



**ASV Supported Commercial
Hydrographic Survey Alaska, 2016
21/10/2016**

**"Driving Future Economies"
Cory Brooks**



Quality
ISO 9001



ASV systems



CURRENT DESIGNS

C-Worker 6



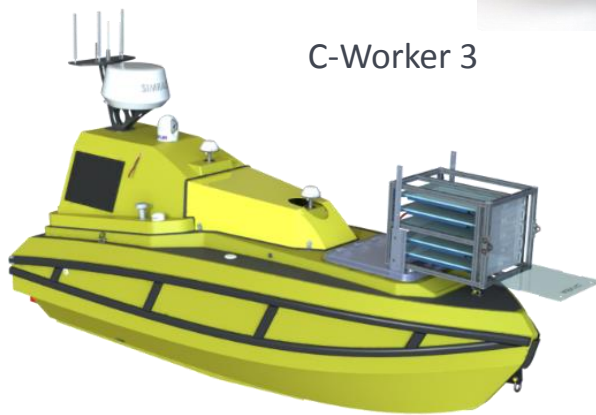
C-Worker 7



C-Worker 5H



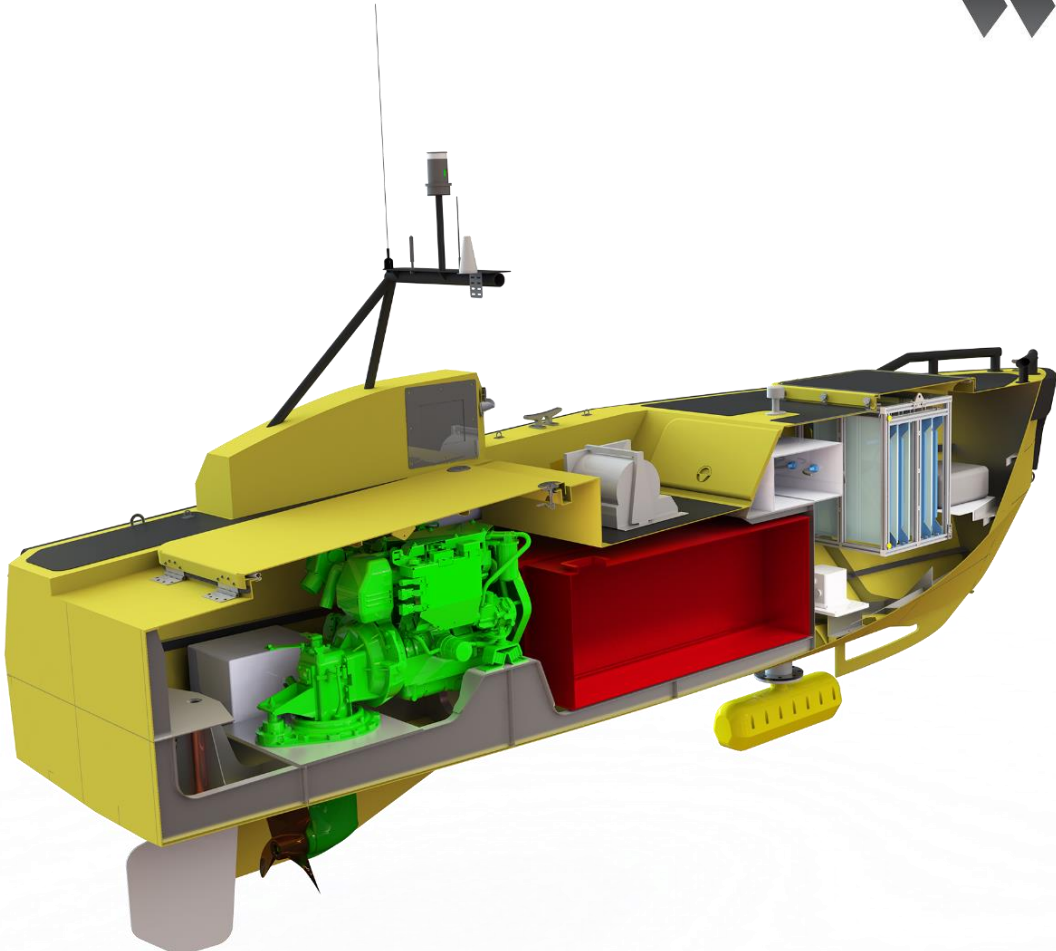
C-Worker 3



C-Enduro

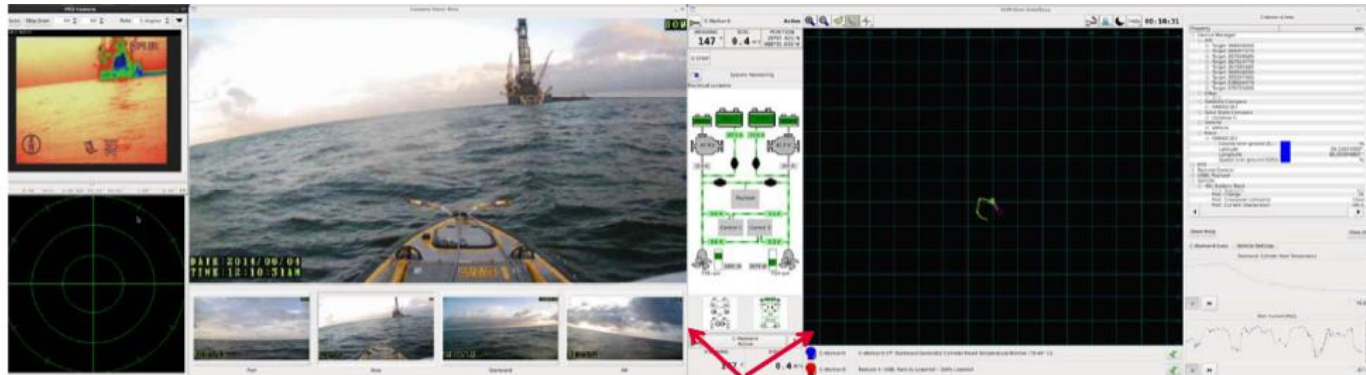


C-WORKER 5H

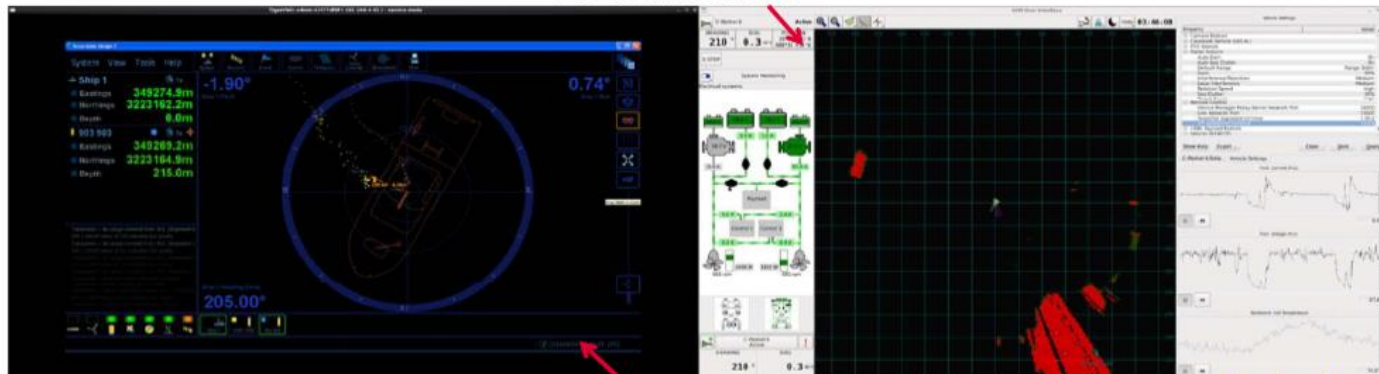


COLLISION AVOIDANCE & TARGET FOLLOWING

ASView User Interface; Can apply sensor-directed autopiloting (e.g ROV tracking)



ASVtd interface



C-WORKER - CONTROL SYSTEM

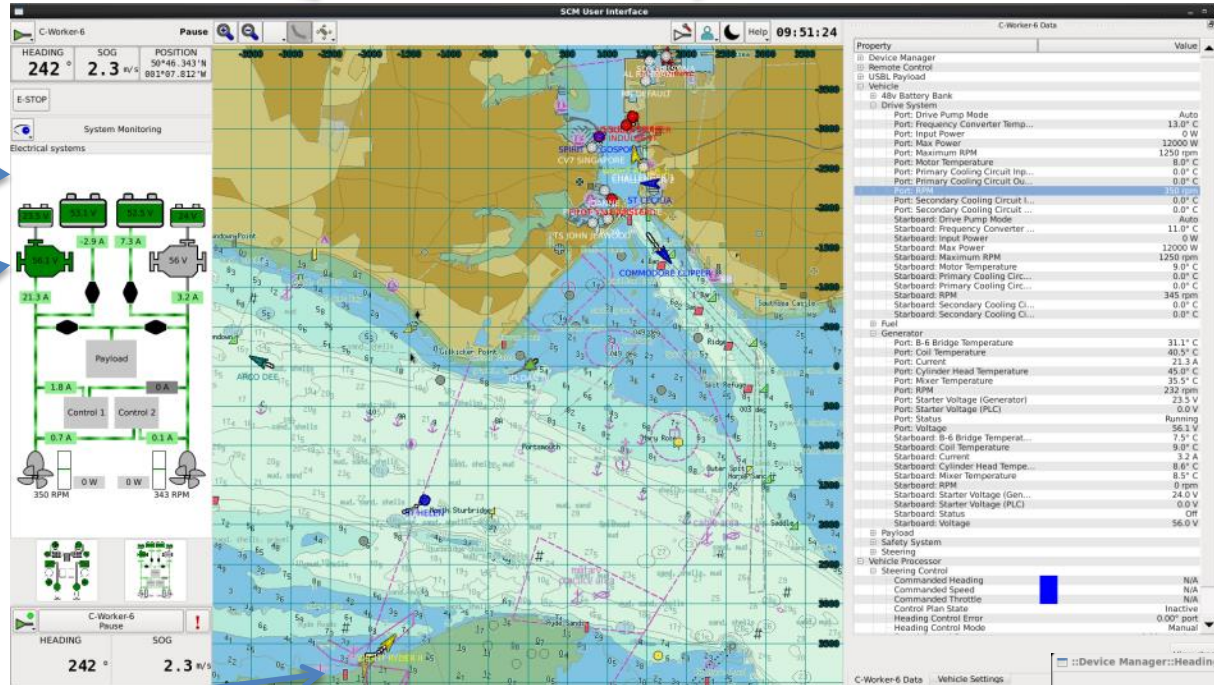
User Interface

View controls

Setup controls

Key Data

Selectable Tabs



Top down displaying;

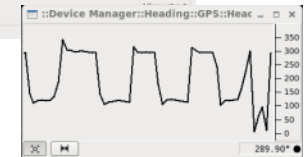
Full S57 ENC's

AIS targets from receiver on USV

Vessel track

Vessel mission plans

Data window displays all vehicle telemetry data. All data can be viewed in a trend plot



WHAT ABOUT REGULATIONS & COLLISION AVOIDANCE?



UK Marine
Industries
Alliance

**BEING A
RESPONSIBLE
INDUSTRY**

An Industry
Code of Conduct

Maritime Autonomous Systems (Surface) MAS(S)

Supported by:



ASV unmanned
marine systems



ATLAS ELEKTRONIK UK
A company of the ATLAS ELEKTRONIK Group



BAE SYSTEMS



BARRUS
Est. 1977



BMT Isis
"Where will our knowledge take you?"



BR
& Co
BIRCH REYNARDSON & Co



BRITISH
MARINE
LEADING THE INDUSTRY



FINMECCANICA
LAND & NAVAL DEFENCE ELECTRONICS DIVISION



FRAZER-NASH
CONSULTANCY



FUGRO



HTCHAMBERS



IMaEST
Institute of
Marine Engineering,
Technology & Innovation



Lloyd's Register
Marine



MIDAS



MOST
(Autonomous Vessel)



MSubs Ltd
underwater vehicles & equipment



National
Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



PIONEER
WITH
PLYMOUTH
UNIVERSITY
MARINE INSTITUTE



Planet
Ocean Ltd



QinetiQ



Sea
Robotics



seebyte



THALES

C-WORKER 5 ASV SYSTEM OPERATION

Sidescan Sonar Deployment and Retrieval System



C-WORKER 5 LARS SYSTEM DESIGN

Single Point Lift Option

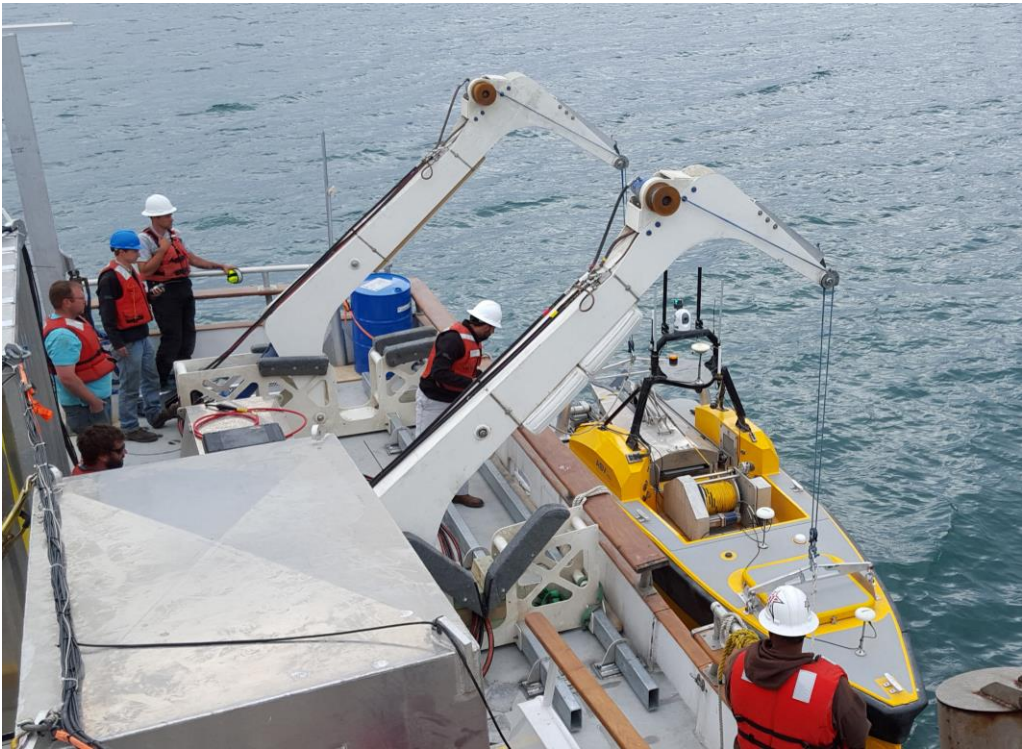


- 4 straps lift from single point
- Held in place with rigid supports for easy attachment from host vessel
- Total height of lift for railing clearance is 14' 8" (= 4.47m)



C-WORKER 5 LARS SYSTEM DESIGN

In Field Launch



APPLICATIONS TO DATE

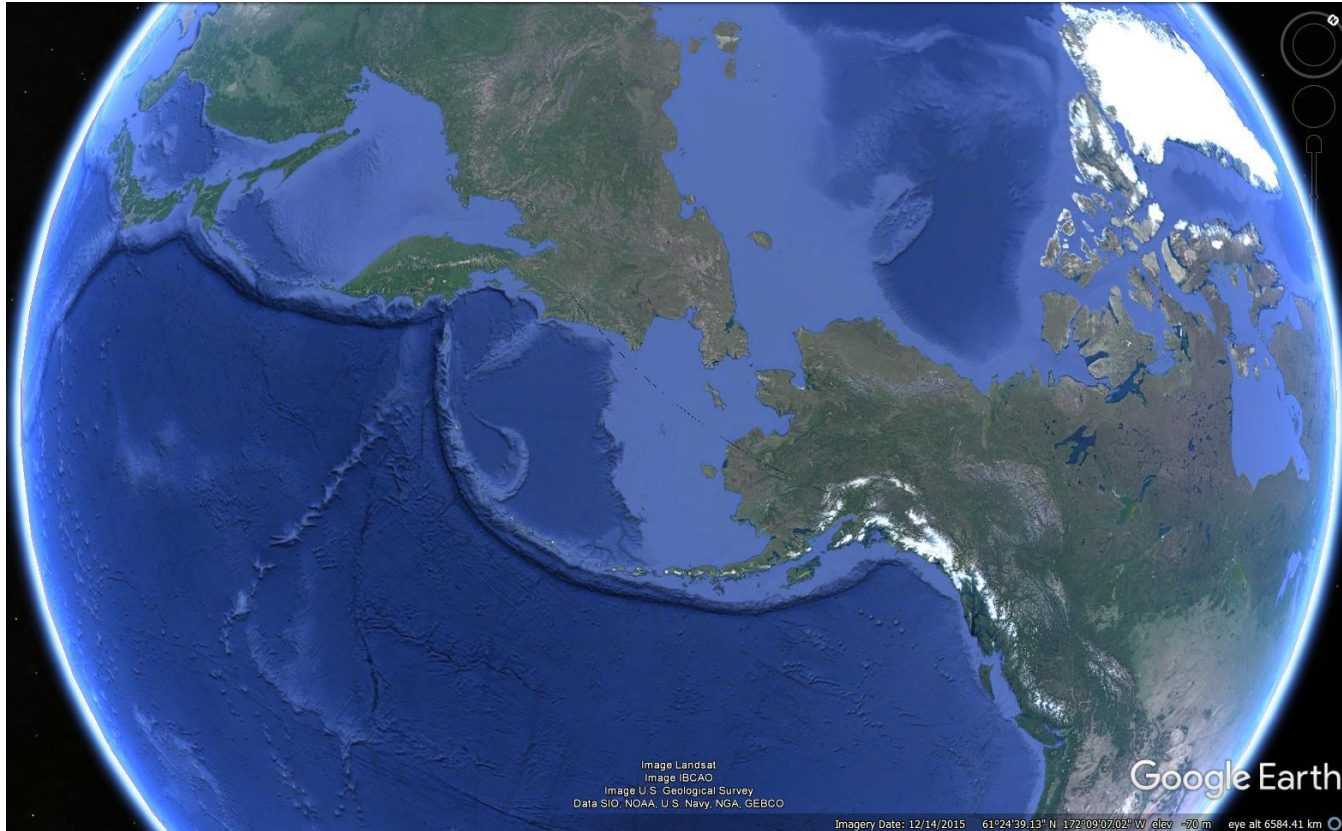
- ▶ **Hydrography** - NOAA and other seabed charting operations
- ▶ **Marine construction survey support** - (USBL, TDM/ROV tracking, LBL array setup)
- ▶ **Environmental** - Passive acoustics, seep/leak detection, water quality, LiDAR
- ▶ **Data Conduit** - Low cost upload from seabed data loggers
- ▶ **Security** - Harbor security, 24/7 unmanned monitoring, cameras, IR, other
- ▶ **Metocean** - ADCPs, Loop Current monitoring
- ▶ **Seismic survey support** - USBL, CTD, PAM, ADCP
- ▶ **Military** - Targets, MCM, AUVs/ROVs, surveillance, scouting
- ▶ **Deep tow towfish tracking** (UXO, etc.)
- ▶ **Conversions** - RIBs, FRCs, Patrol Craft, Crew Boats, Others

Case Study: Nunivak Island, Alaska Hydrographic Survey

Sensor Platforms



Where is Nunivak Island?



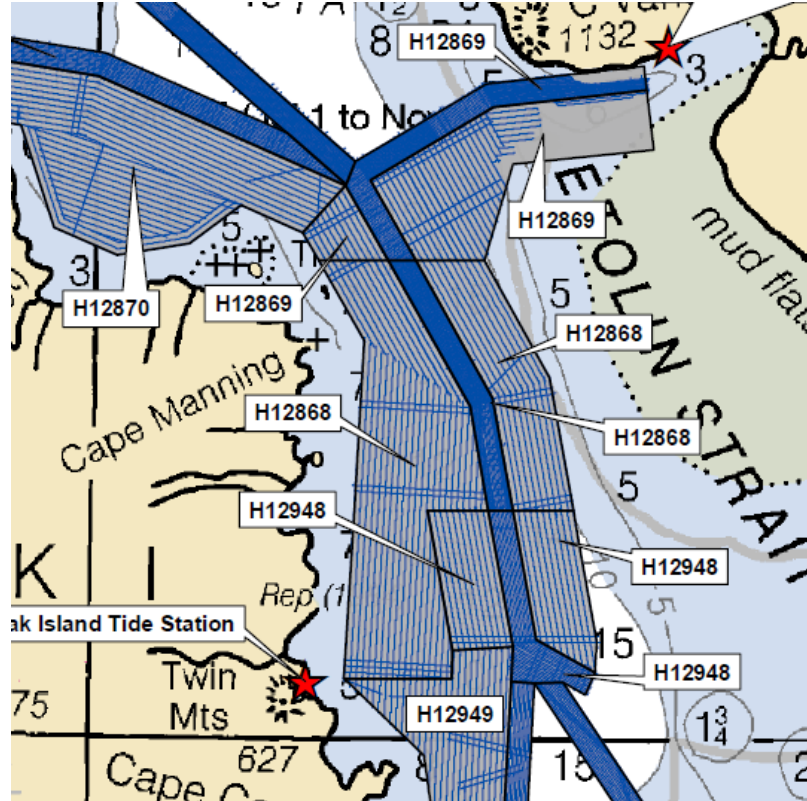
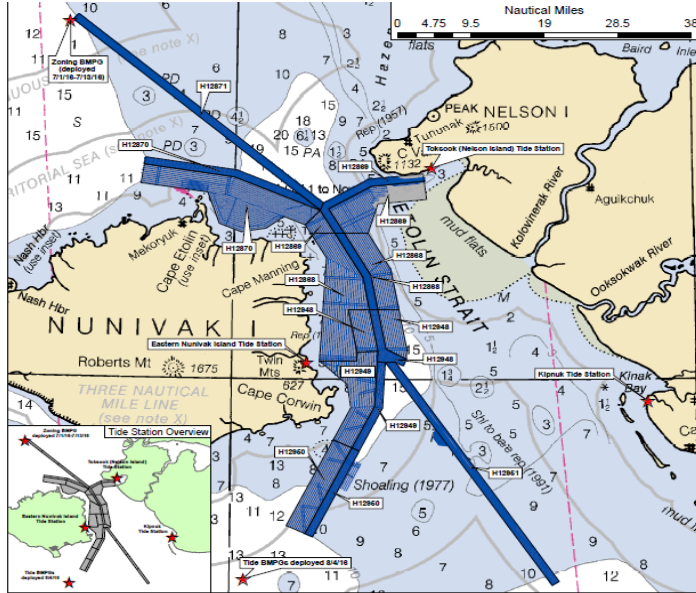
Where is Nunivak Island?



Where is Nunivak Island?





What was surveyed?



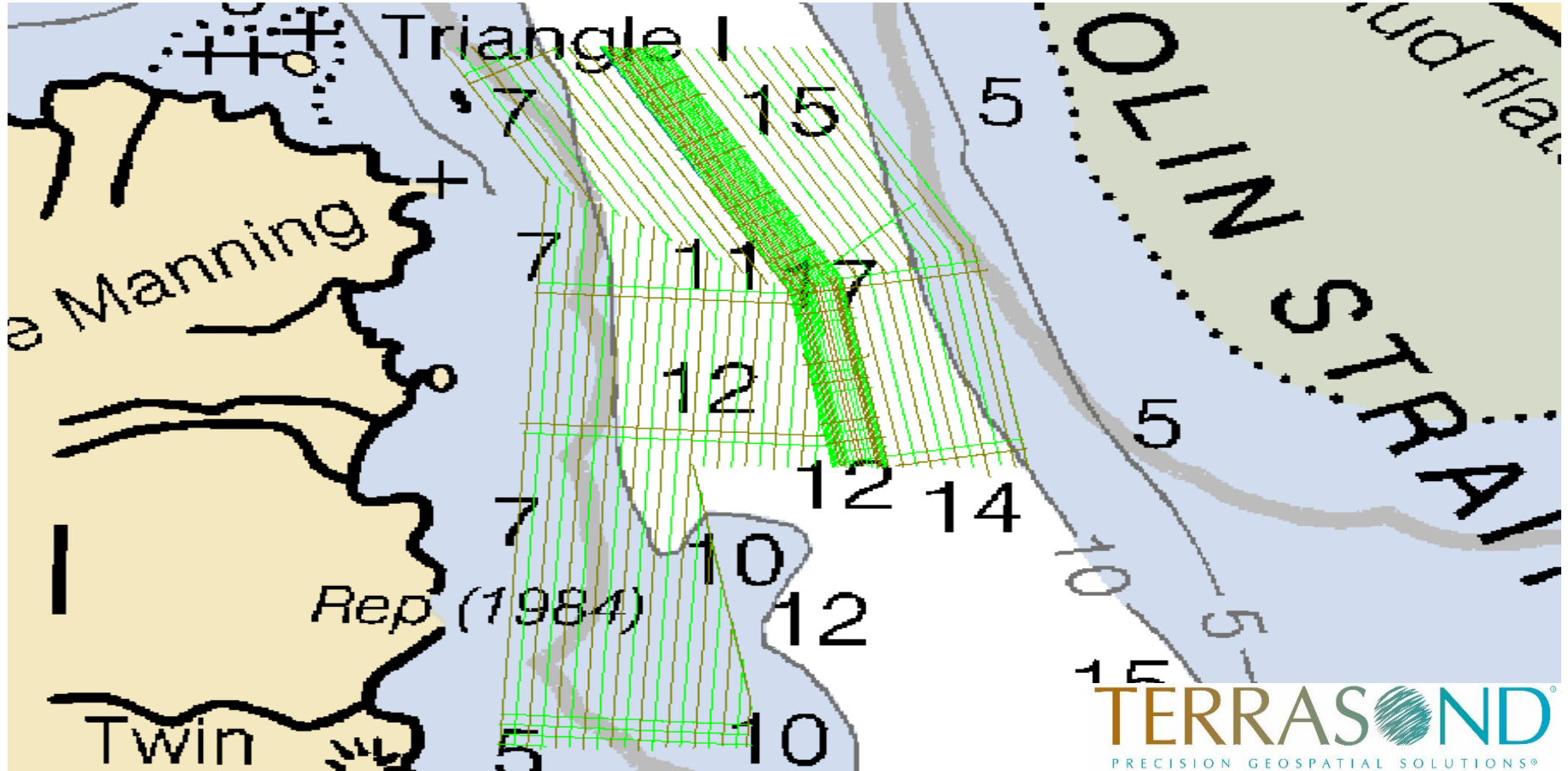
Weekly Progress Sketch
 OPR-R300-KR-16
 Etolin Strait, Alaska
 Survey Vessels:
 Q105
 ASV-CW5
 Coverage as of 08 August 2016
 TerraSond, Ltd.
 Andrew Orthmann, Lead Hydrographer
 Charts 16006; 35th Ed.

Survey Coverage

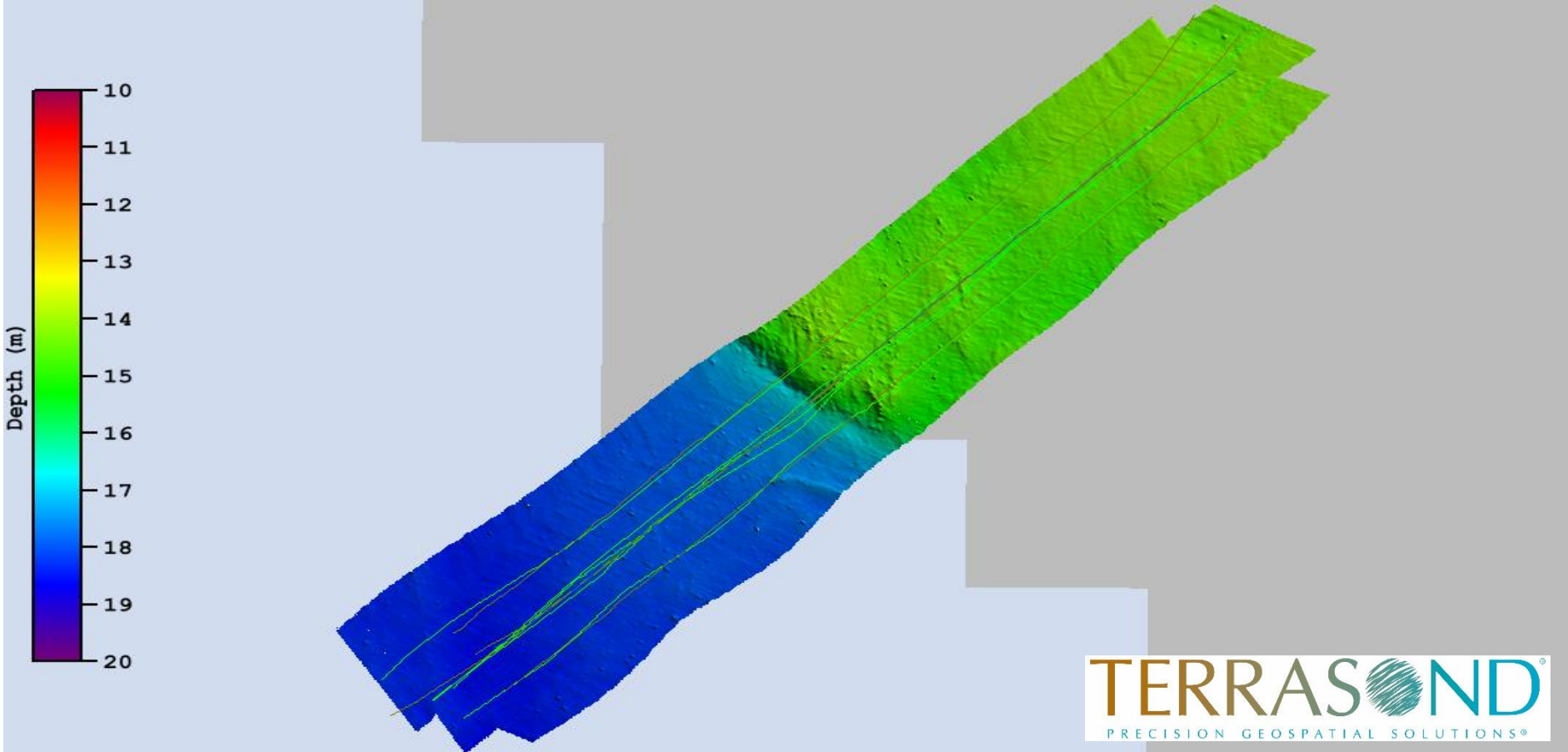
- ★ Tide Stations
- Completed Lines
- Survey Areas

Overview Map



SIMULTANEOUS MULTIBEAM PATCH-TESTS



Q105 PATCH-TEST SURVEY LINE TRACKING

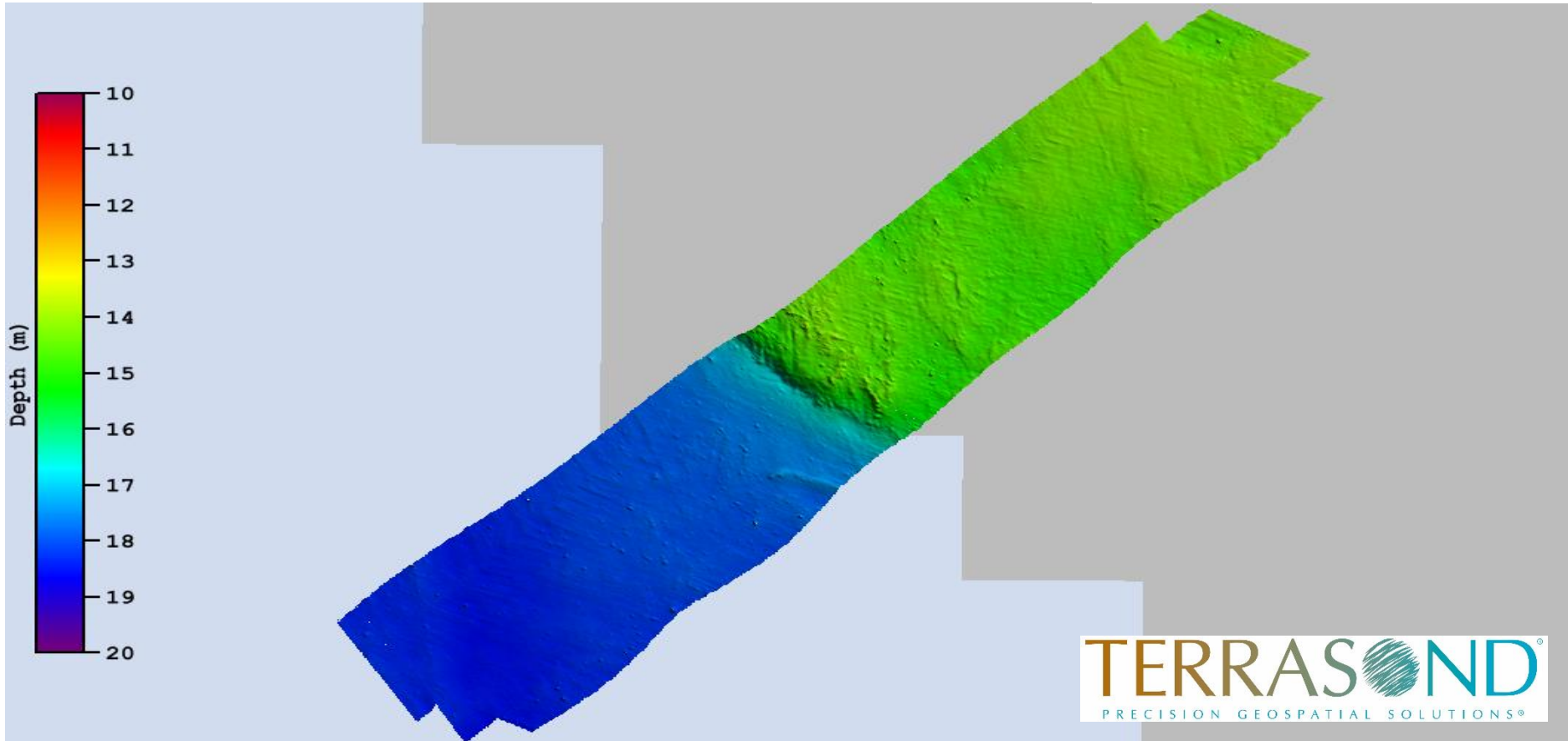
Q105
4-5m Variance



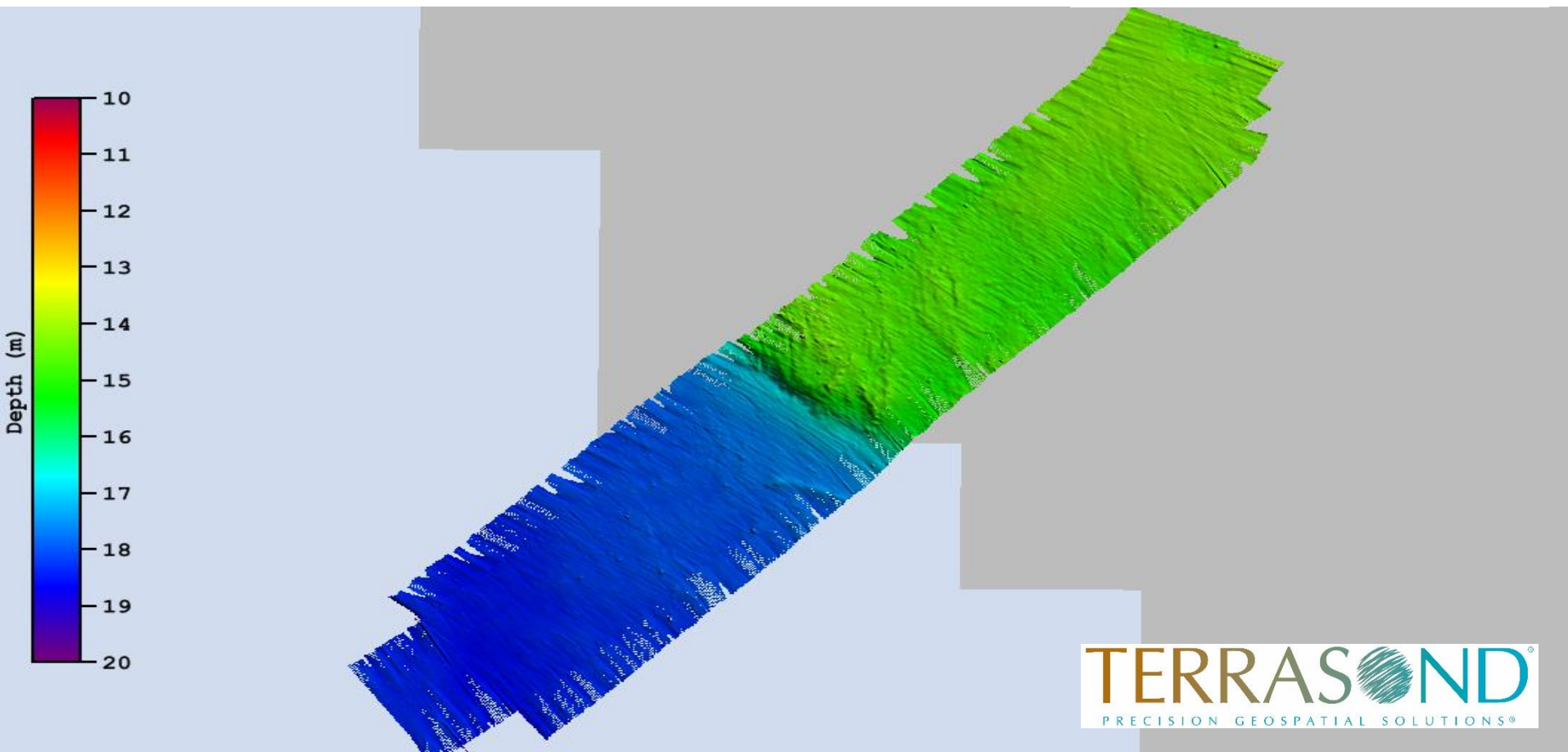
CW5H
<1m Variance

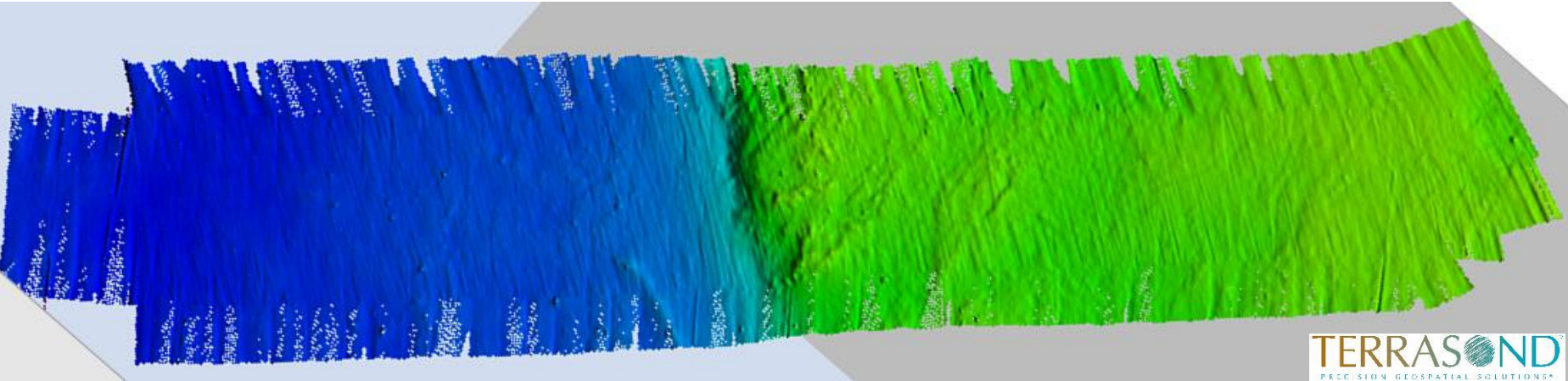
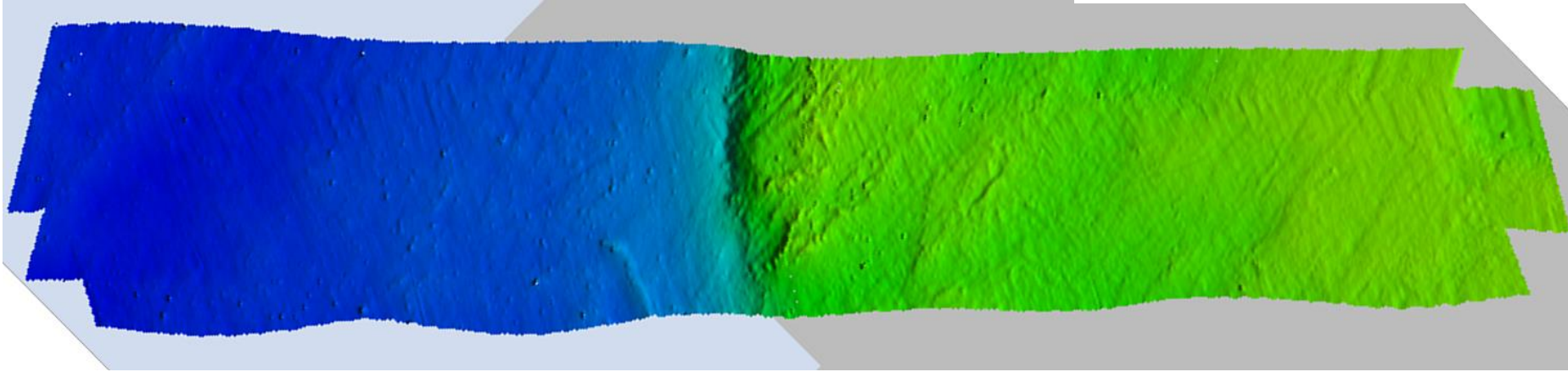


Q105 vessel patch-test

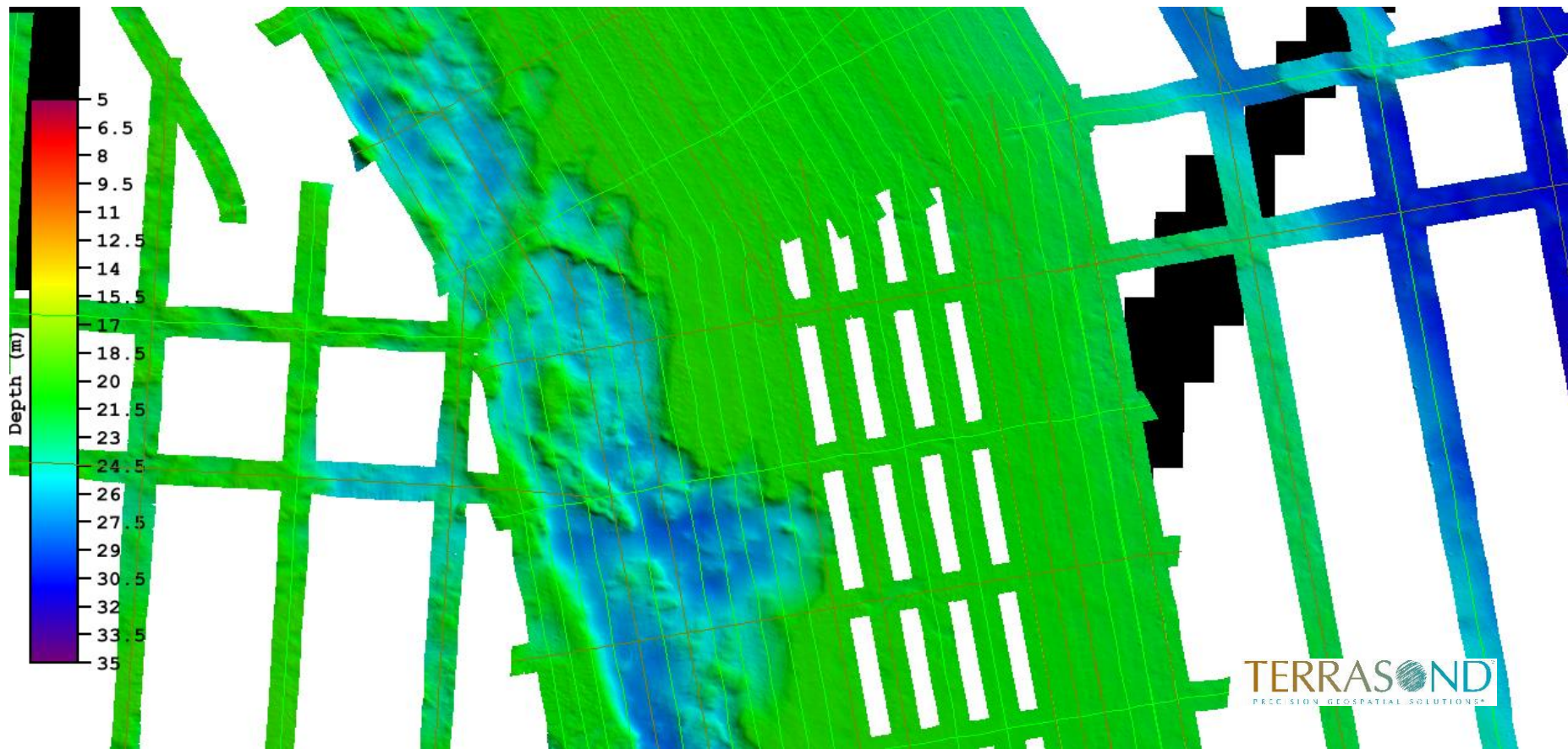


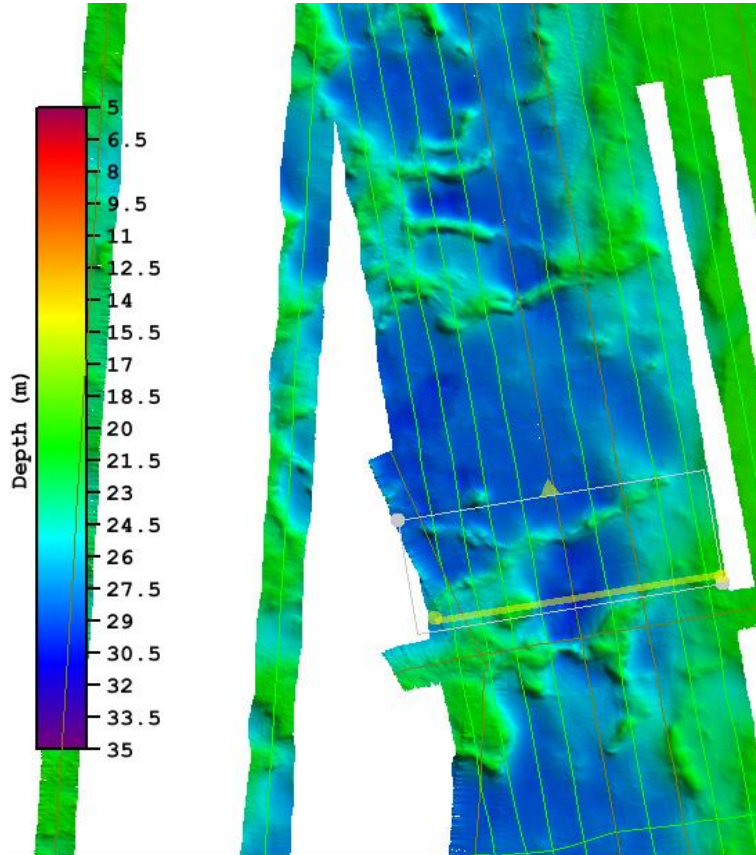
ASV patch-test



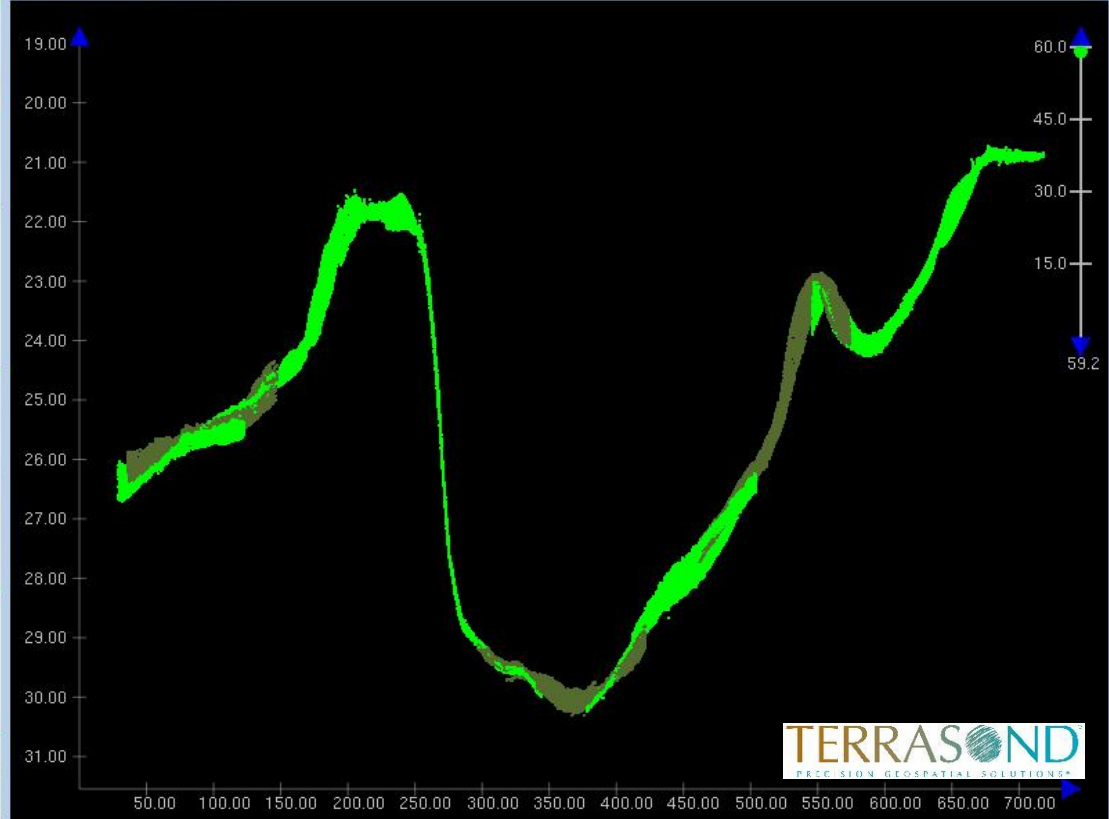


SURVEY SHEET # H12868

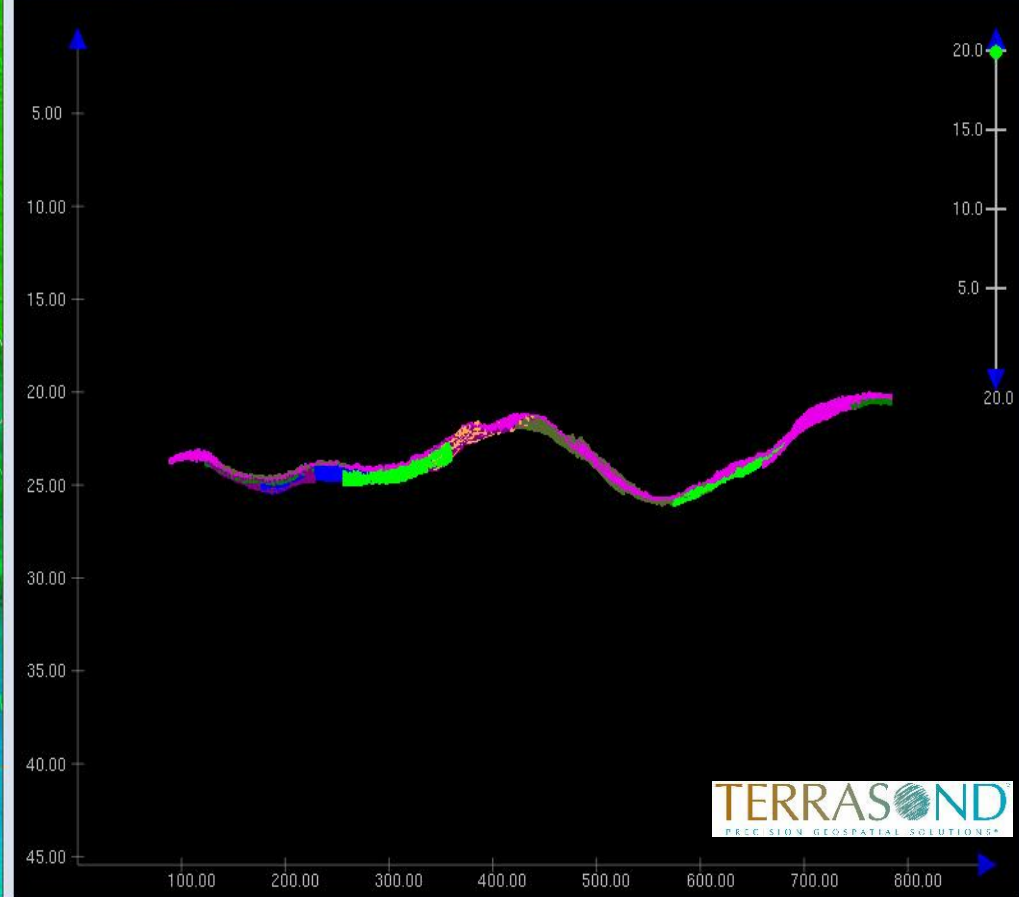
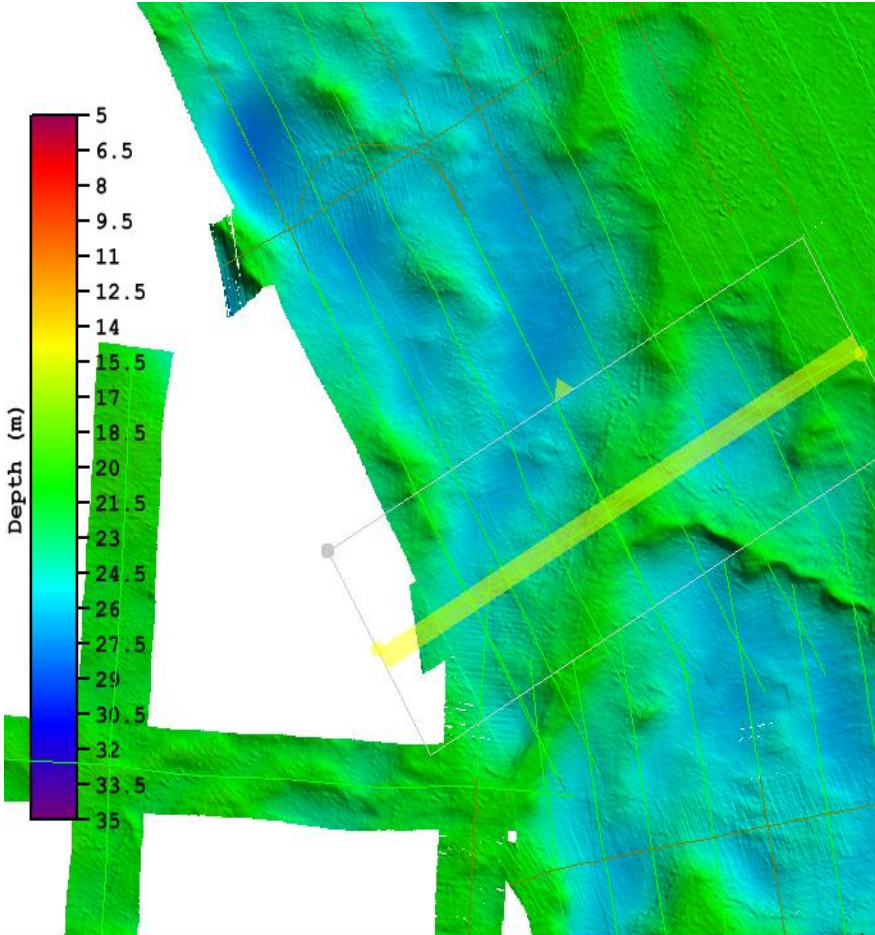




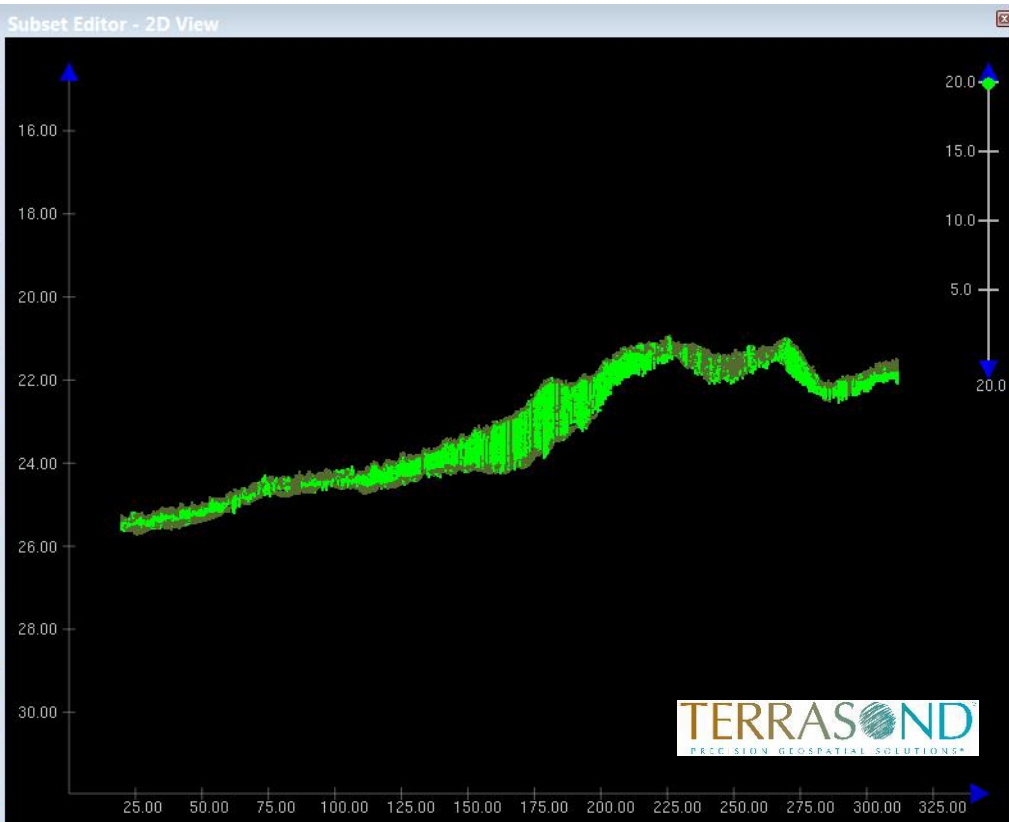
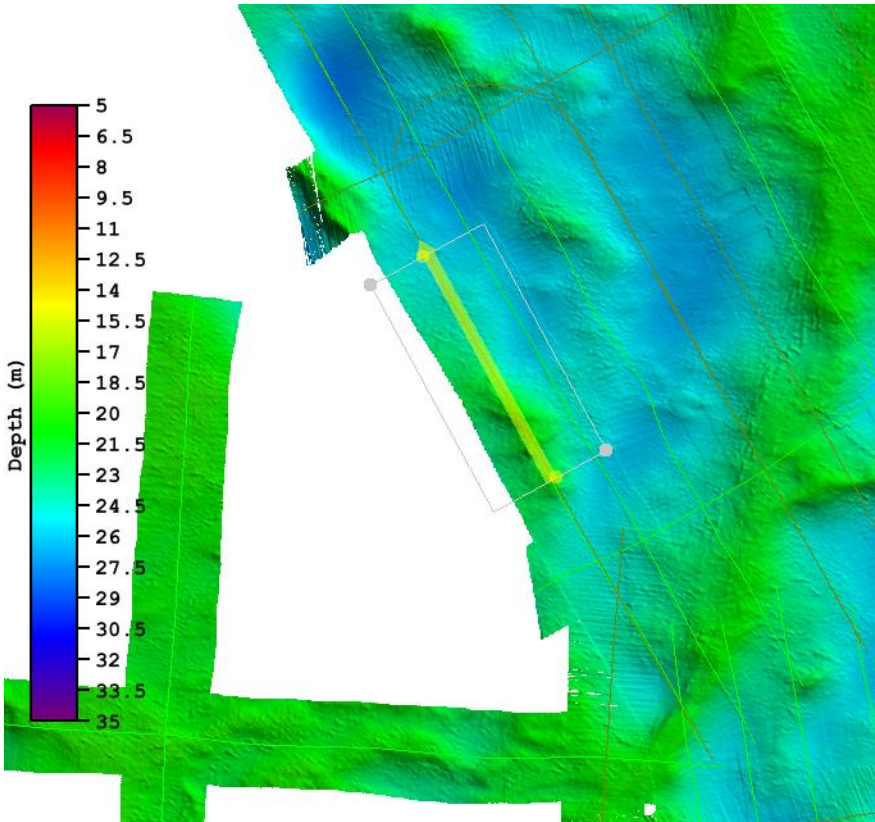
Subset Editor - 2D View

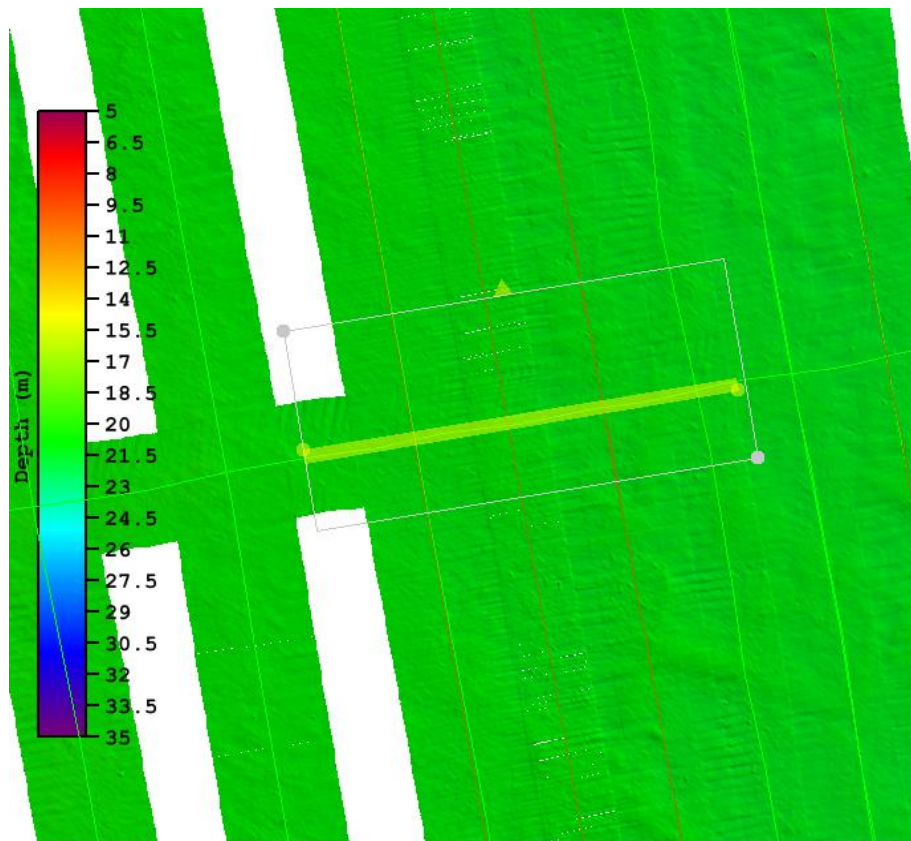


Subset Editor - 2D View

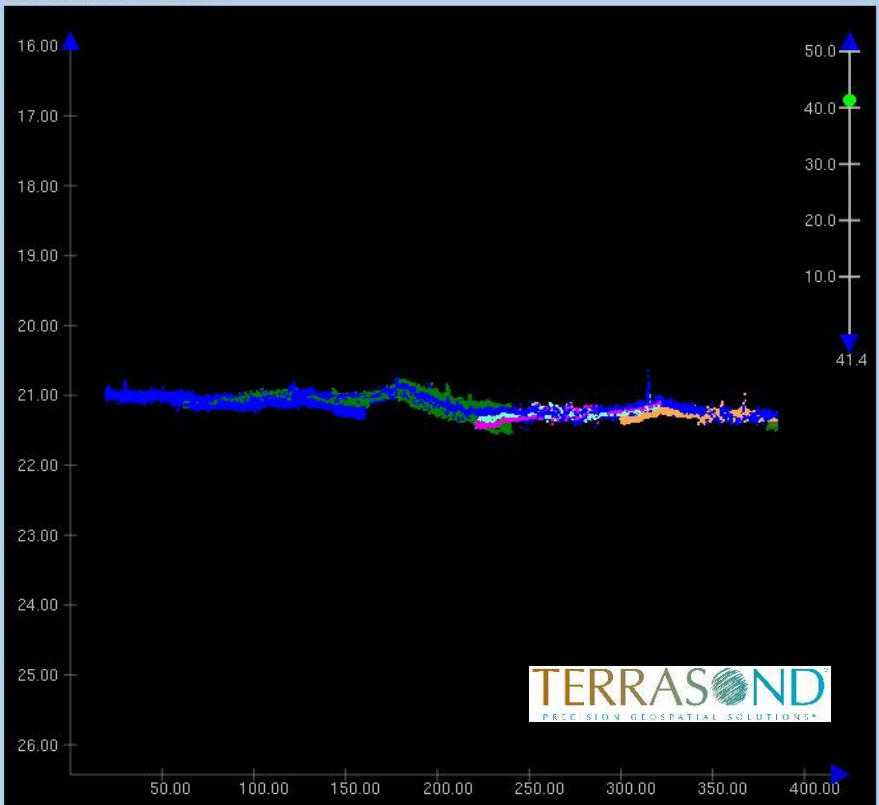


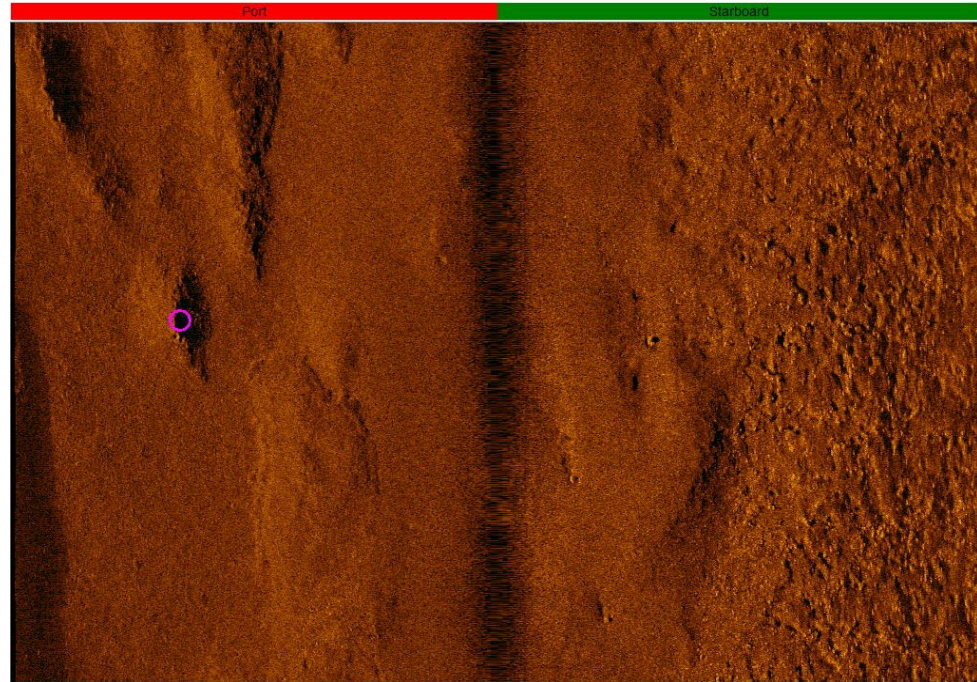
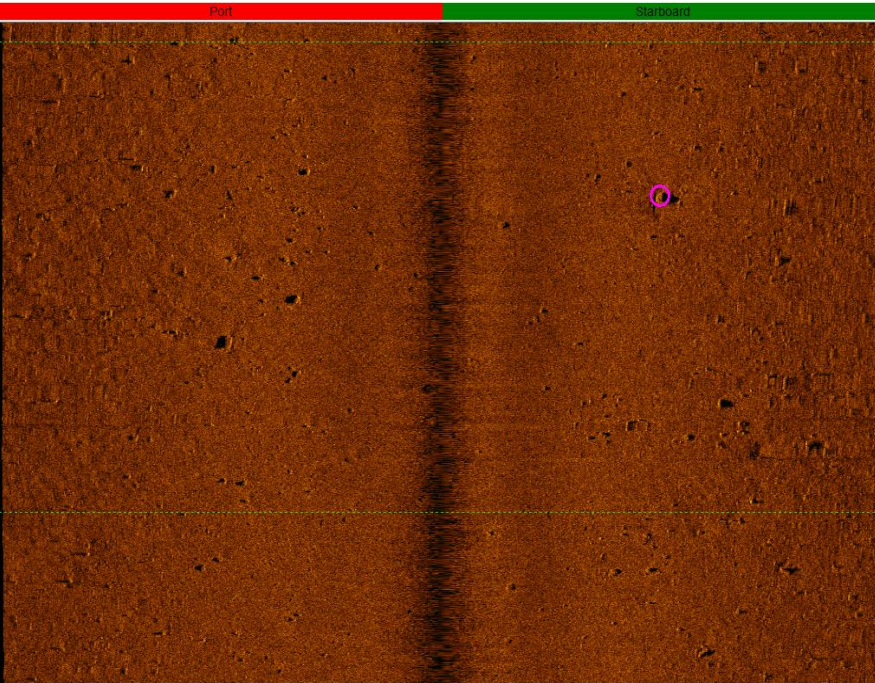
COMPARISON





Subset Editor - 2D View





Project feedback



- ▶ Identical sensors on the vessel and ASV
- ▶ ASV Endurance set to 3.5 days to leave a 40% fuel reserve for risk management
- ▶ A maximum of 2 hours turnaround to refuel and download data
- ▶ Two people per shift for ASV ops inboard the Q105
- ▶ Smaller mother ship compared to having a separate manned launch
- ▶ **Production increased by almost 50%**

A yellow autonomous underwater vehicle (AUV) is shown floating on the surface of the ocean. The AUV has a complex structure with various sensors and equipment mounted on top. The background features a dark, choppy sea and a bright red sun setting on the horizon, creating a dramatic and serene atmosphere.

**THANK
YOU**