AUTOSUB: WORLD LEADING AUTONOMOUS UNDERWATER VEHICLES



NOC Innovations

AUTOSUB LONG RANGE: ENDURANCE-CLASS AUV FOR OVER-THE-HORIZON MISSIONS

Autosub Long Range (ALR) is the autonomous underwater vehicle that balances exceptional endurance with advanced capability for over-the-horizon missions.

Evolved from over 27 years of development at the UK's National Oceanography Centre (NOC), the ALR fleet has been used extensively to meet the challenging demands of ocean operations and research in remote and hostile environments. ALR has been developed for endurance, reliability and the capability to operate independently where little or no vessel support is available.

WHY AUTOSUB LONG RANGE?

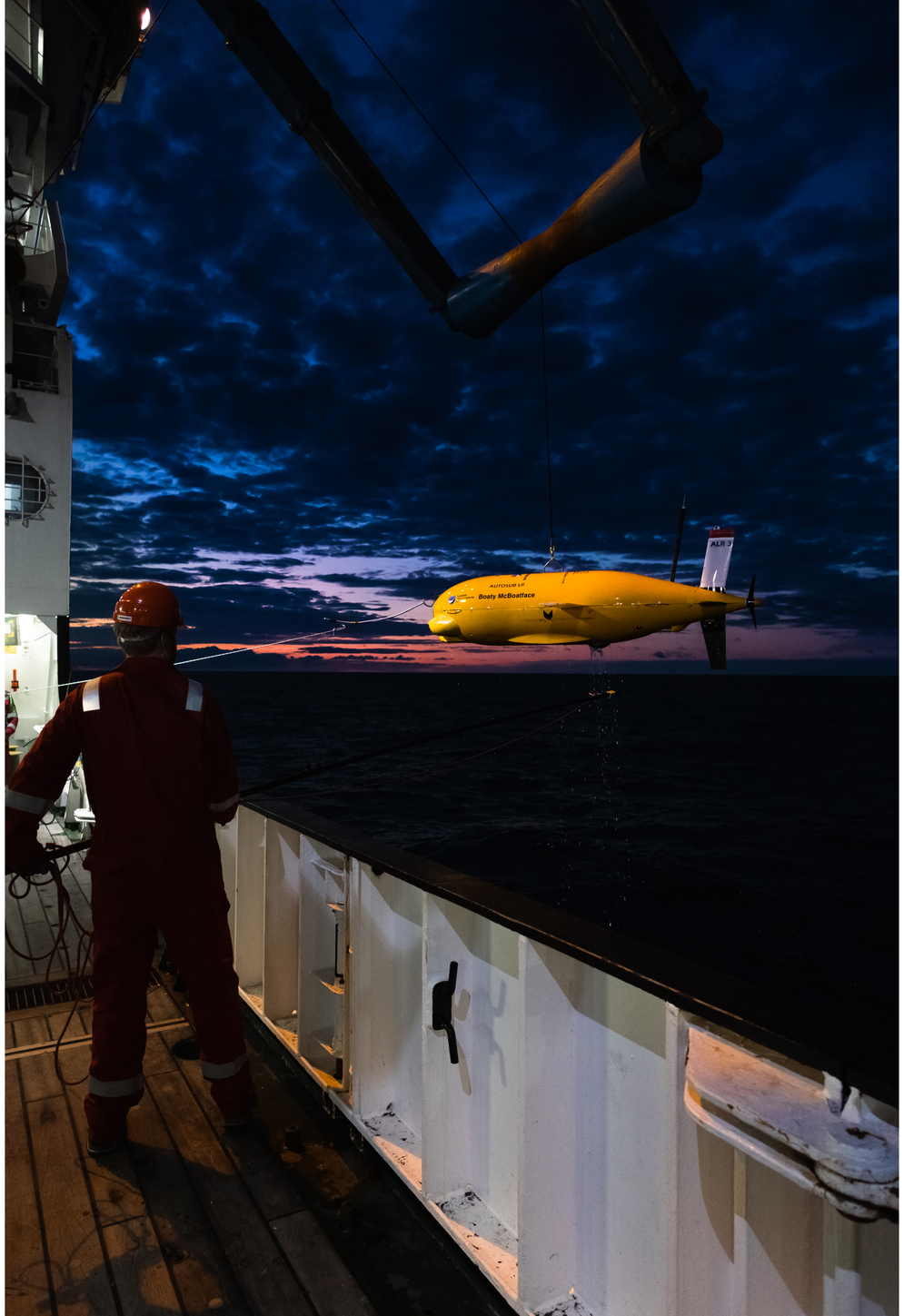
Over-the-horizon, vessel-independent operations

- **Shore launch and recovery without the need for a support vessel:** Easily deploy from a marina, slipway or harbour.
- **No specialist equipment required:** Compact size and weight allow simple handling using a single-point lift with no specialised lifting gear.

Performance you can reply upon

- **Range:** Missions up to 4,000 km*. Record mission achieved 2,200 km.
- **Extensive duration:** Missions up to 80 days*. Record mission achieved 56 days.
- **Dynamic re-tasking:** ALR can surface as required to give the option of re-tasking via satellite for flexibility, or persist at depth depending on the priorities of the mission at hand.
- **>5,000 operational hours:** Proven performance across diverse, demanding environments.

*possible, dependent on payload and mission



- **50+ unique sensors integrated:** Each ALR can be customised to meet the mission requirements.
- **Reduced weather dependency:** ALR offers greater weather resilience when compared with surface assets.

Superior data quality while lowering costs

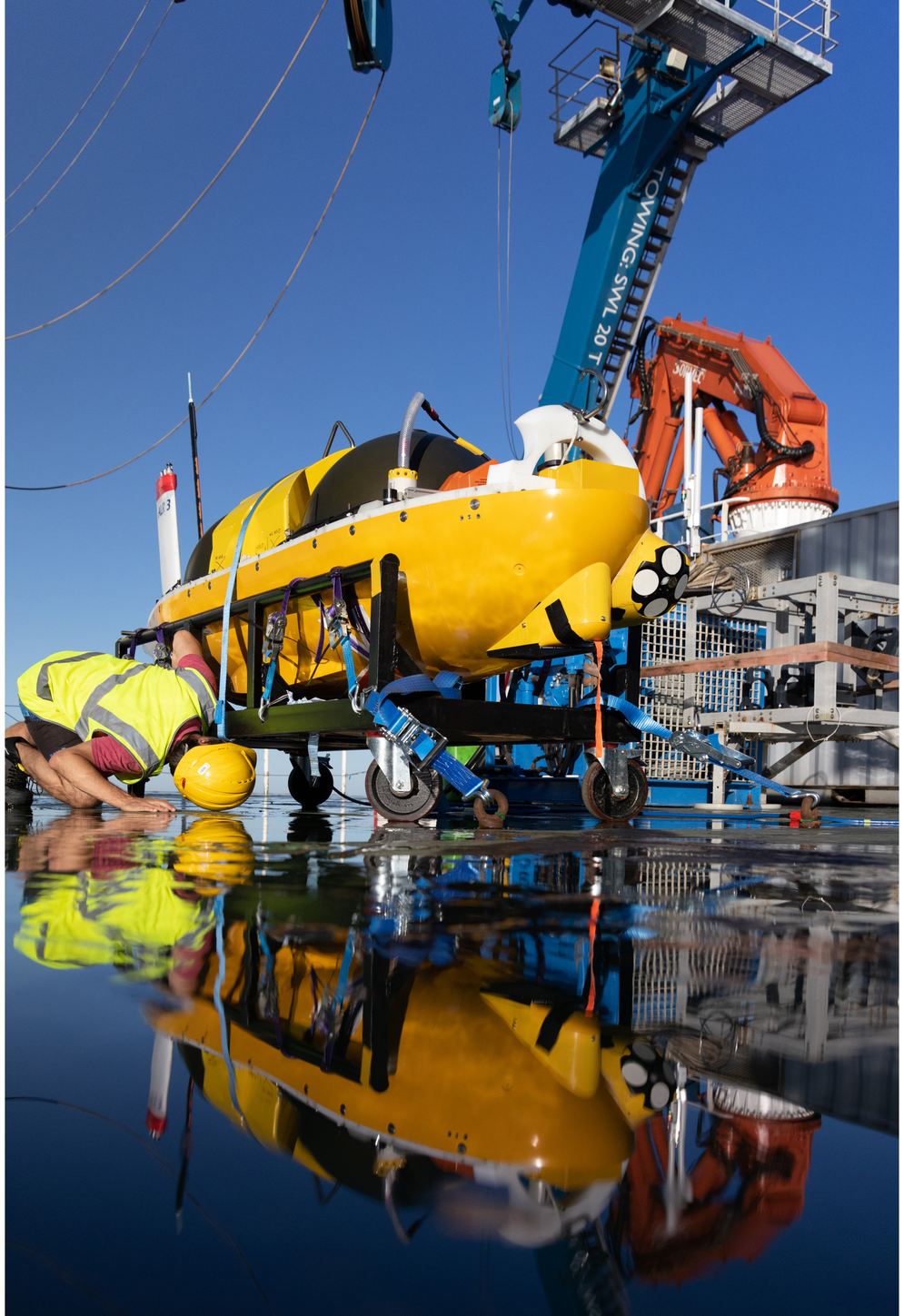
- **Low-altitude survey:** Ability to track a route at 3 m altitude above the seafloor for higher-resolution mapping.
- **A new approach to wide-area monitoring:** Reliable and cost-effective when compared to traditional methods.

Delivering solutions for every mission

- **Physical Oceanography:** Water mass structure, circulation, turbulence.
- **Biogeochemistry:** Nutrients, oxygen, pH/CO_2, primary productivity.
- **Benthic Imaging:** Habitats, MPA monitoring, substrate characterisation.
- **Under-Ice Exploration:** Ice-shelf cavities and polar processes.

Custom-built configurations for you

- **Autosub Long Range is now available for purchase:** Each model is tailored to your sensors, payload and workflow requirements.
- **Contact us to discuss your requirements:** Reach out to our team at business@noc.ac.uk or call +44 (0)300 131 2321.



AUTOSUB LONG RANGE IN-DEPTH

ONBOARD CONTROL SYSTEM (OCS)

A ROS-based autonomy and control framework powers all Autosubs. Flexible and cross-platform, the OCS encapsulates vehicle-specific behaviour into configuration parameters, enabling exceptional adaptability and rapid reconfiguration across different platforms and mission profiles.

The OCS open-source core supports transparency and reuse. It manages everything from low-level actuation, sensing, communications and power, to high-level guidance, navigation, obstacle avoidance and mission execution. OCS interfaces seamlessly with NOC's Command and Control stack for intuitive, robust operations, and has been in continuous use since 2019 on deep-ocean and under-ice campaigns.

COMMAND & CONTROL (C2)

Our web-based, open-source Command and Control (C2) ecosystem enables over-the-horizon piloting, monitoring and fleet management for both commercial-off-the-shelf platforms (e.g., TWR Slocum) and Autosub.

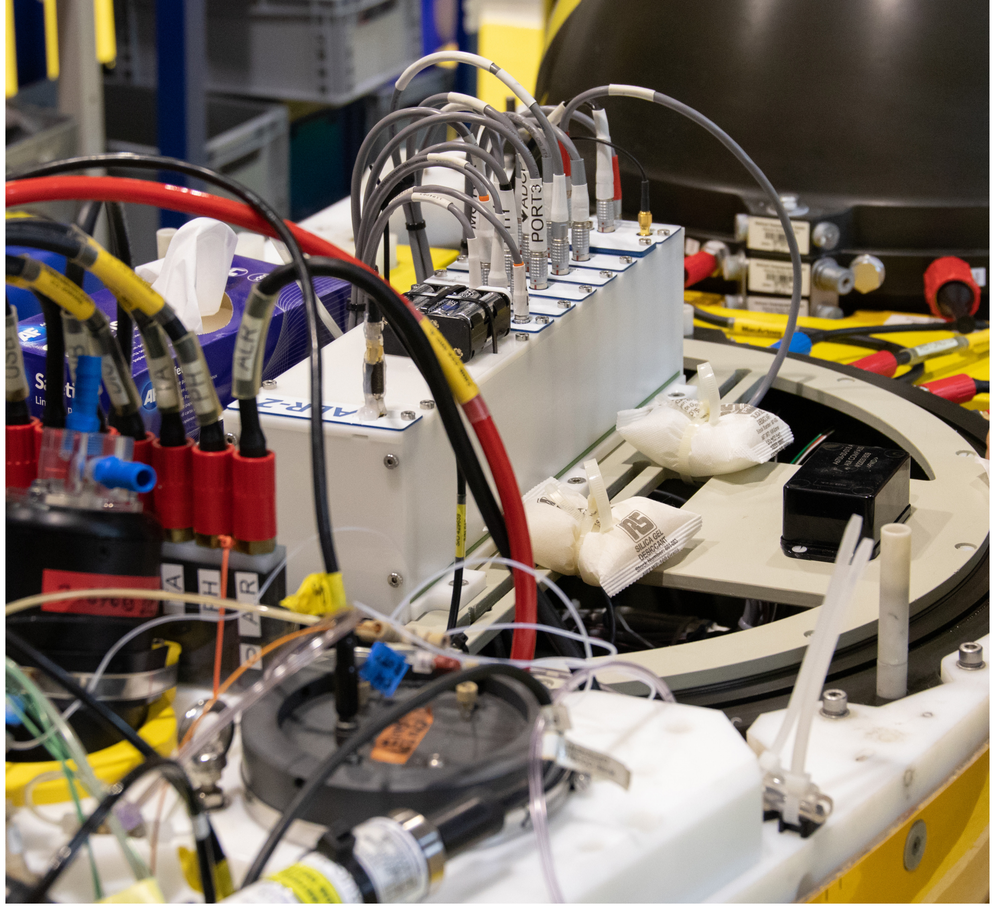
With role-based access and interoperable interfaces, pilots and scientists can view, analyse and react to data in near-real time, enabling rapid investigation of anomalies and maximising scientific opportunity. For near-field expeditions, C2-in-a-Box (C2iAB) provides an offline variant for direct ship- or shore-side control via Wi-Fi or acoustic links - no satellite or internet required.

The lightweight infrastructure supports rapid deployment in both temporary and permanent operations. The topside equipment that enables C2 includes C2iAB in either a laptop or 12U rack setup.

TRAINING

We offer a range of comprehensive training courses, created specifically for the safe operation and maintenance of the ALR.

Each training course is designed to meet the needs of the end users and cover 100 standard operating procedures. Courses include Basic Piloting, Advance Piloting and Maintenance.



COLLABORATION

We collaborate with the marine community through R&D partnerships which aim to advance next-generation ocean-observing robotics and accelerate understanding of our planet's most complex environments.

Our multidisciplinary team - engineers, computer scientists and researchers - co-design new platforms and adapt proven building blocks to extend existing or create new capabilities. They also deliver expert training and operational support. Whether you're trialling a novel sensing concept or scaling an established programme, we're ready to discuss how we can work together.

	ALR 1500	ALR 1500 EXTRA PAYLOAD	ALR 6000
Depth Rating	1500m	1500m	6000m
Dry Weight	~800kg	~900kg	~800kg
Dimensions	**Length** ~3.6 m **Diameter** 0.8 m **Width** ~2.1 m	**Length** ~4.2 m **Diameter** 0.8 m **Width** ~2.1 m	**Length** ~3.6 m **Diameter** 0.8 m **Width** ~2.1 m
Speed	0.5-0.7 m/s (sprint 1 m/s)		
Navigation	Low power transit mode with bottom lock 0.7% error distance travelled High Power survey mode with bottom lock 0.05% error for distance travelled		
Batteries	**Primaries** 93 kWh **Rechargeables** 30 kWh		**Primaries** 26 kWh **Rechargeables** 14 kWh
Range examples: (assuming 60W Survey sensor)	**Primaries** 300km low power transit + 1250km survey **Rechargeables** 300km low power transit + 230km survey		**Primaries** 300km low power transit + 160km survey **Rechargeables** 300km low power transit + 80km survey
Communication Systems	Iridium Satellite communications (Rudics, SBD & Certus), Wifi (2.5Ghz) 1km range, Acoustic modem including USBL positioning updates (Sonardyne Avtrak), GPS Receiver		
Safety Systems	Battery pressure vent ports, Abort weight system Xeos Iridium Location Beacon, XEOS AIS Beacon, XEOS Light flasher Forwards looking obstacle avoidance sensor		
Control System	C2 Command and control system, providing mission planning, near real-time data, over the horizon piloting and mid-mission optimisation		
Core Payload sensors	Seabird MP52 CTD Nortek DVL500 or Sonardyne Mini Sprint Nav (additional up facing DVL/ADCP on request)		
Optional Environmental Sensors	Dissolved Oxygen, Methane sensor, Hydrocarbon sensor, Turbulence probe, Magnetometer, Seabird Eco Triplet, Underwater Vision Profiler (UVP), Lab-on-Chip chemical sensors, Hyperspectral Radiometer, eDNA sampler (RoCSi), Water Sampler, Passive acoustic sensor, Acoustic doppler current profiler		
Optional Survey Sensors	**Sidescan** Edgetech 2205 + SBP, Sonardyne Solstice + bubble detection **Multibeam** Norbit WBMS **Camera Systems** AESA 2 or Voyis Observer		
Support Equipment	Vehicle battery charger, Vehicle trolley, PV Handling Trolley, 20ft operations container operations, service and computer terminal station, Launch & recovery kits		
Applications	Deep water geophysical survey, Construction support, Marine archaeology, Oceanography, Search and recovery		

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National Oceanography Centre

NOC Innovations Limited is a trading subsidiary of the National Oceanography Centre (NOC).

By working with us, you gain access to world-leading ocean science, engineering and technological innovation whilst directly supporting NOC's charitable mission to deepen global understanding of the ocean for the benefit of society and the natural world.

The purpose of NOC is to gain a deeper knowledge of the ocean to address major challenges facing society and the natural world. We are uniquely placed, working with partners from around the world, to turn research and technological innovation into trusted knowledge for real action and solutions.

Find out more at **NOC.AC.UK**

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