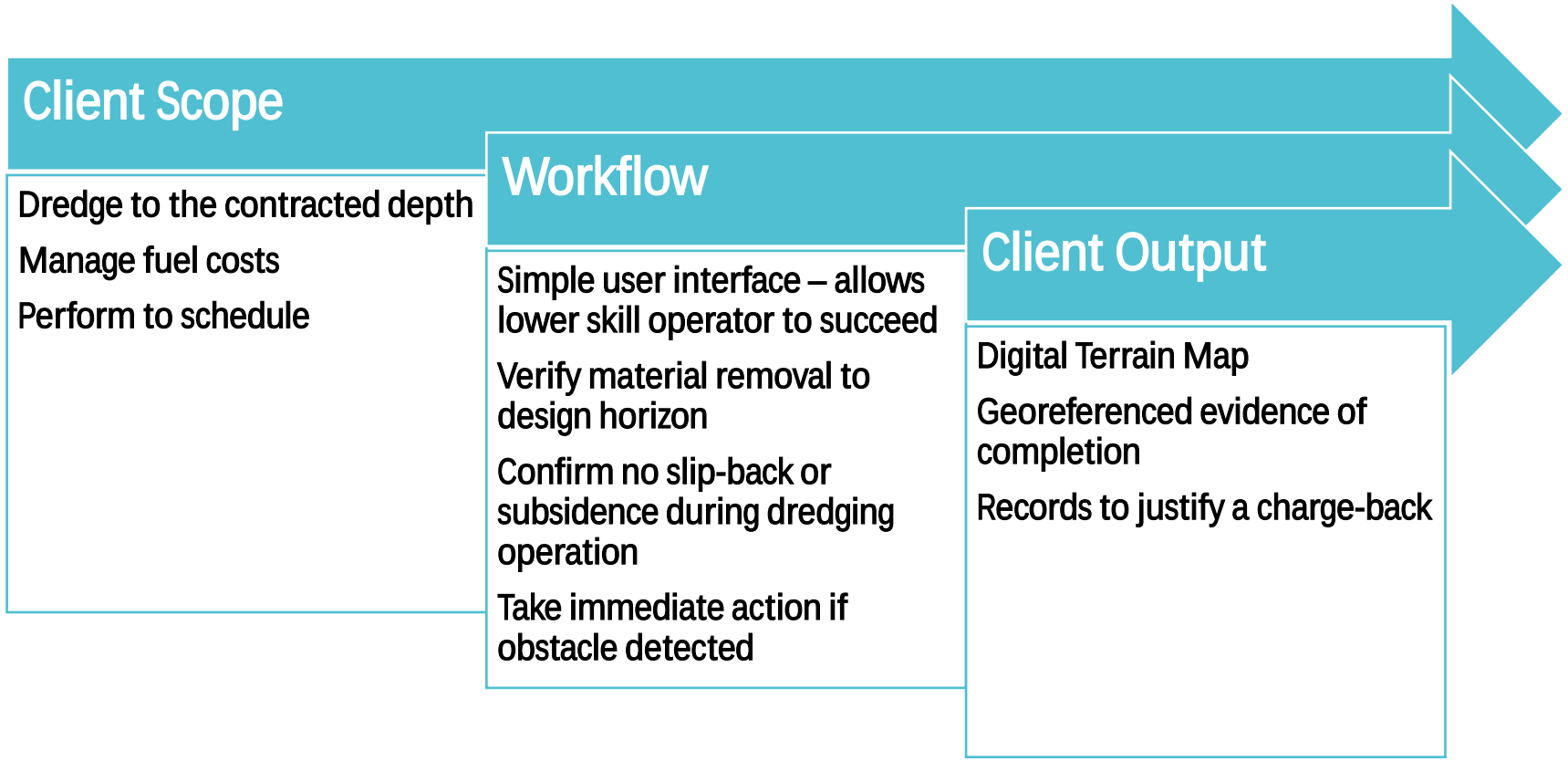
Total Awareness during Dredging Ops



- Pre- and Post-Dredge QA Survey
- Real-time dredge monitoring
- Dredging mission asset assessment and planning

Real Time Dredge Monitoring

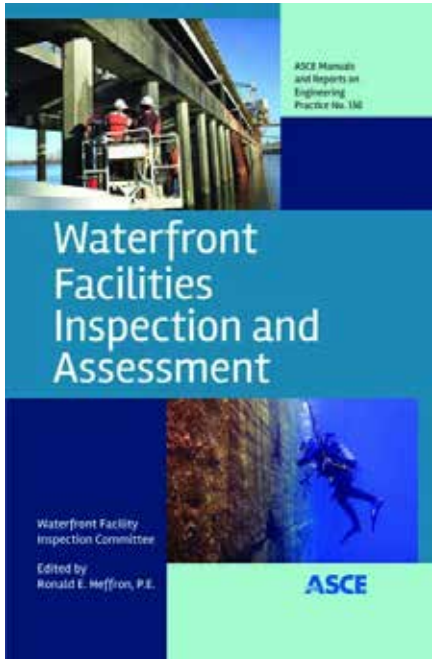


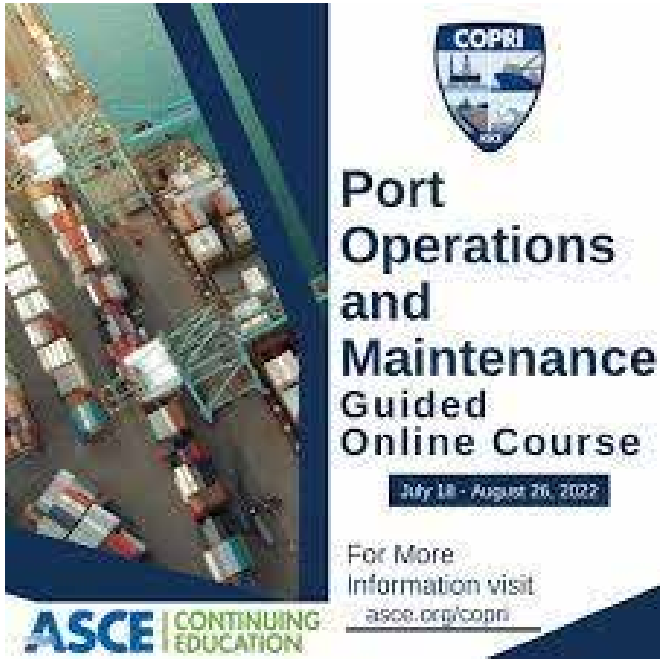
Port Security from Waterside

Underwater drones

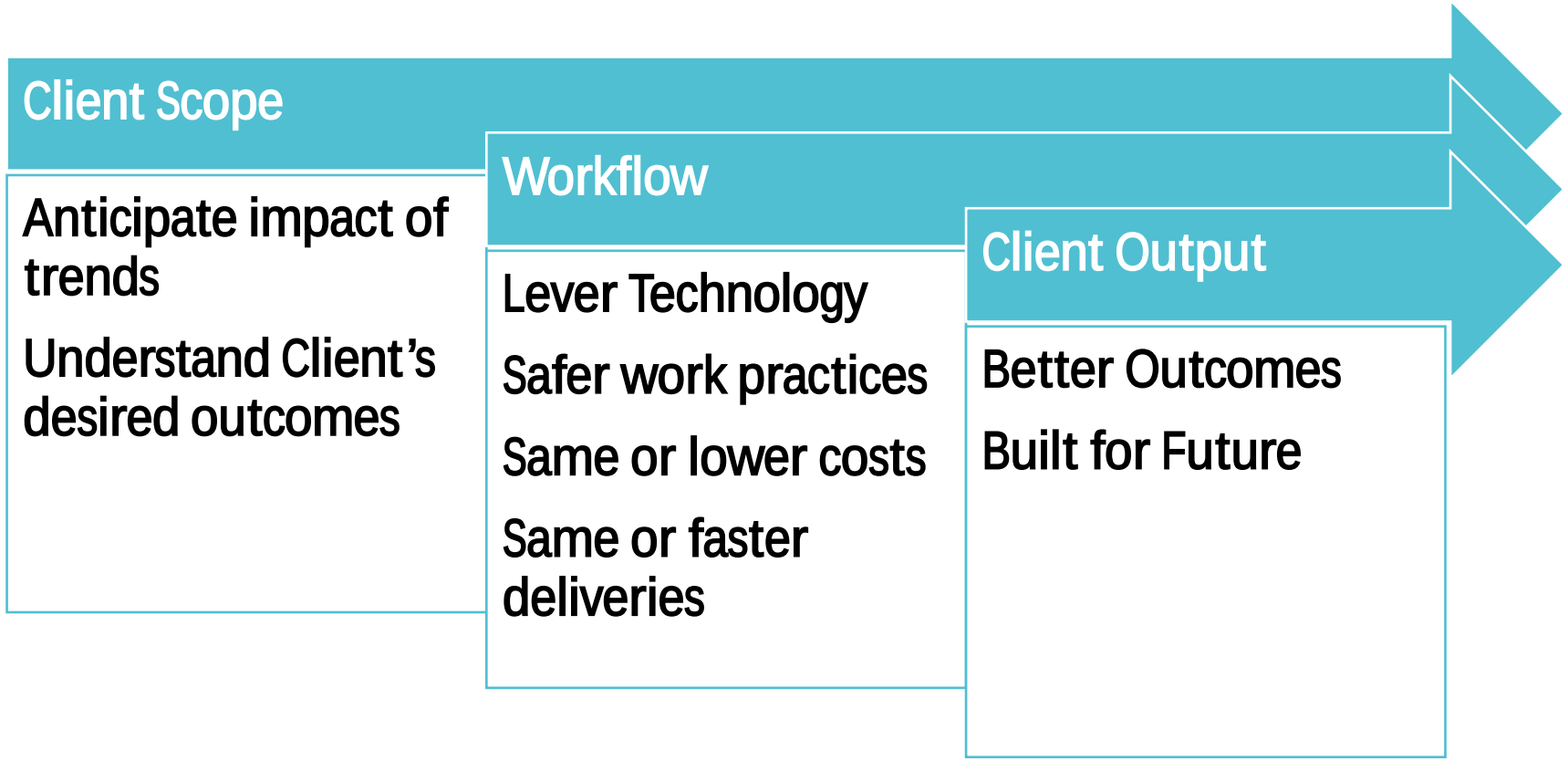
Arial drones

Management Infrastructure Decision Toolbox





It’s All About Workflow



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Thank you!

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