DEEP TREKKER

Photogrammetry for Underwater Asset Management

Robotics to help extend Assets beyond their estimated life

Date: March 14th, 2024
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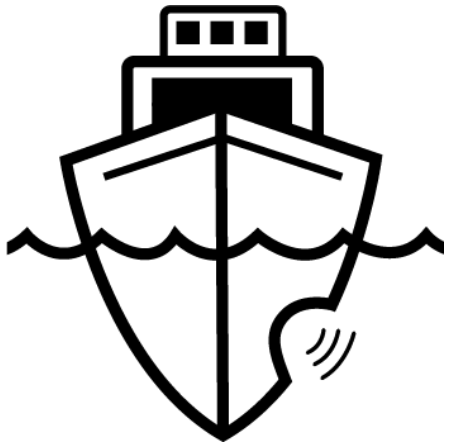
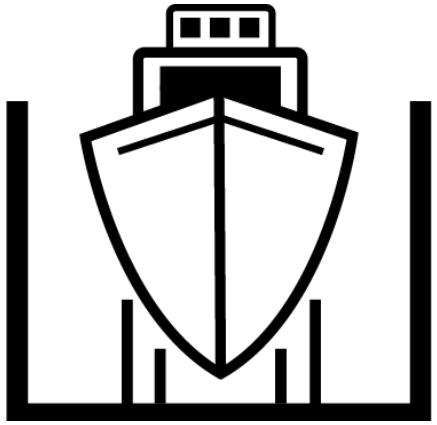
Director, Sales & Marketing
Deep Trekker

Deep Trekker Product Family 2024

CUSTOMER EXAMPLES

Problems that our customers encounter

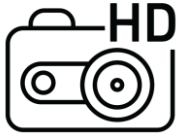




- Volume of Data (1 Day of Footage takes 5 days of review)
- Standardisation of inspection results/reporting
- Cost of divers
- Cost of dry docking
- Diver safety
- Unbiased reporting
- Data (UT thickness, fouling type)
- Evidence of compliance - IMO Guidelines (NZ Biofouling regulations)

Technologies for Underwater Vehicles

What is currently possible with today's technology



1. Photogrammetry

1. Ultrasonic Thickness & NDT Options

1. Imaging Sonars

1. Positioning

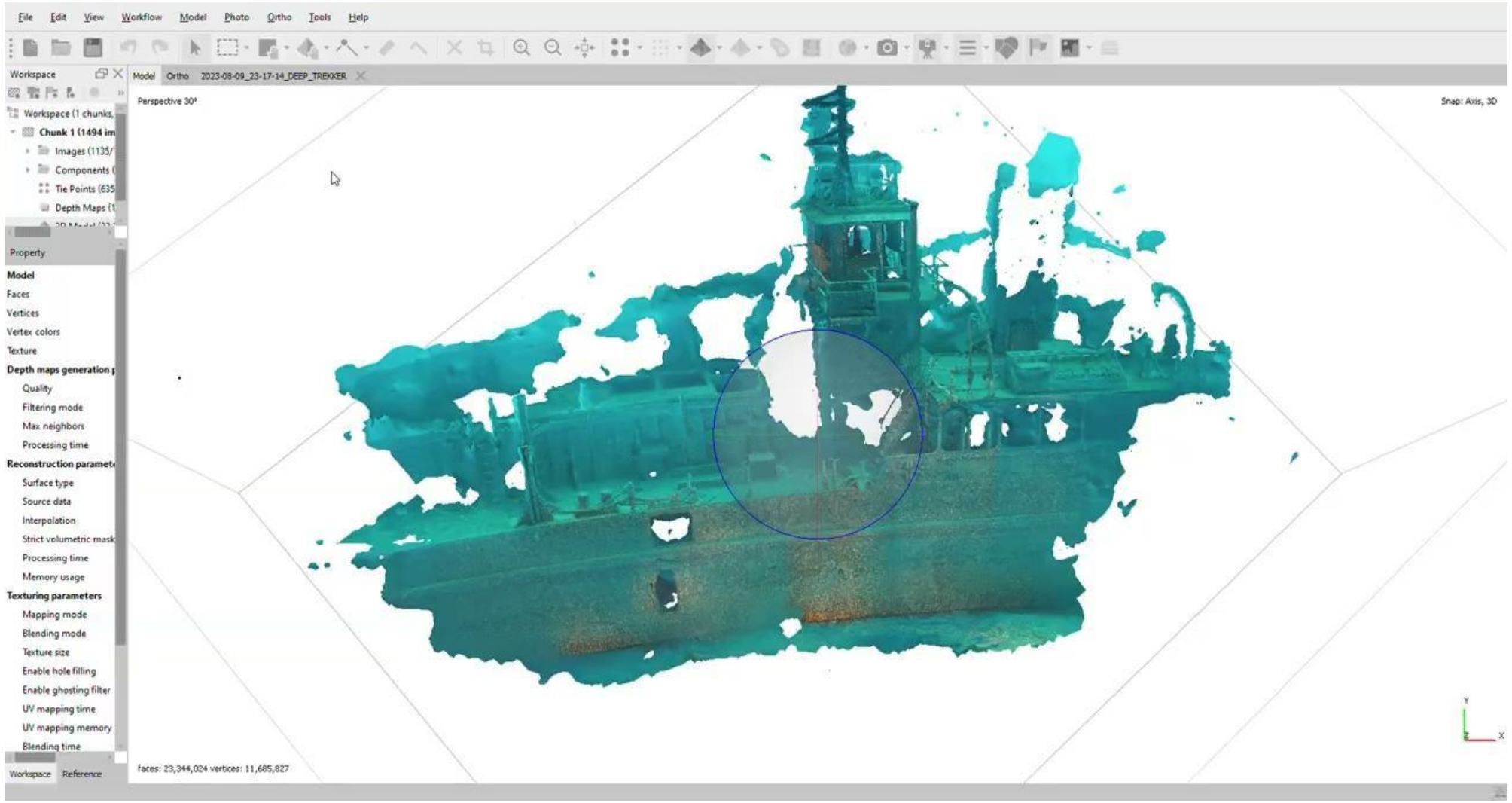

2020/03/05
23:39:14
STATUS
SONAR
USBL
DEEP TREKKER INC.
35.0m
30.00
20.00
10.00
20.00
10.00
-1
TURNS
11°C
TEMP
0°
ROLL
1°
PITCH
S
179°
62°
CAMERA
2.7M
DEPTH
LAT: 43.3931236
LON: -79.7066956

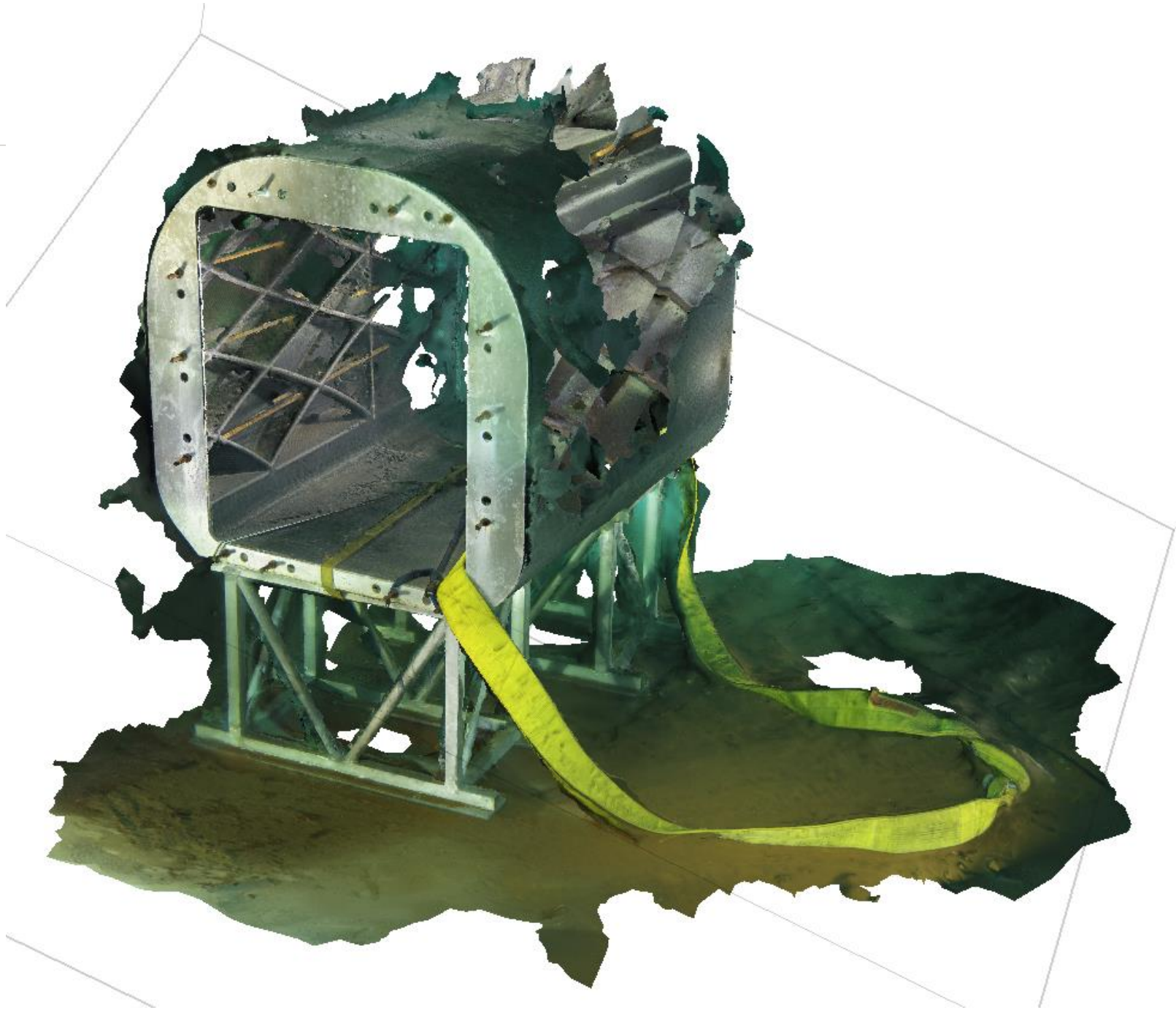
360 Cameras

Voyis Integrations

Laser Scanner, Discovery Camera, Stereo Camera

Auto Snapshot + Photogrammetry





Photogrammetry

Building 3D Models - The spectrum of what is currently possible

PHOTOGRAMMETRY OPTIONS

General understanding of underwater assets and their change over time to millimeter accuracy for engineering decision making.

	Ground-truth [cm]	Voyis Stereo	Voyis Right-only	Oclea	Voyis Stereo Percent Error	Voyis Right-only Percent Error	Oclea Percent Error	Notes
Number of photos	~	5456	2728	1240	~	~	~	~
Processing Time	~	6h	~	1h	~	~	~	~
"Do not Stand" sticker	13.9	13.96	13.9	13.9	0.43%	0.00%	0.00%	Used for scaling, Scaling was limited to 4 decimal places
Green saftey sticker	25.5	25.48	25.34	25.37	0.08%	0.63%	0.51%	Vertical
Crossbeam	50.9	50.98	50.8	50.3	0.16%	0.20%	1.18%	Perpendicular to scaling direction
Ladder size	91.5	91.5	90.96	90.4	0.00%	0.59%	1.20%	Largest size, vertical
"T" text	1.6	~	1.5	1.5	~	6.25%	6.25%	Small size
Chain Width	3.014	3.000	2.820	2.880	0.46%	6.44%	4.45%	Round, only well-reconstructed in Voyis-stereo

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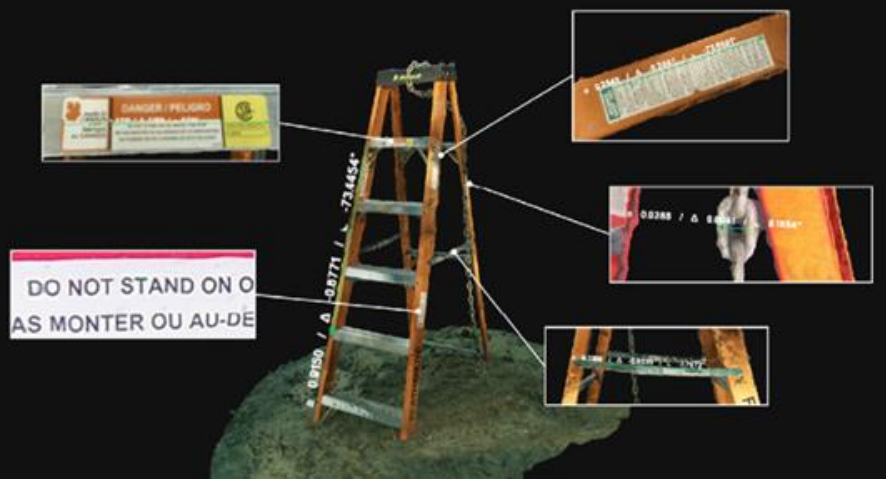
Voyis Stereo Accuracy Comparison



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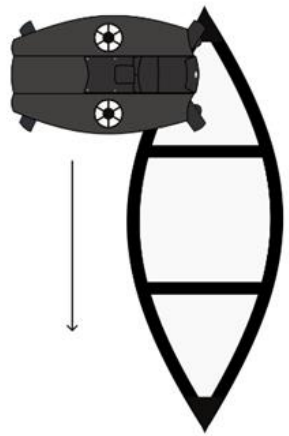
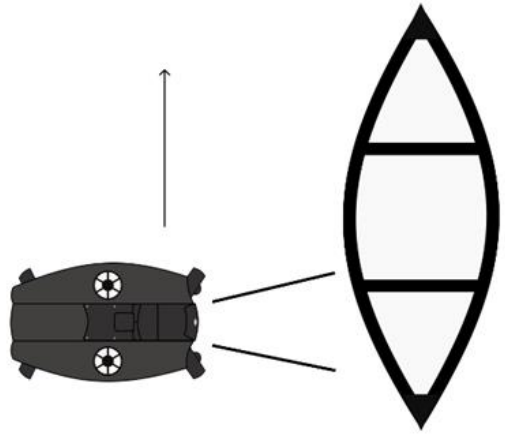
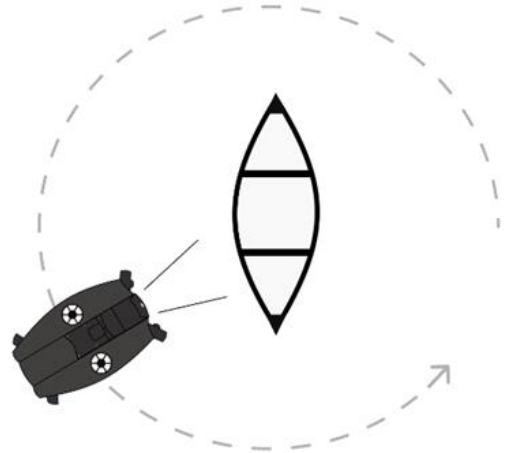
Top-down View



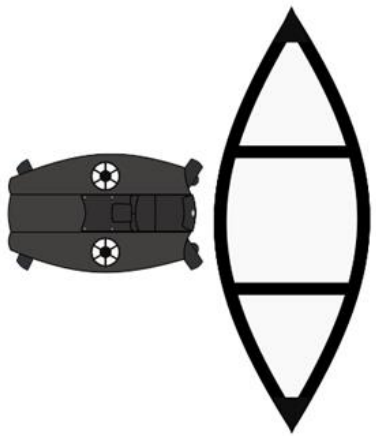
Front-facing view



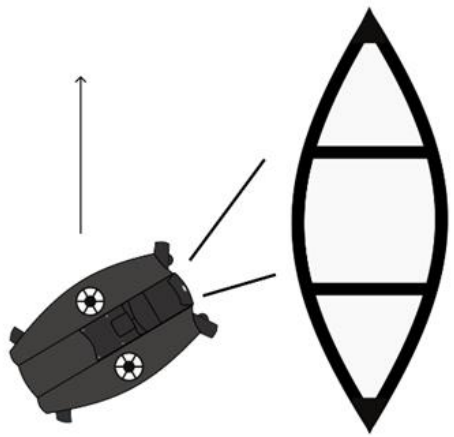
360 Degree rotation



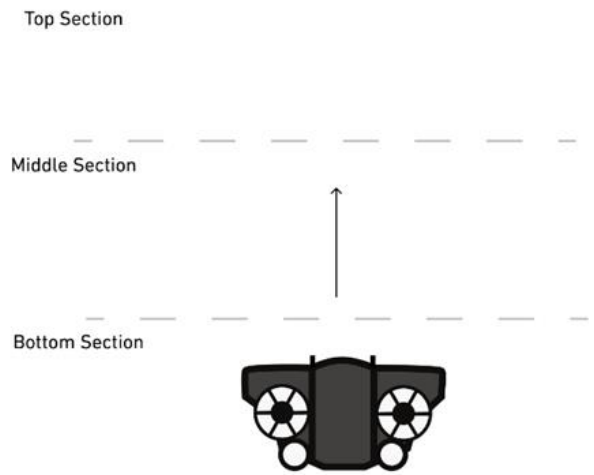
Close up Shots



Diagonal Views



Various Heights



Spiral Path

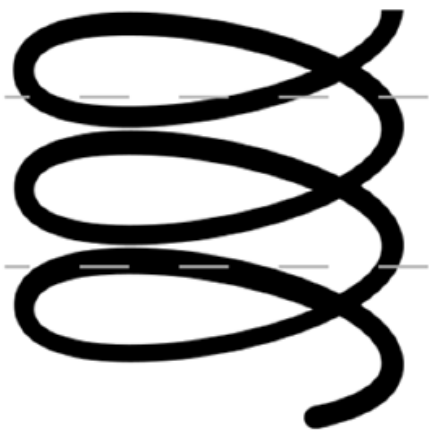
Wave Path

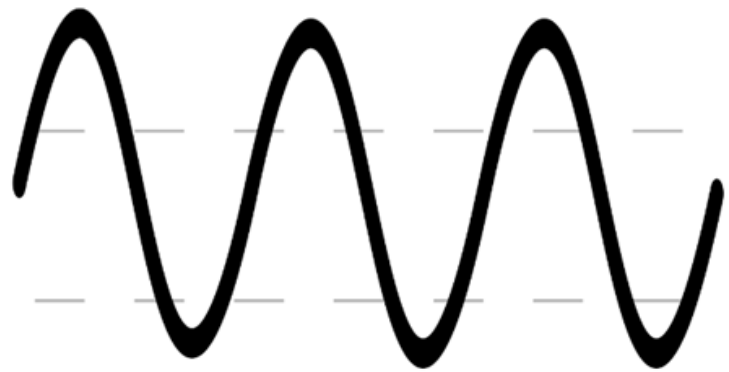
Straights Path

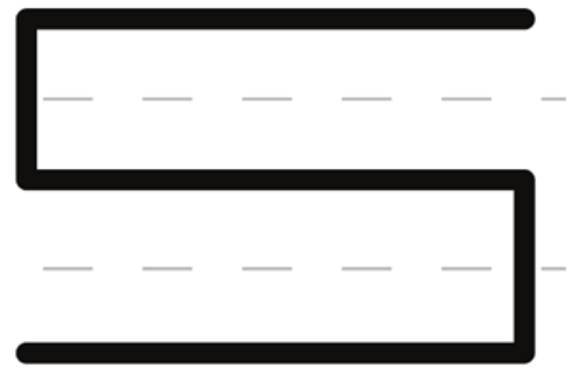
Top Section

Middle Section

Bottom Section







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Other Key Factors

- Lights!
- Consistent Camera Settings
- Stereo vs. Mono

Additional Tools

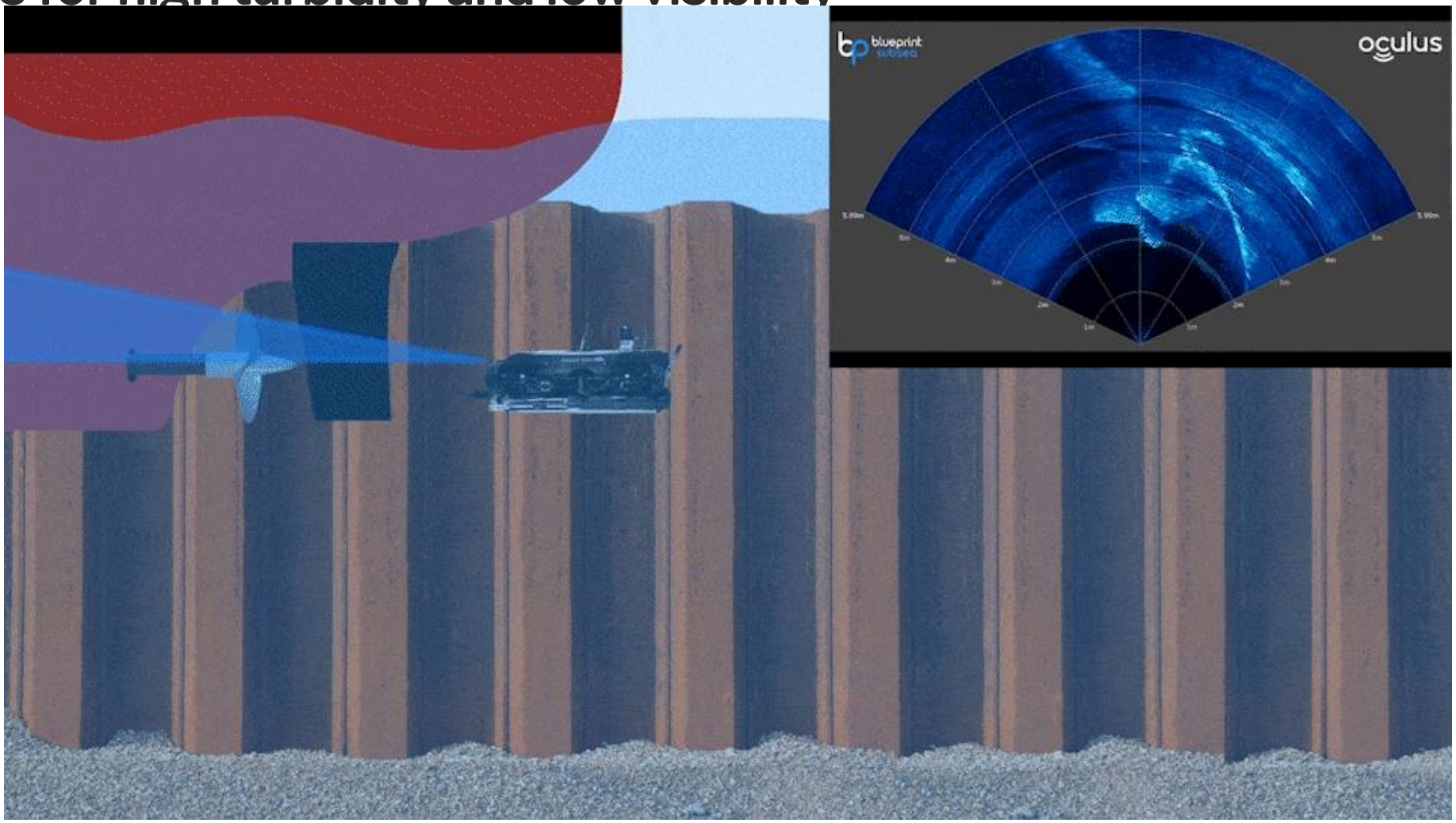
Tools to help with other challenges for vessel inspections

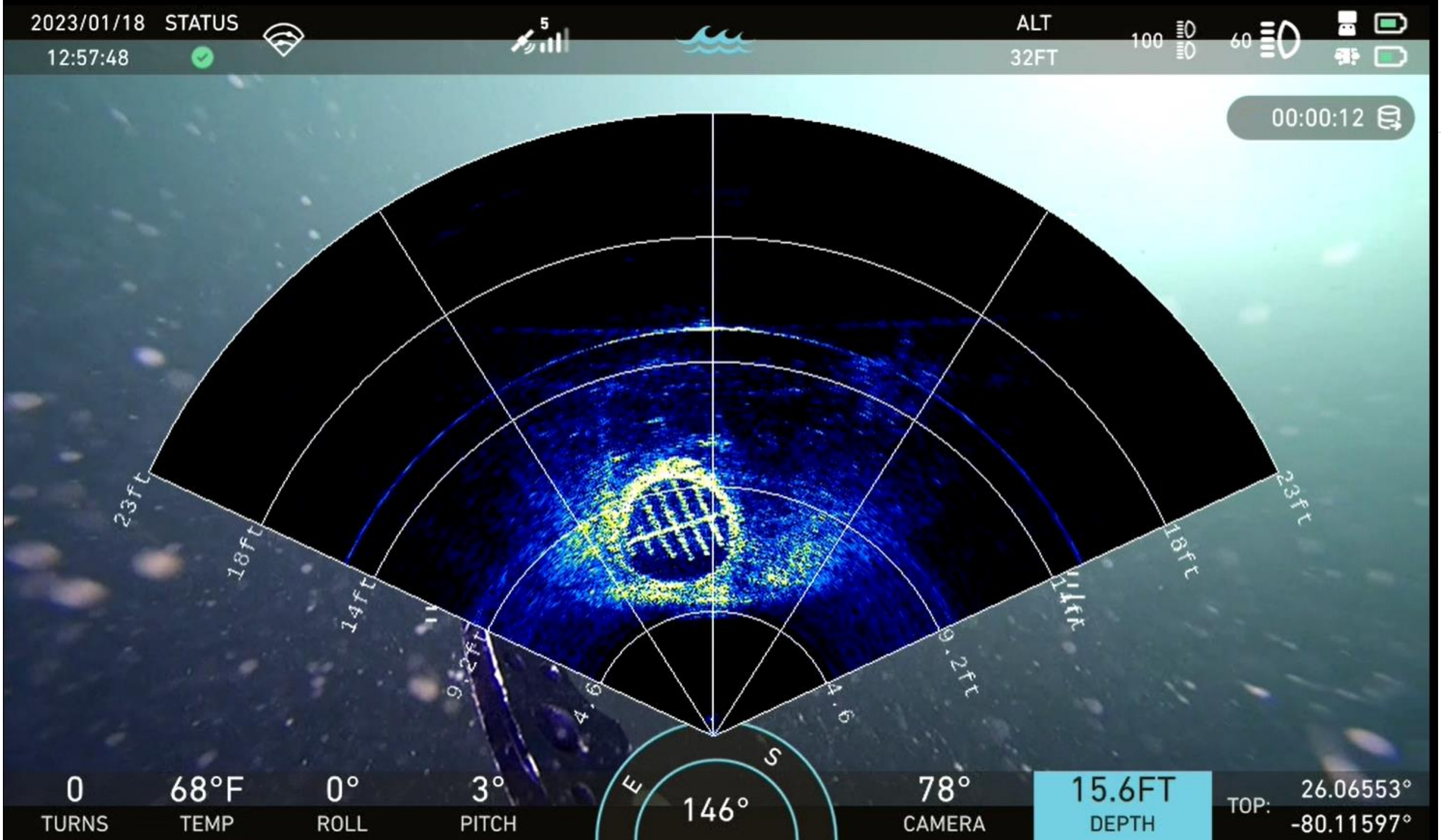
Cygnus Ultrasonic Thickness Gauge

Capture Ultrasonic Thickness data to measure levels of corrosion

SONAR 101 PROPELLER INSPECTION

Solutions for high turbidity and low visibility




2023/01/18 STATUS
12:57:48
5
ALT
32FT
100
60
00:00:12
23ft
18ft
14ft
9.2ft
4.6
4.6
9.2ft
14ft
18ft
23ft
0
TURNS
68°F
TEMP
0°
ROLL
3°
PITCH
E
S
146°
78°
CAMERA
15.6FT
DEPTH
TOP:
26.06553°
-80.11597°

Underwater Positioning

Options for Tracking Position Underwater (GPS does not work underwater!)

Dead Reckoning

Global map

Local map


STATUS
12:44:22
CREATE ACTION
GO TO WAYPOINT
SET DEPTH TO 3.5 M
SET SPEED TO 0.5 M/S
GO TO WAYPOINT
SET DEPTH TO 4.5 M
SET SPEED TO 1.3 M/S
0
13°C
TEMP
2°
ROLL
CHANGE DEPTH
CHANGE SPEED
6.5M
DEPTH
PITCH

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