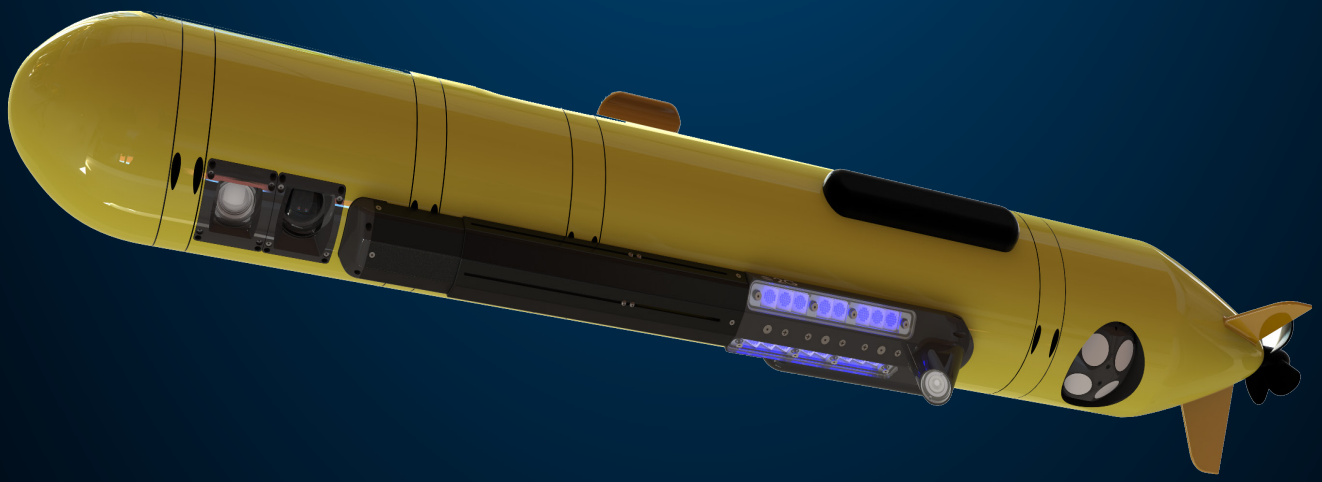
2G ROBOTICS

DEFENCE



AUV Identification Payloads For Mine Countermeasures

Complete Situational Awareness

4K resolution enhanced images and quantifiable laser data for complete situational awareness. Direct laser measurements of mine targets to enhance image-based optical identification and localization.

High Operational Tempo

Onboard, real-time light correction and undistortion for rapid download and post-mission analysis. Target reacquire using AUV assets to minimize sorties and increase operational tempo.

Increased Covertness

Complete mine identification with submerged AUVs. Covert ID of multiple MLO's in a single AUV mission with a vessel at standoff distance.

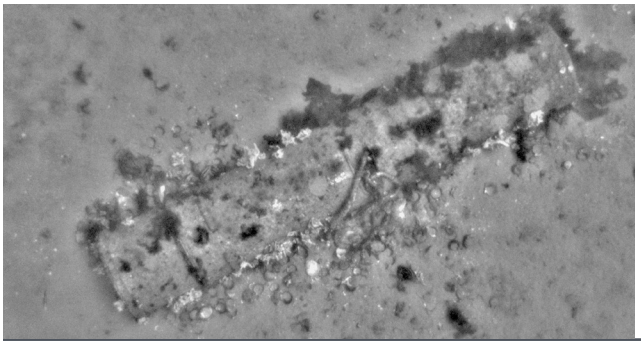
Reduced Risk

Remote camera ID minimizes minefield driver deployments by reducing false positives from sonar detection.

Low Cost

Payloads built for cost-efficient platforms reduce cost. Reduction of diver team and expensive maintenance of MCMVs.

Mine Identification Payloads



Performance

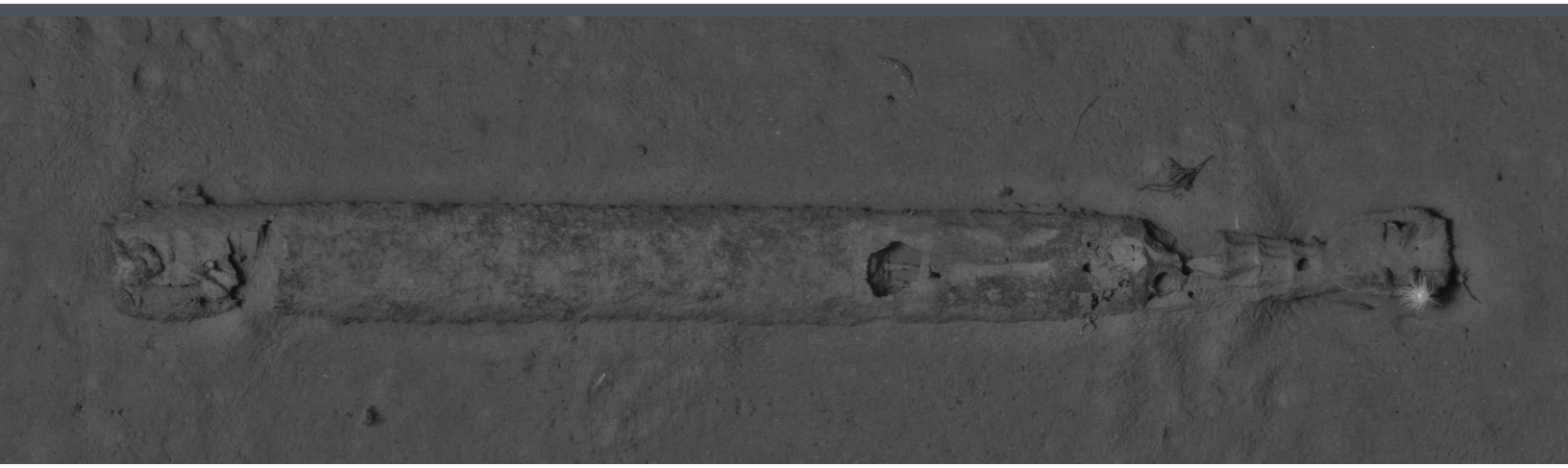
- High Resolution - 2464 points per laser profile.
- Leading sensor sensitivity allows short exposures for over 50Hz laser line capture.
- PPS time synchronization.
- Industry leading laser power at 700mW for max water penetration.

Reliability

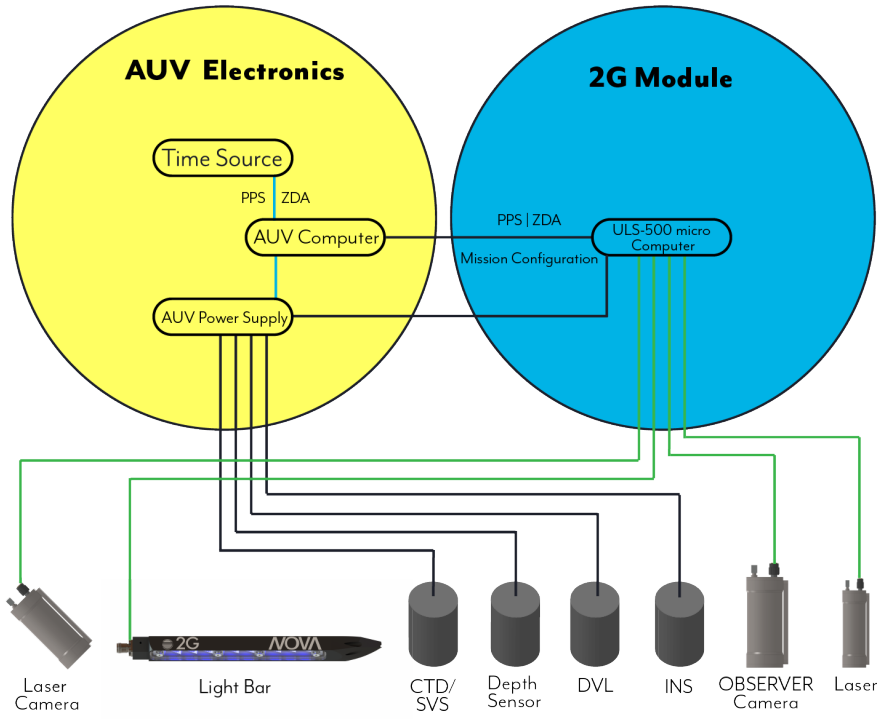
- Rigorous opto-mechanical design to ensure high accuracy at high speeds and at range.
- Actively cooled laser and camera for consistent operation at all temperatures and depths.
- High signal-to-noise ratio to allow detection and amplification in poor water conditions.

Customer-Focus

- Includes tested accuracy and precision report.
- No infield calibration required.
- Camera specifically designed to capture laser profiles.
- Integration, testing, and operational support.

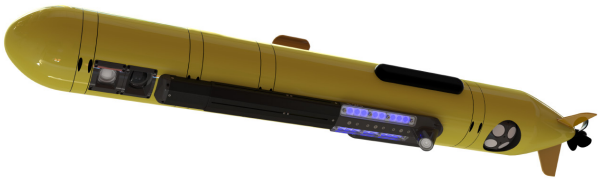


AUV Integration



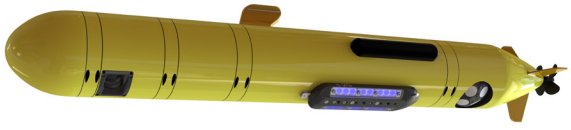
- API allows seamless integration and autonomous operation.
- High sample rates for industry leading along-track resolution.
- Long range capture capability at up to 10 meters.
- Precise positioning from PPS time synchronization with navigation sensors.
- Proven reliability: 2G sensors have integrated with the indus-

Payload Configurations



Optical ID Payload

- ULS-500 Micro
- OBSERVER stills camera
- 2G NOVA Lightbar
- Drop-in module or retrofit integration

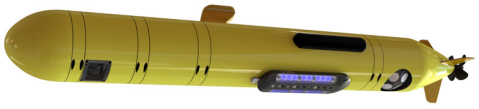


Camera ID Payload

- 4K OBSERVER stills camera
- 2G NOVA Lightbar
- Drop-in module or retrofit integration

Mine Identification Payloads

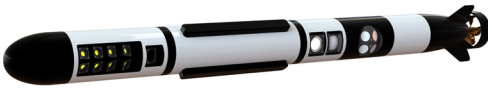
Available Configurations



HYDROID
A KONGSBERG COMPANY

REMUS 100, 300, 600

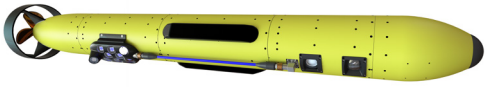
Optical ID Payload (600 only)
Camera ID Payload (all)



L3HARRIS

IVER 3 Open System

Optical ID Payload
Camera ID Payload



TELEDYNE
GAVIA
Autonomous Underwater Vehicles

Gavia

Optical ID Payload
Camera ID Payload

GENERAL DYNAMICS
Mission Systems

Bluefin 12S, 21

Optical ID Payload (21 only)
Camera ID Payload (12S & 21)

Optical ID Payload Specifications

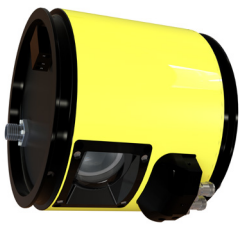
2G OBSERVER camera & NOVA Lightbar	
Camera Sensor	2/3" CMOS | 12-bit
Camera Type	Monochrome
Resolution	2464 x 2056
Sensitivity	> 70% Quantum Efficiency
Frame Rate	3 Hz (Real-time image processing) | 10 Hz (Raw images only)
Signal to Noise	39.6 dB
Dynamic Range	76.0 dB
Field of View	50° x 44° in water
Lens	Fixed -6mm - F2.1
Image Processing	Real-time image enhancement & undistortion
Data Format	Raw 12-bit .Tiff | Processed 8-bit .Tiff
Number of LEDs	8 or 16
LED Colour	Blue or White
Light Output	Up to 200,000 lumens (adjustable)
2G ULS-500 Micro (laser scanner)	
Laser Type	700 mW | Class 3B | 450nm
Points Per Laser Line	2464
Angle of View	50°
Resolution	Along Track: 18mm | Across Track: 1.5mm (4m altitude, 3 knots, and 85 Hz laser rate)
Range	10m maximum
Frame Rates	85 Hz (laser only) | 50 Hz (laser + stills)
Calibration	Calibrated on Vehicle
Data Formats	Laser Scanner: .xyz (CSV), LAS Publishing
System	
Power	Laser Scanner & Control Electronics: 55W typical | Stills Camera & LED Panel: 50W typical
Time Synchronization	Synchronization to INS | PPS Time Synchronization
Communication	Ethernet
Control	Option 1: Wifi Accessible Windows GUI | Option 2: Mission Planning Integration with API
Data Download	Vehicle Gigabit Ethernet Network, or External Bulkhead
Data Storage	2 TB Solid State Drive
Recording Time	17 Hours @ 50Hz Laser, 2Hz Stills (8-bit Images)
Software	ViewLS Control GUI | C++ API | ViewLS Data Processor

Mine Identification Payloads

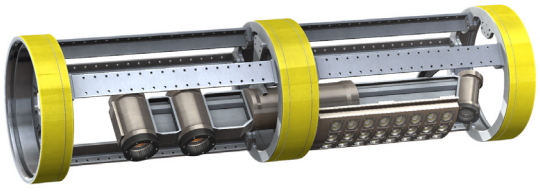
Camera ID Payload Specifications

2G OBSERVER camera & NOVA Lightbar	
Camera Sensor	1.1" CMOS | 12-bit
Camera Type	Monochrome
Resolution	4112 x 3008 (12.4MP)
Sensitivity	> 70% Quantum Efficiency
Frame Rate	2 Hz (Real-time image processing) | 4 Hz (Raw images only)
Signal to Noise	39.6 dB
Dynamic Range	76.0 dB
Field of View	Up to 90° diagonal in water (dome port)
Lens	Fixed Focus - 8.5mm - F2.8
Image Processing	Real-time image enhancement & undistortion
Data Format	Raw 12-bit .Tiff | Processed 8-bit .Tiff
Number of LEDs	8 or 16
LED Colour	Blue or White
Light Output	Up to 200,000 lumens (adjustable)
System	
Dimensions	Camera Module: 171.5mm (Length) 190.5mm (R100 Diameter) or 324mm (R600 Diameter) | Light Bar: 314mm (Length)
Power	Stills Camera & Light Bar: 50W typical
Time Synchronization	Sychronization to INS | PPS Time Synchronization
Communication	Ethernet
Control	Option 1: Wifi Accessible Windows GUI | Option 2: Mission Planning Integration with API
Data Download	Vehicle Gigabit Ethernet Network or External Bulkhead
Data Storage	2 TB Solid State Drive
Recording Time	17 Hours @ 2 Hz Stills (Enhanced Images)
Software	ViewLS Control GUI | C++ API | ViewLS Data Processor

Lightbar for Camera ID Payload



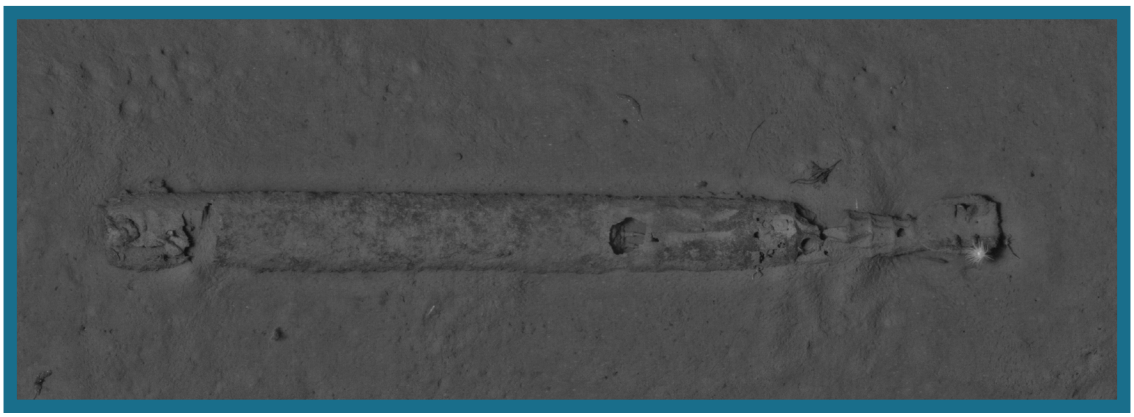
Camera ID Payload

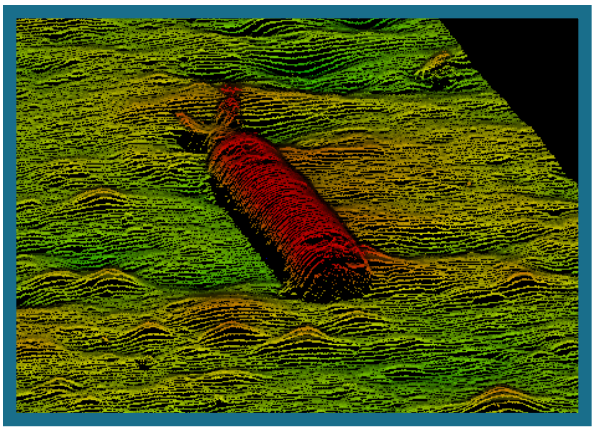


Module for Optical ID Payload

Data Collected from ID Payloads

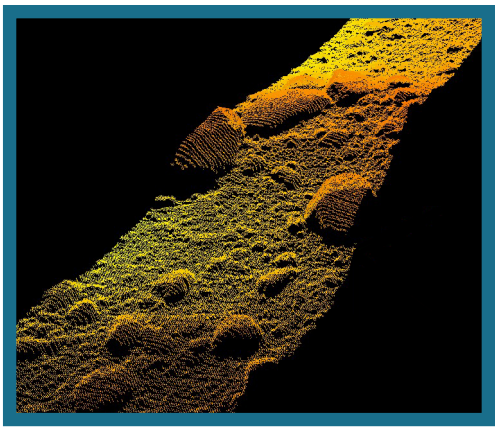
Image mosaic of torpedo collected with OBSERVER camera.

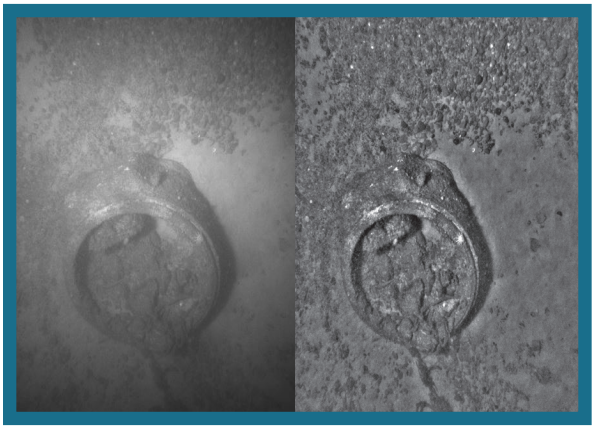


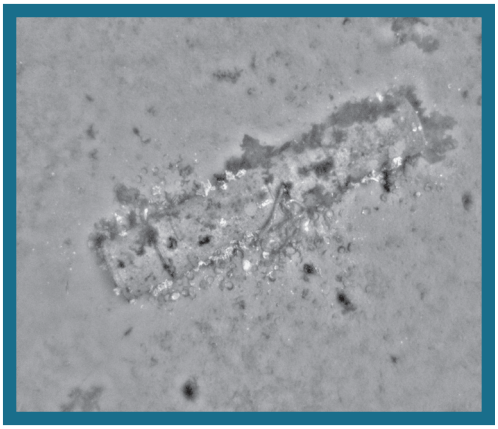
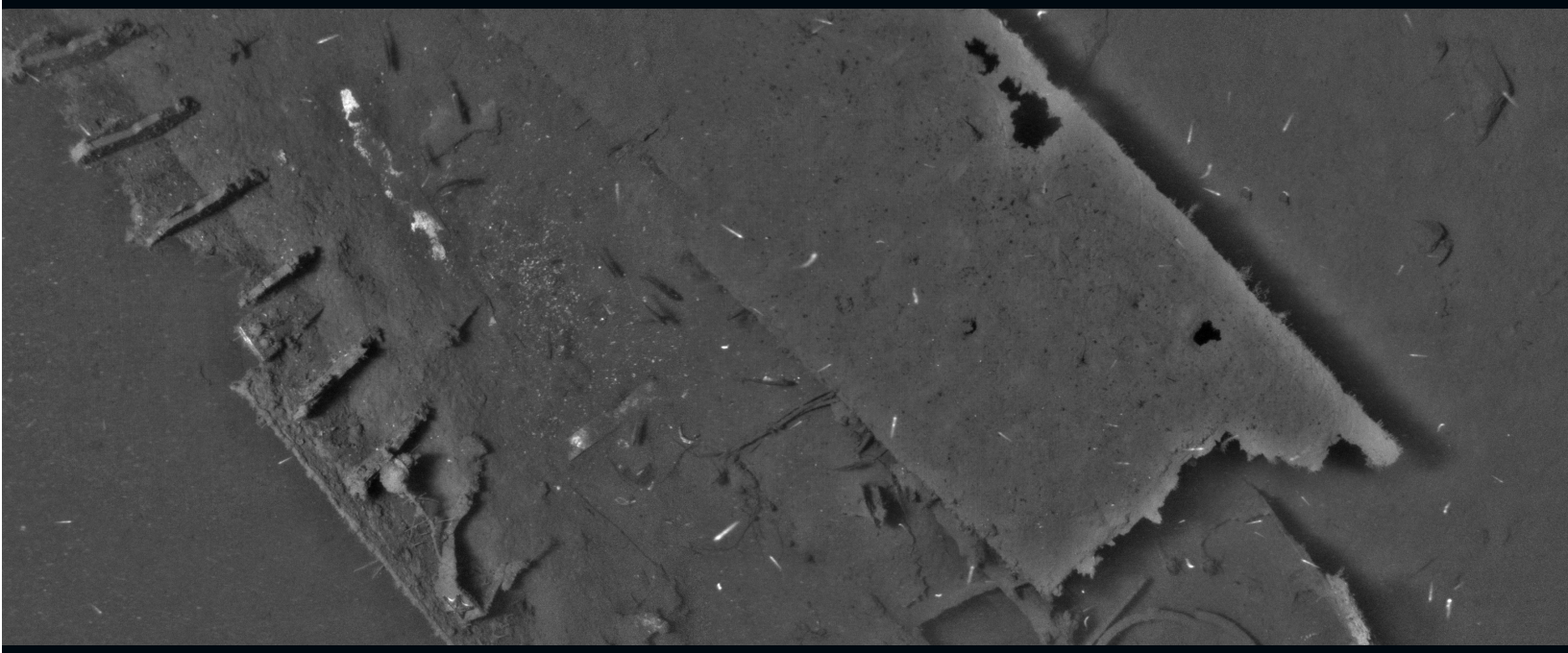
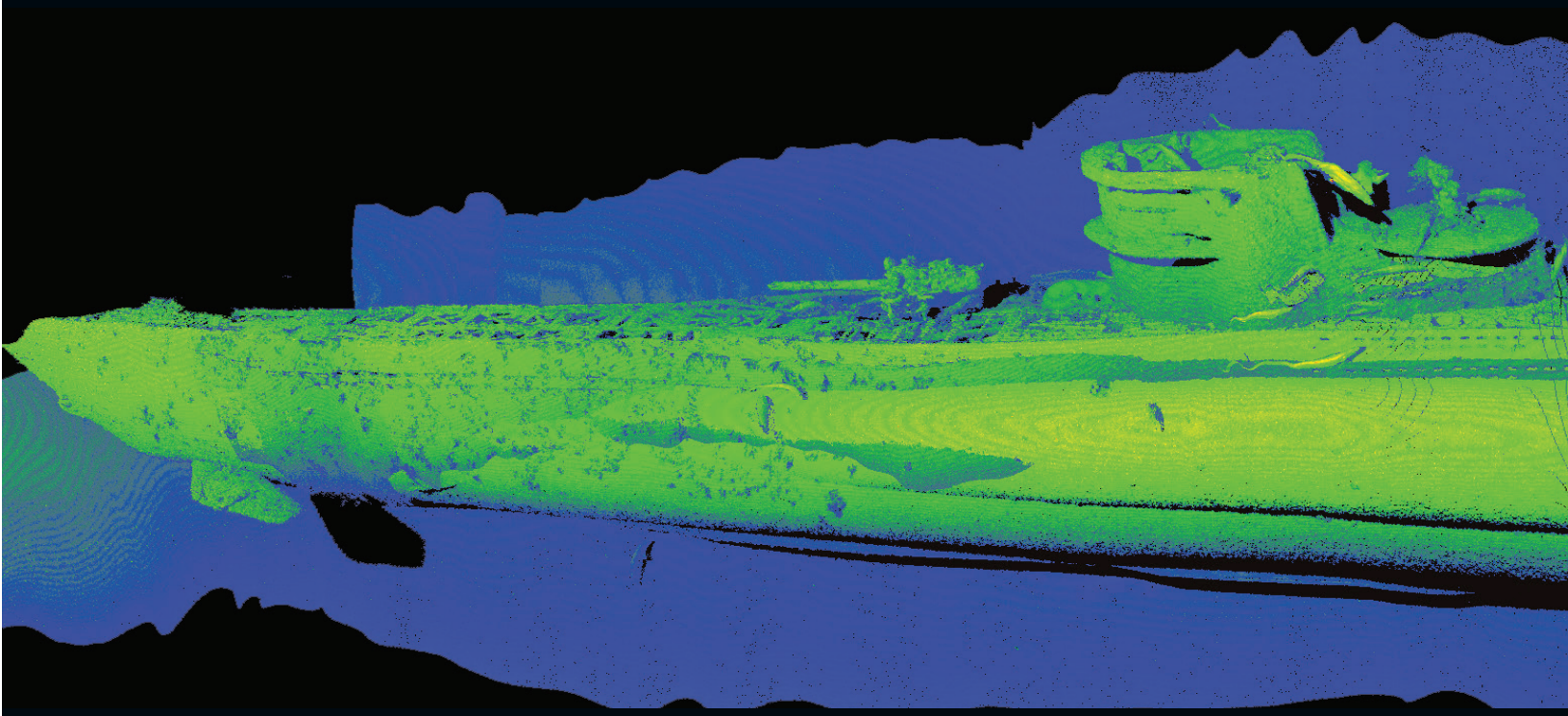


Left: Point Cloud of torpedo.

Right: Point Cloud of Seabed.





Left: Raw vs. Enhanced image.

Right: Mine image captured aboard REMUS 600.