



UNLOCKING AUV POTENTIAL

Recon Combined AUV Payload

Complementary sensor technology housed within a single mission-specific module to increase AUV capability while maintaining efficient vehicle size, weight, and power (SWAP).



WHY USE AUVs?

**AUVs can improve
operational efficiency for
long range surveys**





APPLICATION

Subsea Inspection

01

WIDE AREA

Field mapping,
environmental or
scouring survey

02

LOCALIZATION

Potential areas of
concern, spans,
leaks

03

IDENTIFICATION

Deliver actionable data for
predictive maintenance or
intervention

04

INTERVENTION

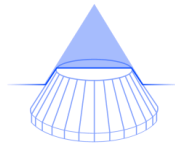
Implement repairs or
mitigation to protect
asset.



AUV INSPECTIONS

Sensors Available for AUVs

Optical



Underwater Laser Scanners

High-resolution quantifiable point cloud models to support volumetric assessment.



Imaging Systems

High-resolution qualitative identification. Localized survey providing clear details of the asset.

Sonar



Sonar Systems

Wide area coverage, low resolution quantifiable point cloud model. Ideal for environmental mapping.

Solution



Recon UUV Payloads

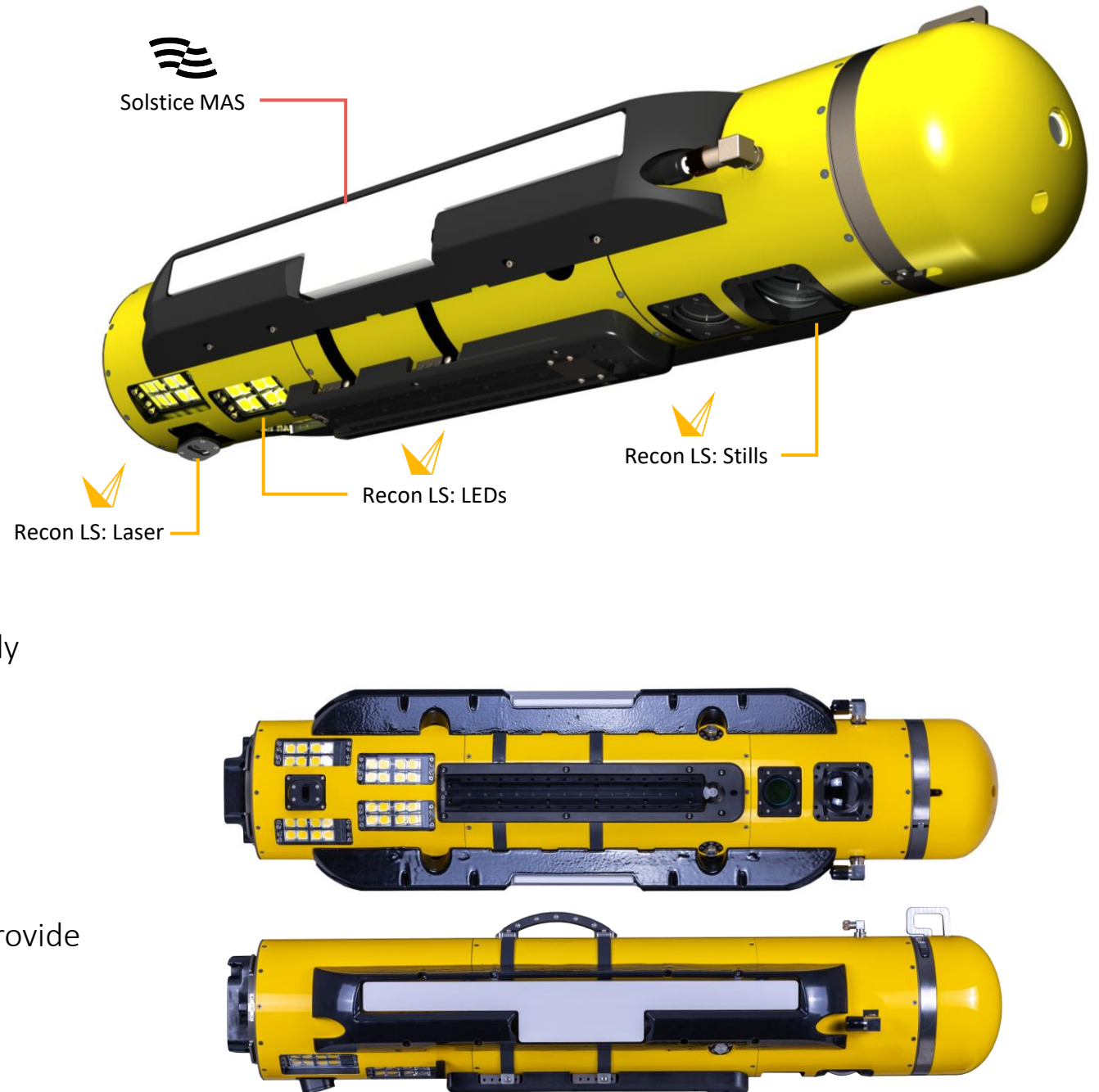
Consolidated sonar, laser scanner, and imaging system for seamless integration with AUVs



ABOUT

Combined Payload

- Captures sonar, stills images & laser data simultaneously
- Fully integrated processing & storage
- Add or retrofit the modular payload on your vehicle
- Ideal for autonomous deployments near shore
- Synergistic technology housed within one module to provide complete survey solution.





APPLICATION

Subsea Inspection

01



WIDE AREA

AUV with
Solstice MAS

02



LOCALIZATION

AUV with
Solstice MAS

03



IDENTIFICATION

Remote Identification
using Voyis

04

REMEDIATION

Remote Operated
Vehicle

OPERATIONAL EFFICIENCY

In-mission remote
identification

TETHERLESS

Cost effective survey, smaller
support vessel

CONFIDENCE

High quality MAS and
laser/imaging deliverables

Voyis' Recon LS

Laser Scanner & Imaging Package





Recon LS Imaging:
4K Stills Camera

Recon LS Laser Scanner:
Optical Receiver

Recon LS Imaging:
Nova LED Panels

Recon LS Laser Scanner:
Laser Projector



LASER & IMAGING SYSTEM

How it Works

- ▶ 50-degree laser swath is swept across the target
- ▶ Camera and laser have a fixed baseline – points are triangulated along the laser line in 3D space
- ▶ Point cloud result is viewed in real-time by the topside operator
- ▶ Combined laser and stills data
- ▶ Uses machine learning to enhance images for true-colour and real-time data enhancement





Higher resolution,
greater detail



Easier to
accurately
detect
defects



Multibeam Echosounder (MBES)

Dynamic Laser Scanner

IMAGE ENHANCEMENTS



Real-Time Image Correction

Raw — Undistort & Debayer — Colour & Lighting



Automated image correction with no input parameters

CAMERA BIT DEPTH

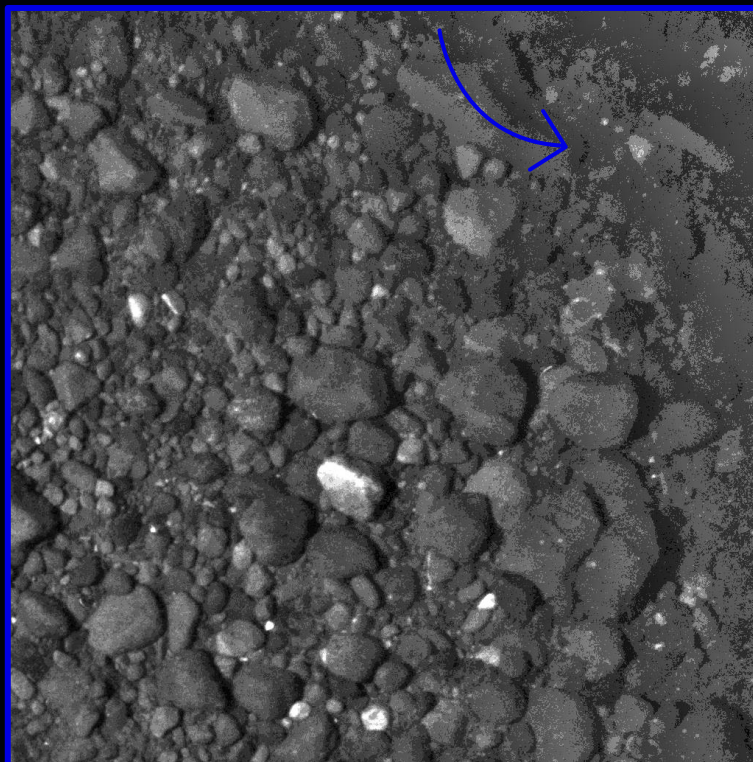


Using Dynamic Range

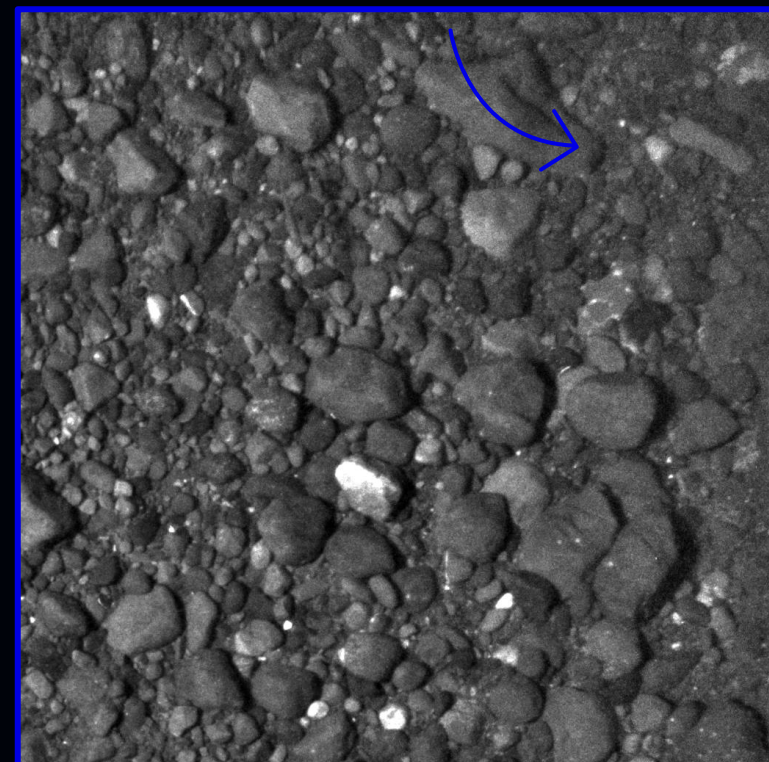
Raw



8-bit Enhanced



12-bit Enhanced



8-bit = 255 levels per pixel

12-bit = 4096 levels per pixel

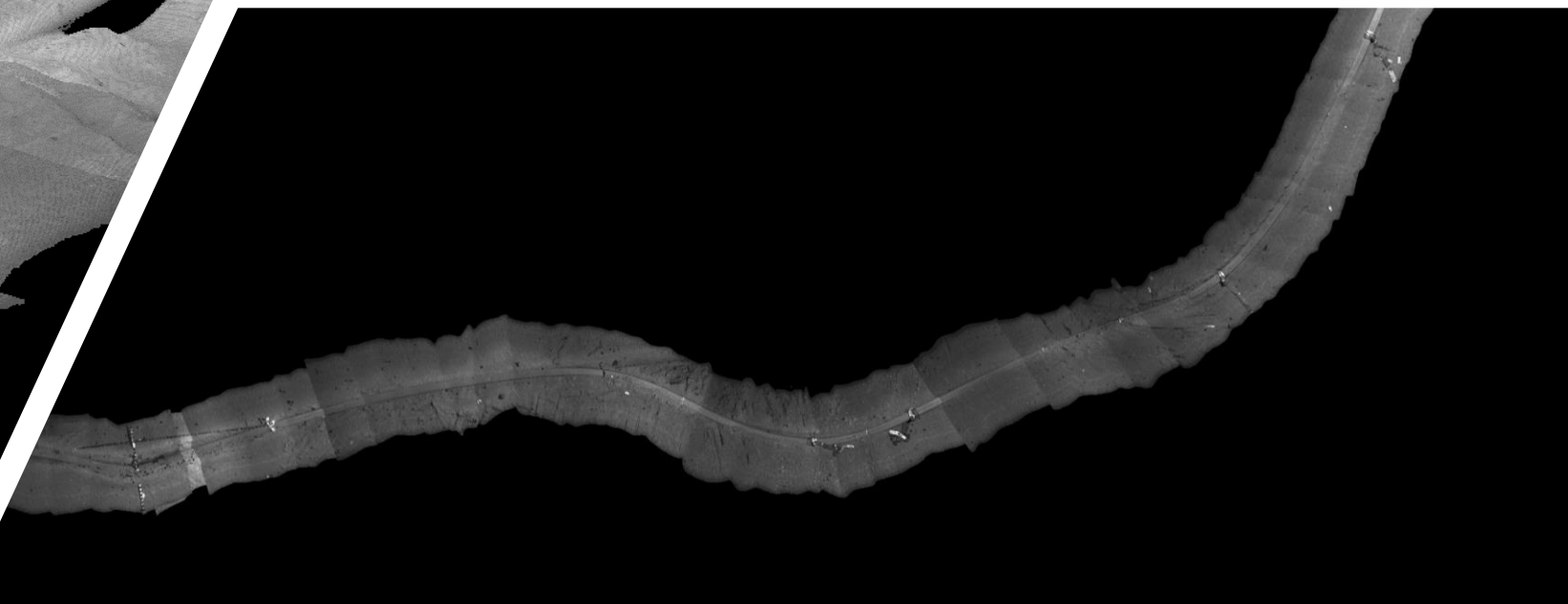
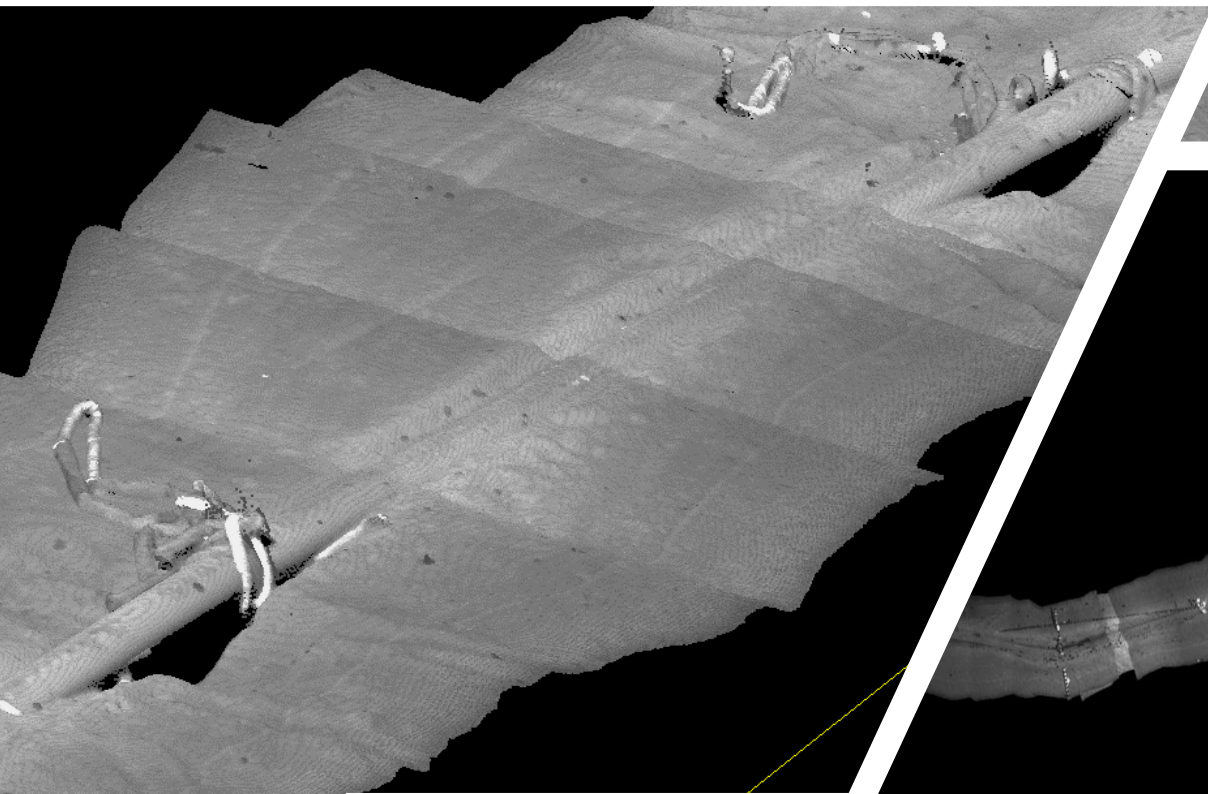
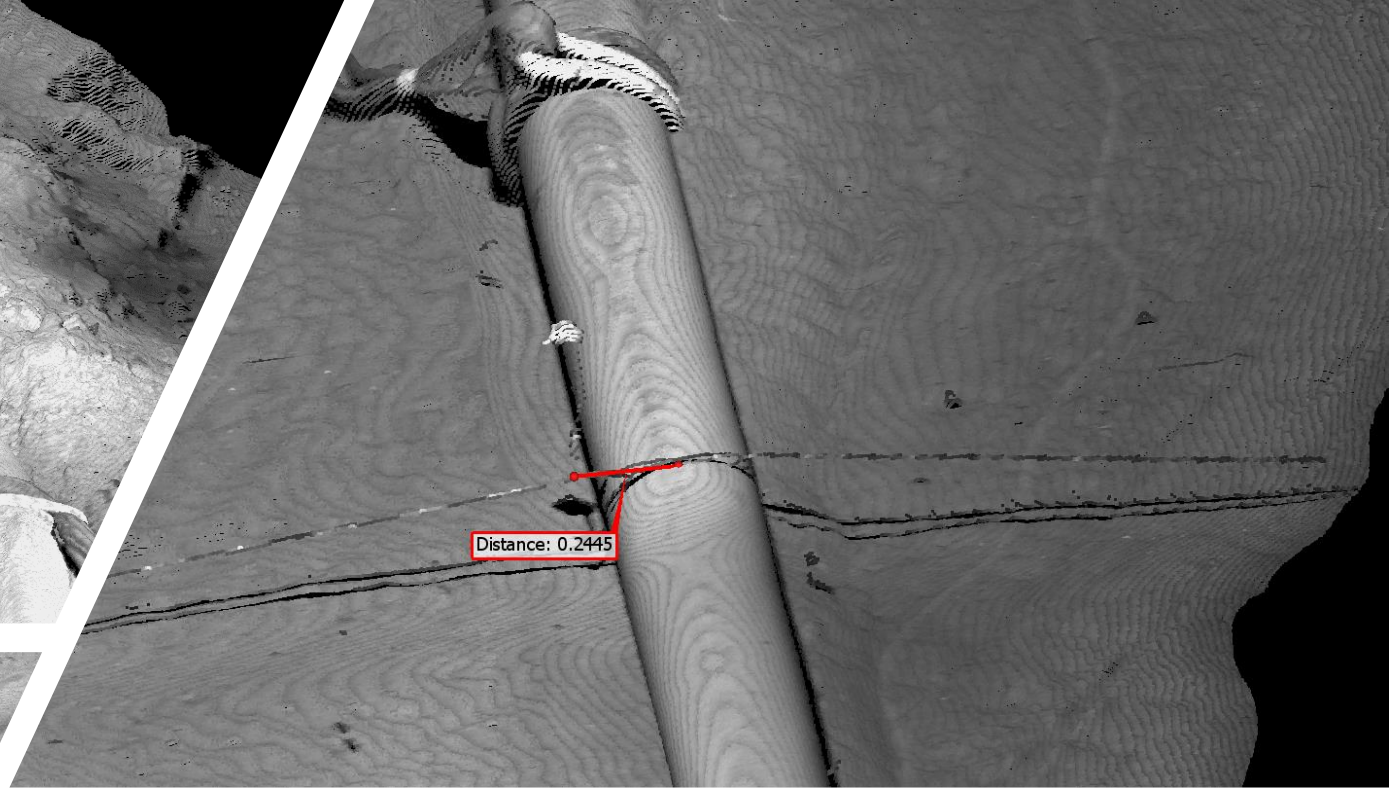
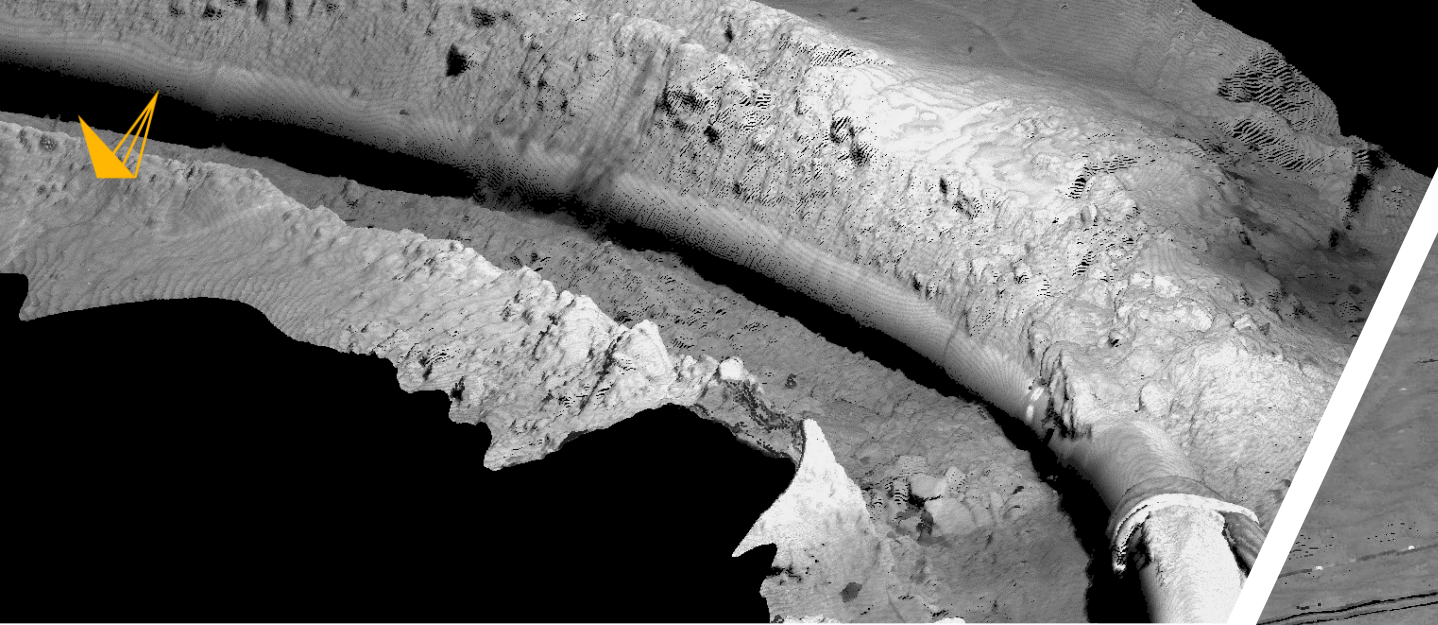
IMAGING CORRECTIONS

Machine Learning True Colour



True colour correction at any vehicle speed – consistent and evenly illuminated for stunning imagery







Wavefront's Solstice

Multi-Aperture Side-Scan Sonar





Solstice Multi-Aperture
Side-Scan Sona



WAVEFRONT

Solstice MAS



Dynamic Focus

Dynamic focusing provides enhanced imagery across whole swath



Multi Aperture

Multiple apertures improve signal-to-noise ratio



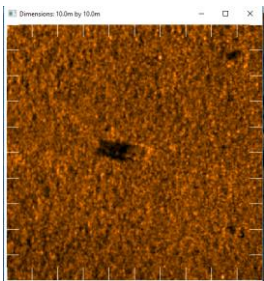
Ultra-high Definition

Class leading 0.15° along-track resolution. Interferometry as standard.

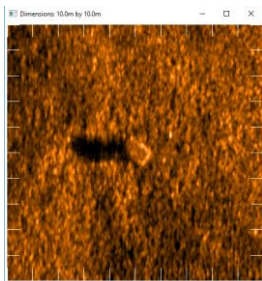


High Contrast

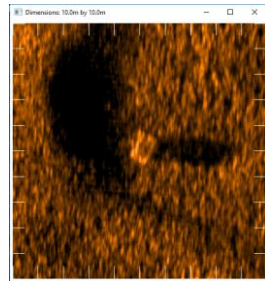
Array design suppresses side lobes and improves contrast



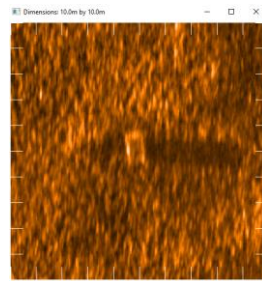
22 m



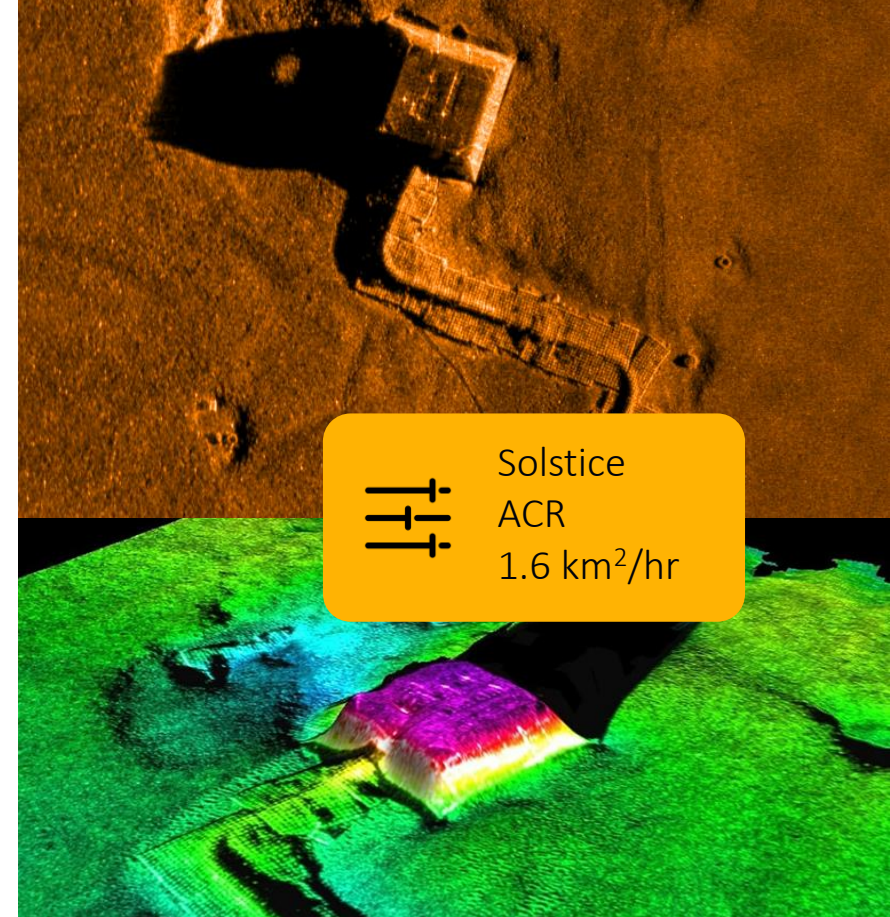
47 m



72 m



92 m

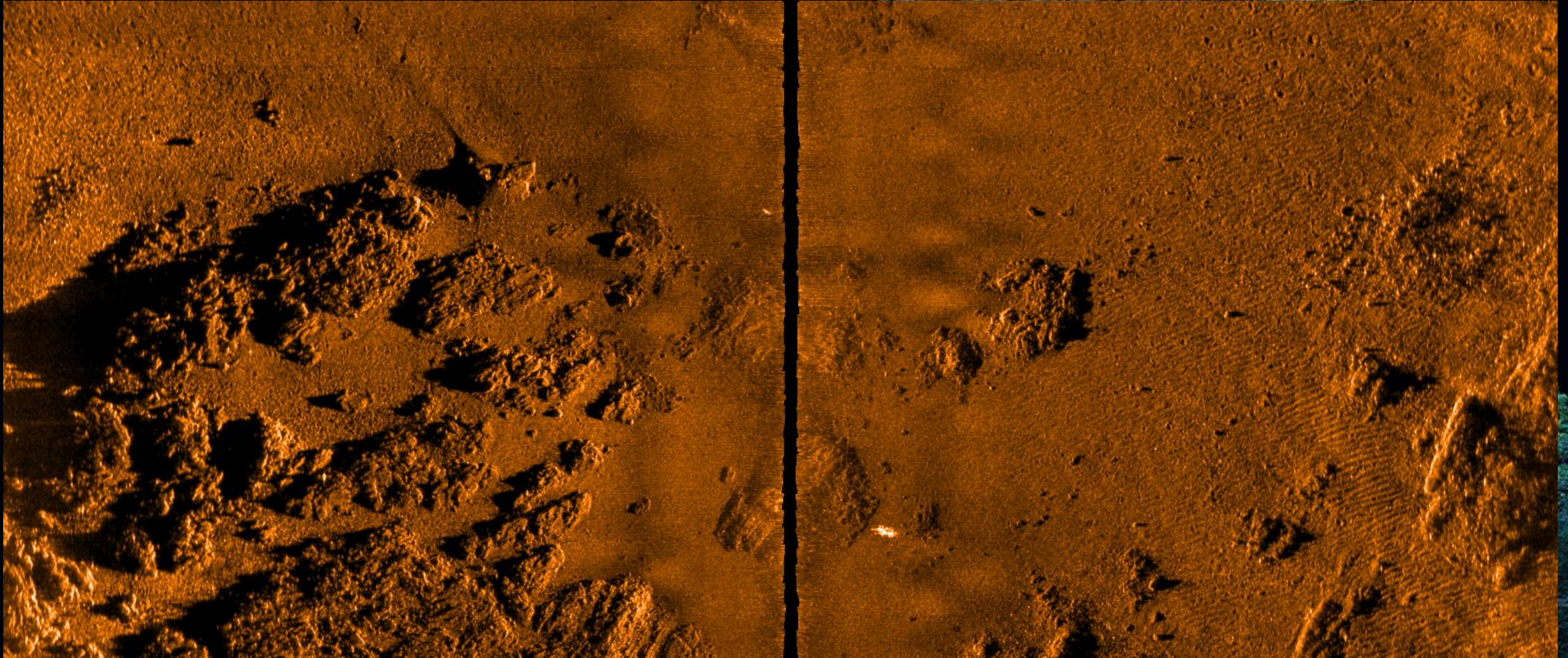


Solstice
ACR
1.6 km²/hr



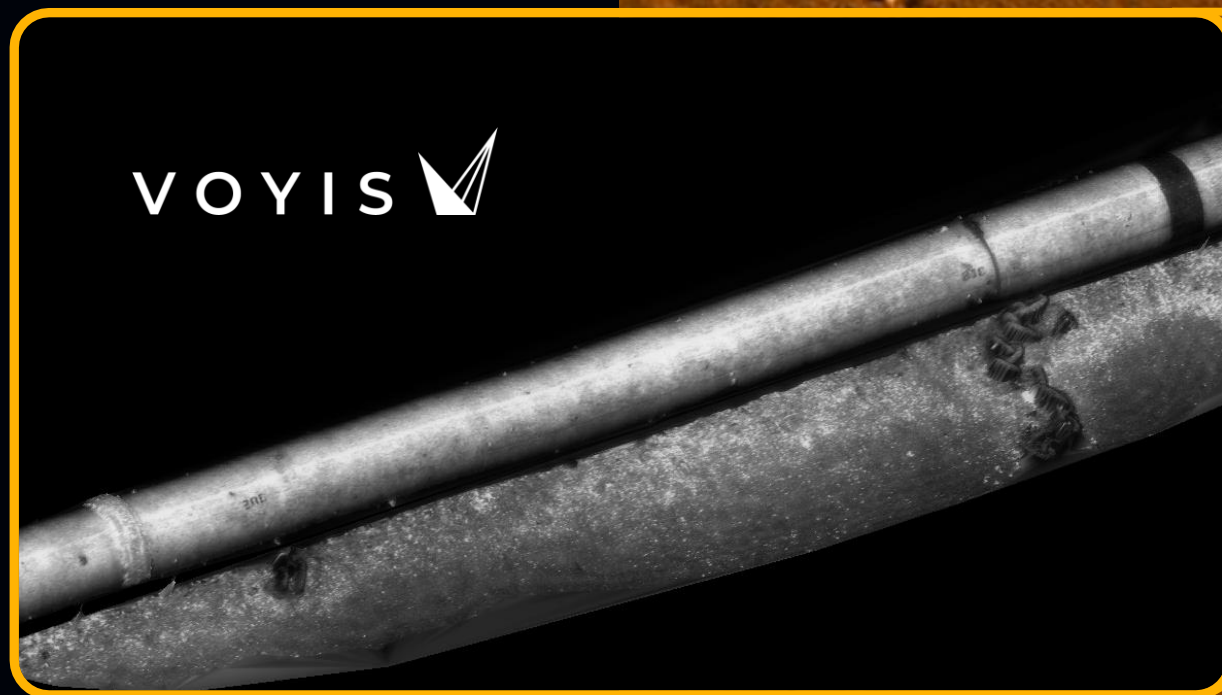


LARGE AREA MAPPING WITH SOLSTICE





LARGE AREA MAPPING WITH SOLSTICE PIPELINE INSPECTION



ULTRA-HIGH RESOLUTION RE-ACQUIRE WITH INSIGHT

Deployment

IVER4 San Diego





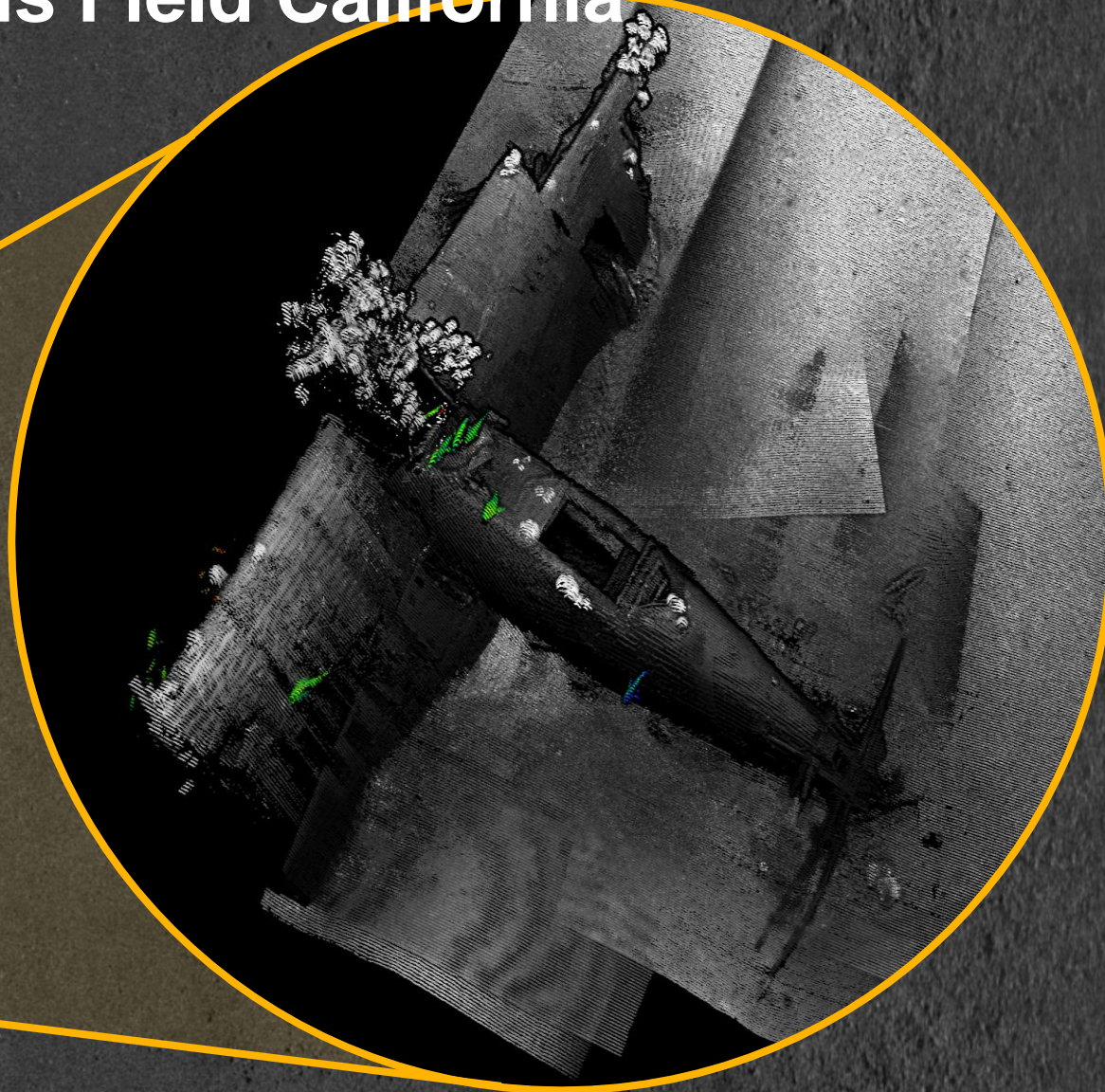
CASE STUDY

AUV Operations – Debris Field California



CASE STUDY

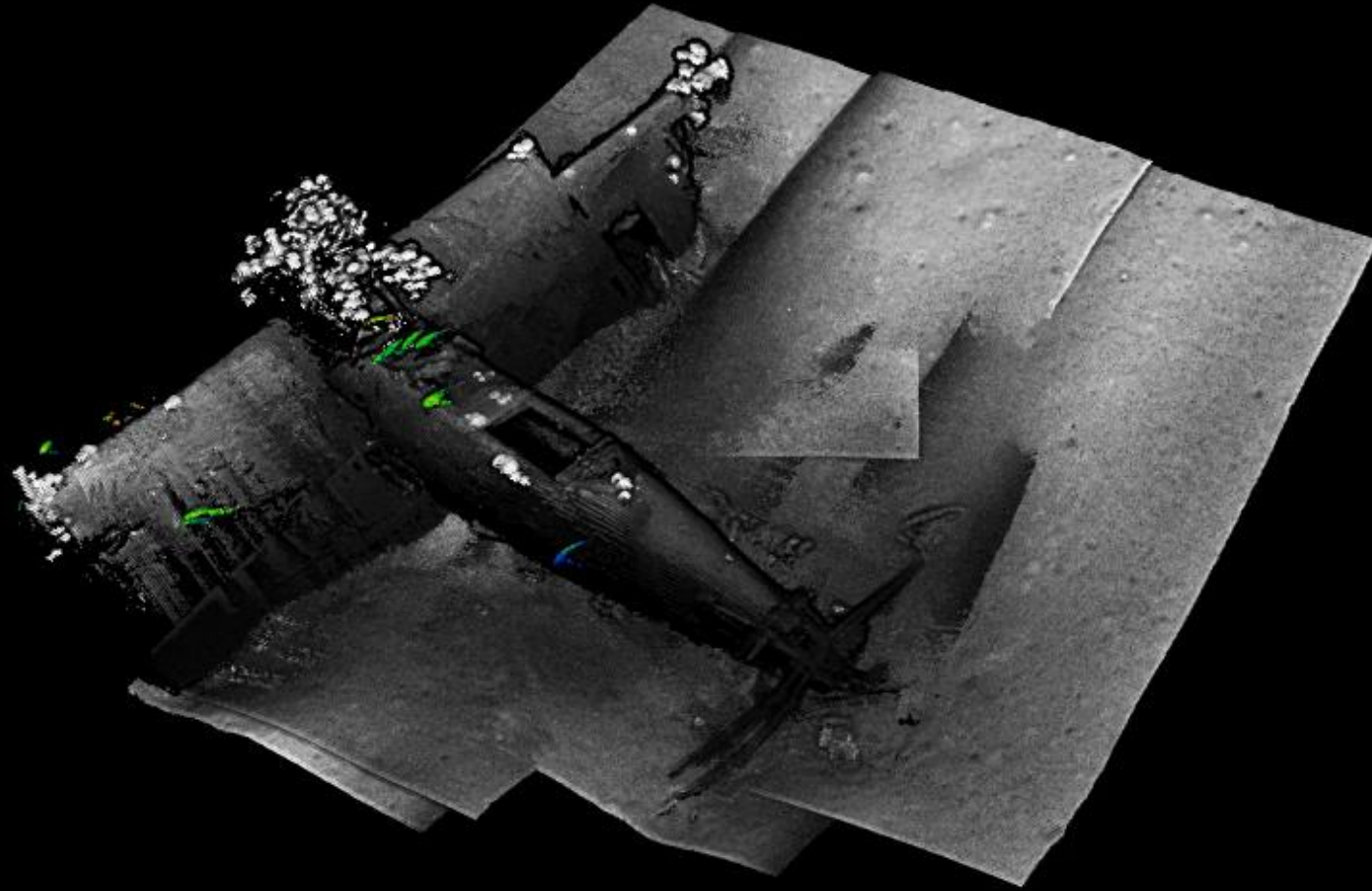
AUV Operations – Debris Field California





CASE STUDY

AUV Operations – Debris Field California





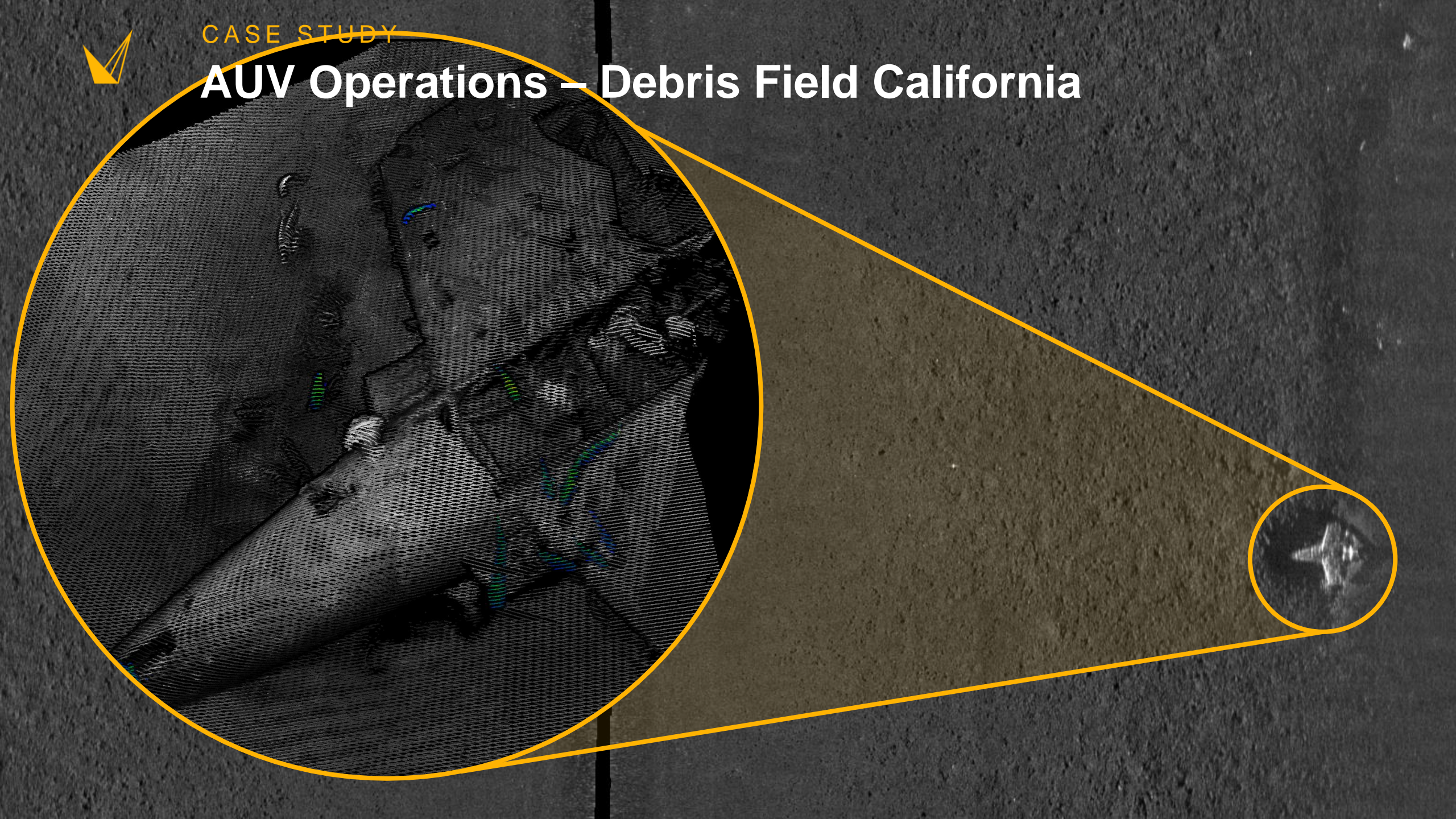
CASE STUDY

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CASE STUDY

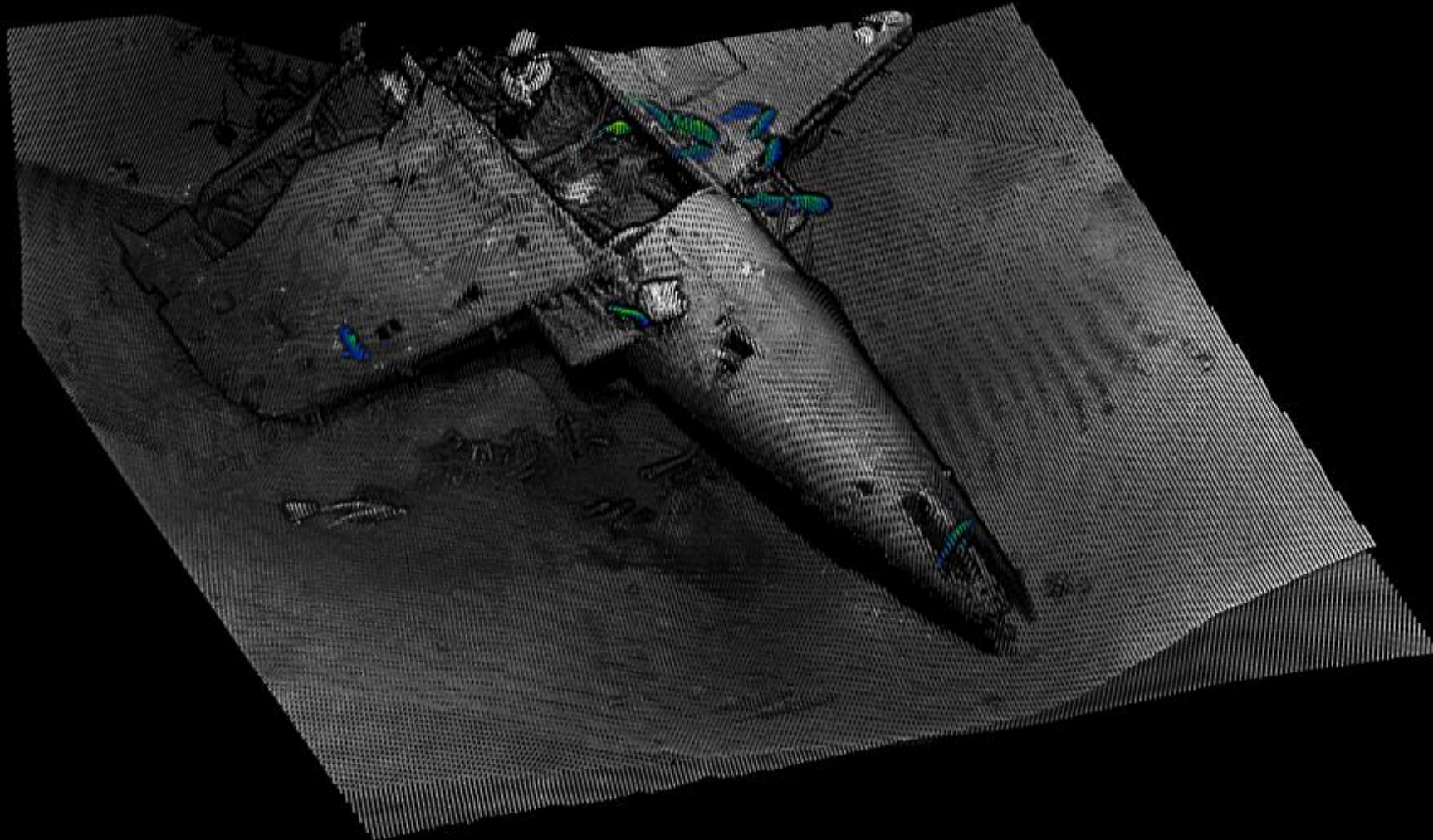
AUV Operations – Debris Field California





CASE STUDY

AUV Operations – Debris Field California





CASE STUDY

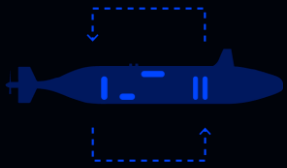
AUV Operations – Debris Field California



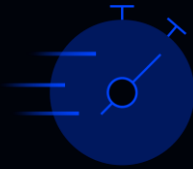


RECAP

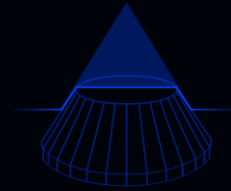
Combined Payload



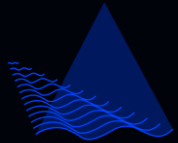
Suitable for a variety of
industry leading AUVs



Increased Operational
Efficiency



Confident Feature
Identification



Wide Area Mapping



Partners with your team



Enable automation &
improved deliverables



THANK YOU

Questions?



Luke Richardson

Luke is the VP, Sales and Marketing and manages the Defence sector. Has been working with Voyis for 5+ years.



VOYIS 