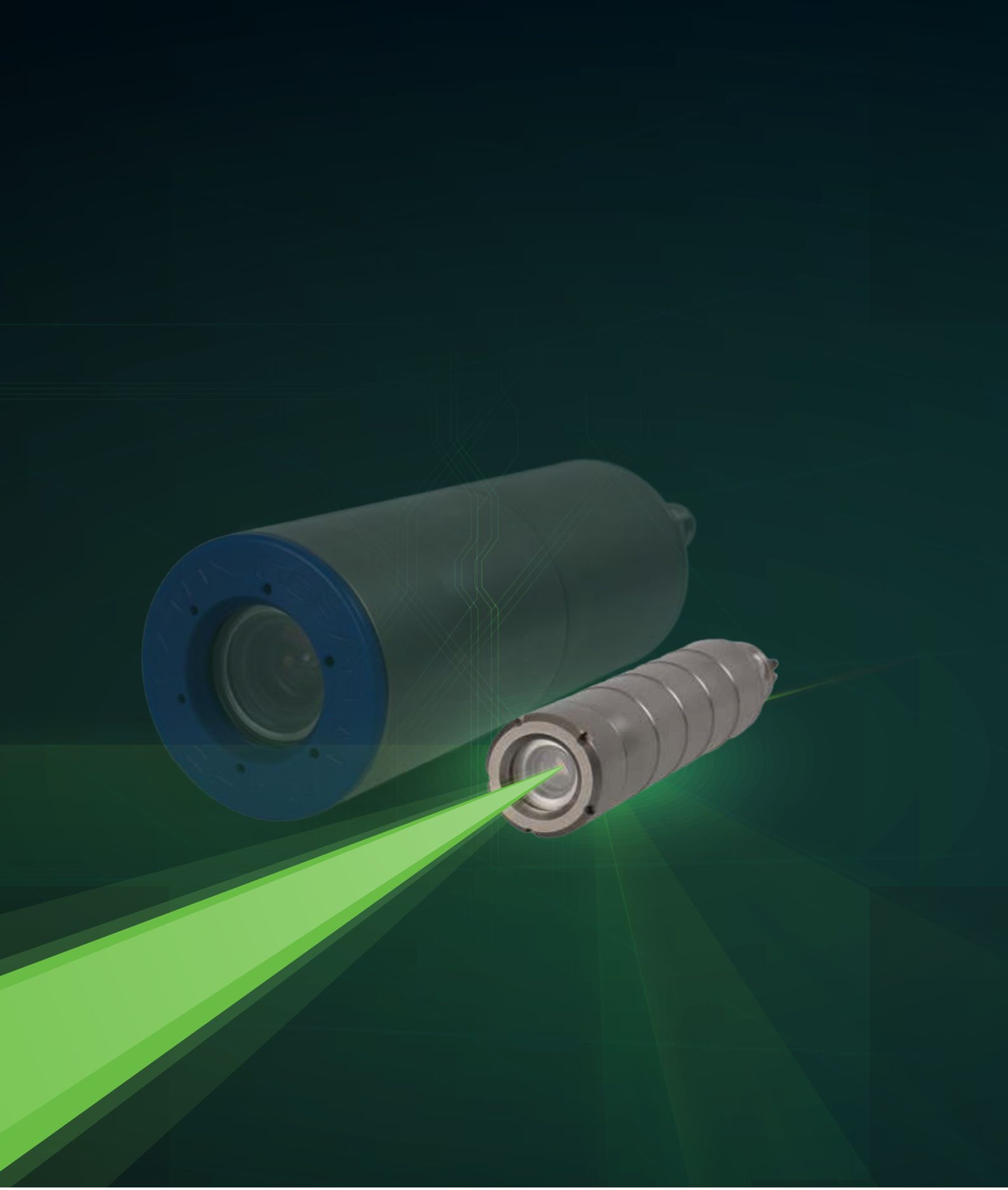
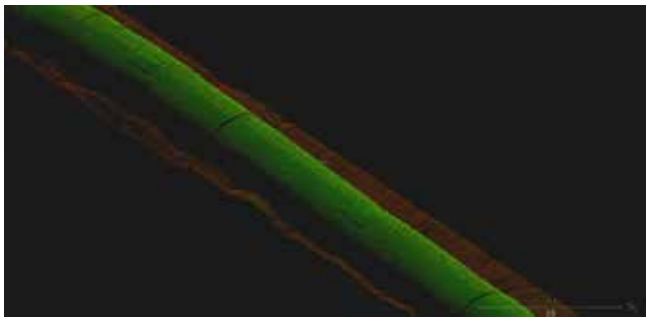


CATHX OCEAN

Imagine the future

L1000 LASER PROFILER

Subsea Profiler for 3D Data Capture



Overview

Laser Profiling System for Subsea Vehicles

The L1000 Laser Profiling System includes the Cathx Ocean M12 A1000 Stills camera and Green Line Laser. The Green line laser is a 520nm long range laser which produces a straight line with uniform intensity over a long range due to its optimal wavelength for water penetration.

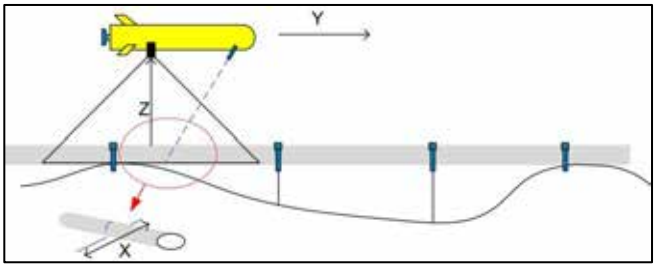
This system can capture UHD Still images and laser profiles in a rapid sequence providing laser xyz data with co-registered still images.

Range and Scale Measurement

A laser system for range and scale can easily be set up using the M12 Camera facing downwards with a Green line laser in parallel.

3-D Point Cloud

A pre-calibrated laser system can be configured for high density 3D point cloud data capture using a Green line Laser facing downward and an M12 A1000 Camera at a suitable angle for optimum measurement and within the physical limits of the vehicle.



L-1000 System

M12 A1000 Camera

12.5MP camera designed as a dual image system capturing laser point cloud with co-registered still images. The A1000's high sensitivity combined with low exposures and progressive scan imaging produces the sharpest image detail available from moving vehicles.

Key Features

· Modes - Stills, Laser, Dual/Interleaved
· 4096 x 3072 UHD Stills @ up to 5fps
· Laser profiles @ up to 40 fps
· Stills + Lasers interleaved @ 5 /25 fps

Laser

150mW Class 3B green line laser producing a straight line with uniform intensity. The laser is fixed in position at an angle to the camera. The A1000 camera triggers the laser at up to 40Hz and captures a laser profile.

Key Features

· 150mW power output (Class 3B)
· Range up to 5 meters in water
· 37° fan angle in water
· Controlled by the A1000 camera

LED Lighting

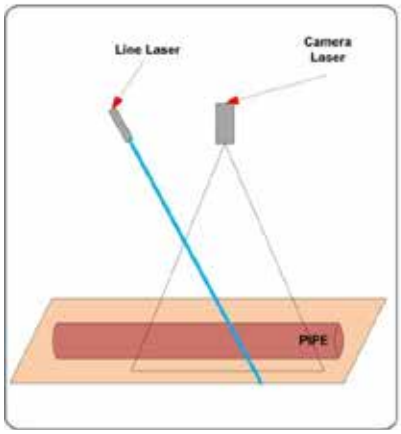
Cathx LED lighting systems are triggered by the M12 A1000 camera in a dual mode laser and white light system. LED lights with a 7000 and 28000 Lumen output are available. *70,000 lumen strobe light due for release in Q2 2015.*

Key Features

· 7000, 28000 Lumen (70,000 coming Q2)
· Up to 95% reduction in power consumption in pulsed mode
· 50° or 80° degree beam angles

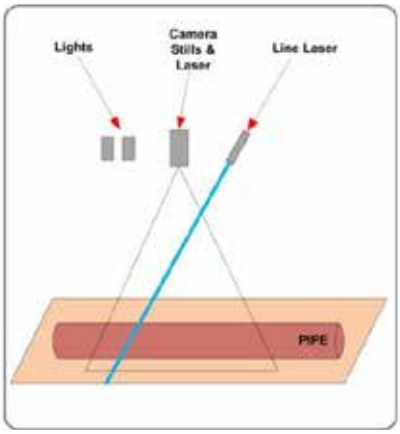
Subsea Vehicle Configuration

Laser XYZ



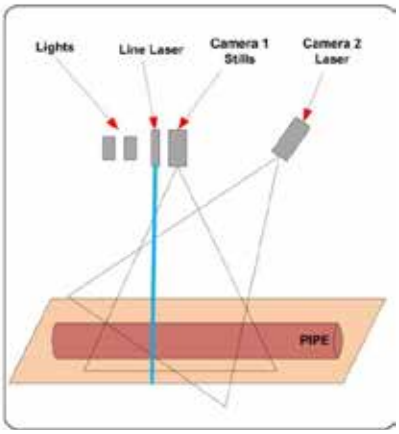
Downward facing laser & angled camera

UHD Stills & Laser XYZ (Dual Mode)



Downward facing camera & angled laser

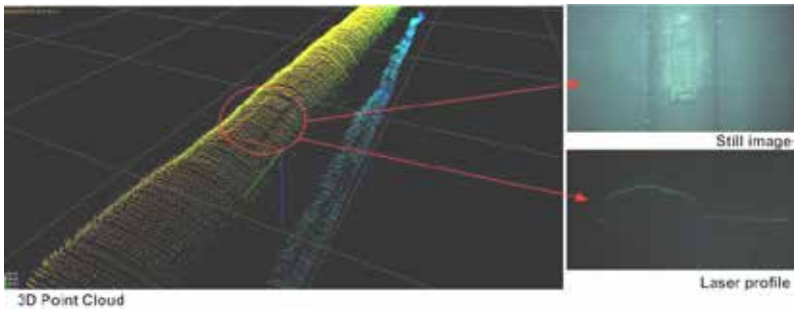
Multi Camera Mode



Dual Camera system for overlapped Still images and high density XYZ

Co registered High Resolution Data

A combination of 3-D Laser point cloud, co-registered still images and image mosaics as shown below provides sharp high resolution data for detailed subsea asset inspection.



Still image Mosaic

Specifications – L1000 LASER PROFILER

Camera Performance	
Sensor Type:	APS –C sized CMOS with RGB Bayer Filter
Sensor Size:	22.5 x 16.9mm
Sensor Resolution:	4096 x 3072, 12.5 Megapixels
Pixel Size:	5.5µm
Processor:	FPGA with integrated Dual Arm Processor
Optical - Camera	
Lens:	F 2.8 24mm, F 1.4 24mm
Field of View:	H37° V29° D45°
Exposure Control:	Manual via Control Interface / Full Auto
Focus Control:	Manual via Control Interface / Push to Auto
White Balance:	Manual via Control Interface / Push to Auto
Aperture Control:	F1.4 – F22
Mode	Stills only, Laser only, Dual (Laser + Stills interleaved)
Frame Rates	Stills mode – 5fps UHD (Higher frame rates achievable for lower resolution) Laser mode– up to 40fps (ROI dependent) Dual mode – 25 fps Laser, 5fps Stills (2048x1152)
Optical - Laser	
Wavelength:	520nm diode laser
Wavelength Stability:	<0.25nm/°C
Fan Angle (in water):	37° – Option for other angles
Power Output/ Class	150mW/ Class 3B
Beam Shape:	Line
Line Uniformity:	+/- 10%
Intensity Distribution:	Gaussian
Focus:	50mm to ∞
Strobe Capability:	1Hz – 200Hz – Controlled by Cathx Ocean Camera
Point Cloud	
Points per Profile	Up to 2046 points per line/profile
Profiles/Second	up to 40 profiles /s (ROI dependent)
Points per second	60000+ points/s
Electrical	
Operating Voltage:	**Camera:** 24V Nominal Range 12V to 24V || **Laser:** 7 to 30VDC
Power Consumption:	**Camera:** 15W max || **Laser:** 2.5W max
Environmental	
Depth Rating:	4,000m or 6,500m Option
Operating Temperature:	-10°C to 35°C
Mechanical	
Housing Material:	Titanium 6AL-4V
Port:	**Flat:** Sapphire Flat Port || **Laser :** Sapphire output window
Dimensions:	**Flat:** 90mm Dia.x 240mm ex. Connectors || **Laser :** 25mm Dia.x 114mm ex. Connectors
Weight:	**Flat:** In air 3.3kg - In water 1.7kg || **Laser :** 180g
Connectors:	Customer specified, quoted separately. Compact right angle option available.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Ø25.0mm
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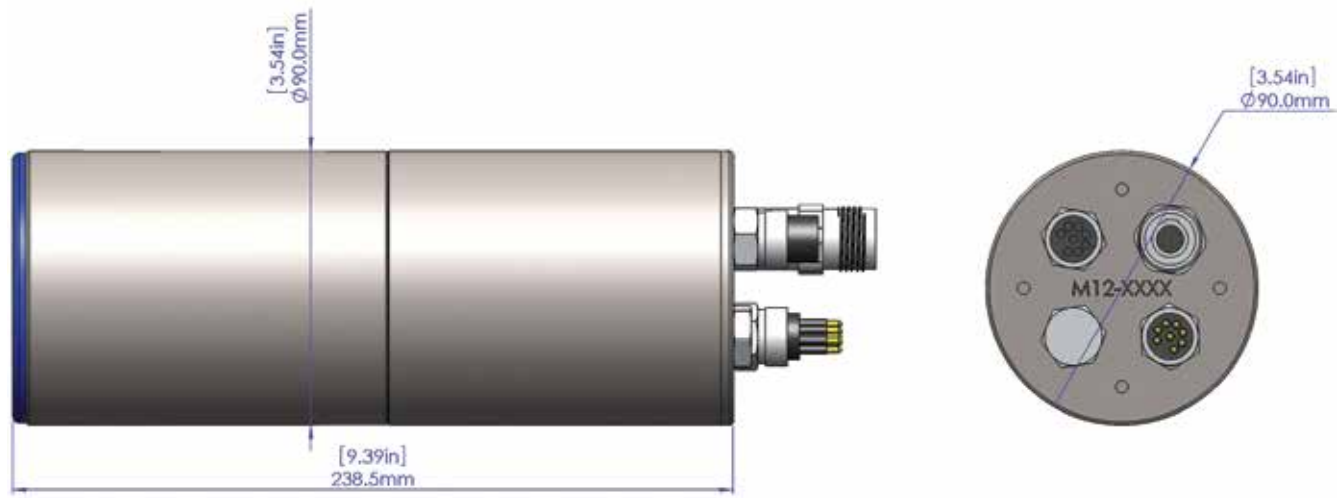
131.4mm
[0.98in]
Ø25.0mm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Ø90.0mm
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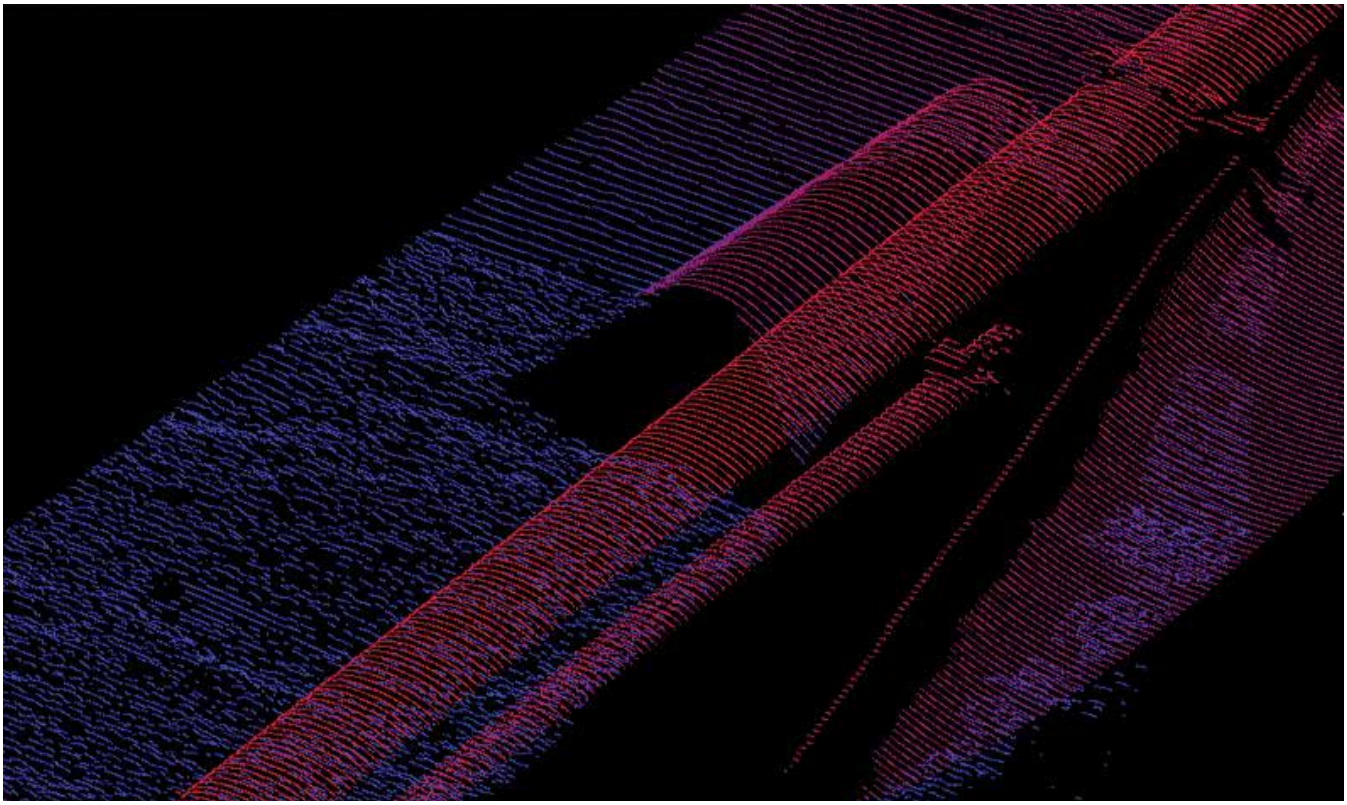
M12-XXXX



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