

# ecoSUB robotics™

## Advanced, small, low cost AUV technology



### Innovative AUV technology Increasing accessibility to AUVs

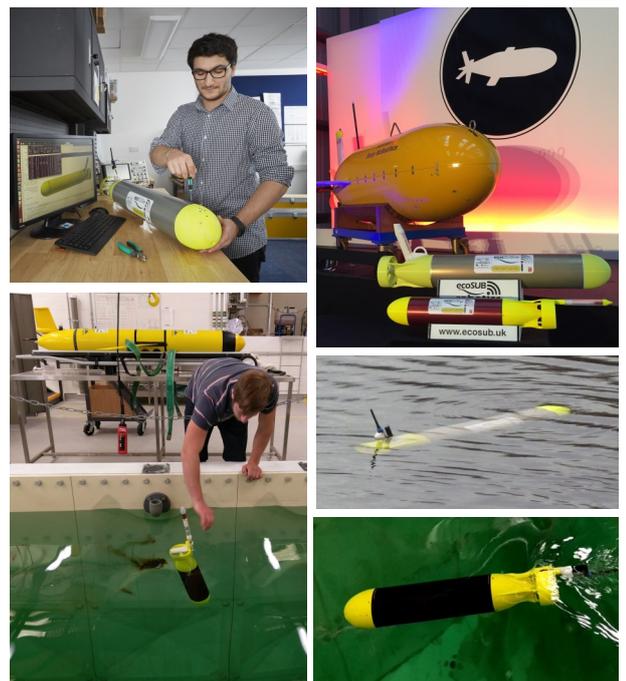
ecoSUB Robotics Limited is committed to making AUV technology accessible to all; reducing the barriers to autonomous system use in the underwater environment

ecoSUB AUVs serve a wide range of sectors, with the capability to deploy useful sensors including high accuracy CTD, speed of sound and fluorimeters.

Many more users from **research, academia and teaching** will be able to access marine autonomous systems (MAS) and apply the benefits of collecting wide spatial and temporal data.

The **defence** sector already recognises the potential for autonomous system use in their situational awareness and tactical operations, ecoSUB dramatically reduces barriers to MAS use, significantly reducing logistical challenges of launch, recovery and operations, with scope for integrated mission control and useful, focused data products to deliver key information when and where it is needed.

**Commercial** operators, especially in the **Oil & Gas** sector, see enormous potential in the affordable use of MAS for a whole range of activity, including rapid response to environmental challenges, subsea inspection and asset monitoring and support. The design of ecoSUBm was



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## ecoSUB $\mu$ 5



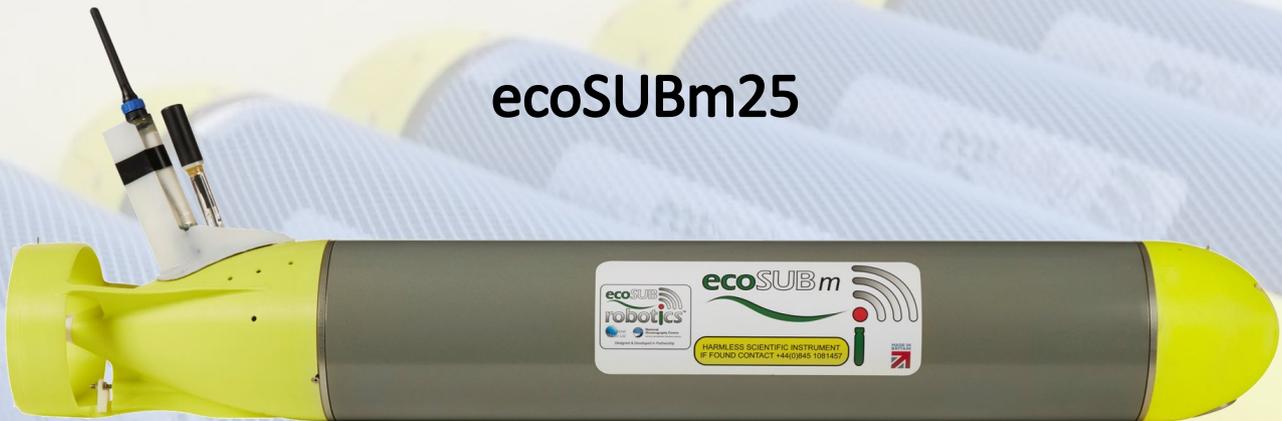
### Specifications

Length (inc antenna)	912 mm—body 650 mm
Diameter	111 mm
Weight in air	4 kg with alkaline batteries
Depth	500m
Battery Technology	

	Manganese Alkaline	Lithium Thionyl Chloride	Lithium Ion
Speed	0.75 m/s	1 m/s	TBA
Range	50 km	250 km	TBA
Endurance	28 hours	5 days	TBA

Communications	(surface) Iridium SBD, Wi-Fi, (submerged) Acoustic (optional)
Surface Location	GPS, infra red and visible light beacons
Housekeeping	internal temperature, pressure and humidity
Sensors	<ul style="list-style-type: none"> <li>•Star Oddi: conductivity, temperature</li> <li>•Valeport: sound velocity sensor</li> <li>•NOC: conductivity temperature, salinity, speed of sound, density, dissolved oxygen</li> </ul>

# ecoSUBm25



## Specifications

Length (overall)	1000 mm
Diameter	146 mm
Weight in air	12 kg with alkaline batteries
Depth	2,500m
Battery Technology	

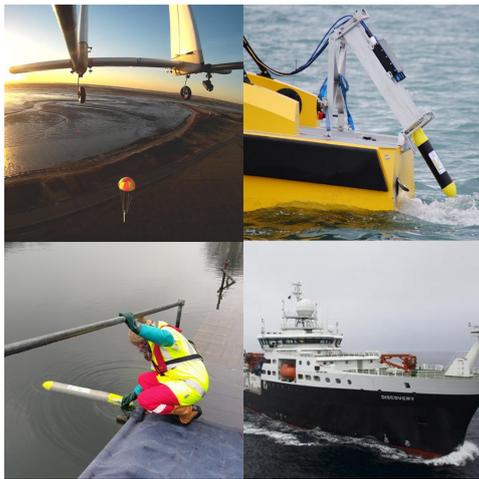
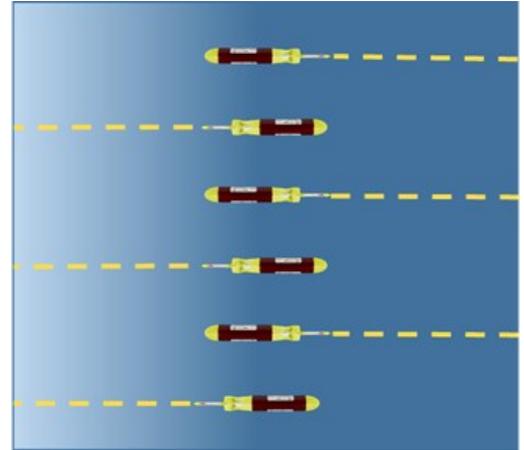
	Manganese Alkaline	Lithium Thionyl Chloride	Lithium Ion
Speed	0.75 m/s	TBA	1.5 m/s
Range	50 km	TBA	25 km
Endurance	28 hours	TBA	14 hours

Communications	(surface) iridium SBD, Wi-Fi, (submerged) Acoustic (optional)
Surface Location	GPS, Infra Red and visible light beacons
Housekeeping	Internal temperature, pressure and humidity
Sensors	<ul style="list-style-type: none"> <li>•Star Oddi: conductivity, temperature</li> <li>•Valeport: Hyperion fluorimeter (Fluorescein, Chlorophyll or Hydrocabon)</li> <li>•Valeport: fast response temperature</li> <li>•Valeport: altimeter</li> <li>•Valeport: sound velocity sensor</li> <li>•NOC: conductivity temperature, salinity, speed of sound, density, dissolved oxygen.</li> </ul>

## Big picture data, fast AUVs for mass deployment

A small, low cost AUV is an ideal platform to be deployed in a shoal able to provide rapid acquisition of large spatial data sets, enabling quick assessment of situations and decision making.

Cover large areas quickly and affordably by deploying multiple ecoSUB AUVs. Target harmful algal blooms, oceanographic features like thermoclines, hydrocarbon leaks, or build a picture of the environmental situation in a fraction of the time of a research vessel or single AUV.



## Easy launch & recovery Small platforms reduce challenge of L&R

ecoSUB $\mu$  was conceived as part of a UK Innovate UK/DSTL project in collaboration with NOC, University of Southampton and ASV to enable the launch and recovery (L&R) of multiple AUVs from an autonomous surface vehicle, C-Worker. The AUV is perfectly designed for autonomous L&R, maintaining a cylinder rule with no protruding features, like fins or aerial. The dimensions of the vehicle enable Sonobuoy tube deployment for potential air launch, and University of Southampton have worked with ecoSUB $\mu$  to deploy it from their fixed wing 'Spotter' unmanned aerial vehicle (UAV). ecoSUB AUVs are convenient to launch from any conventional platform or from the shoreline, and with such a small platform, recovery is easy, significantly reducing the infrastructure required to operate an AUV.

## Developed with expertise Designed & developed in partnership with the National Oceanography Centre

A joint development between Planet Ocean Limited and the National Oceanography Centre has led to the ecoSUB AUV platforms, and the subsequent spin out of ecoSUB Robotics Limited.

The National Oceanography Centre has over 20 years of expertise in the development of their AutoSub program and a multi-discipline, multi-partner team who believe in great design and upsetting the status quo have worked together enthusiastically to develop the extremely sophisticated and beautifully designed ecoSUB AUVs.

