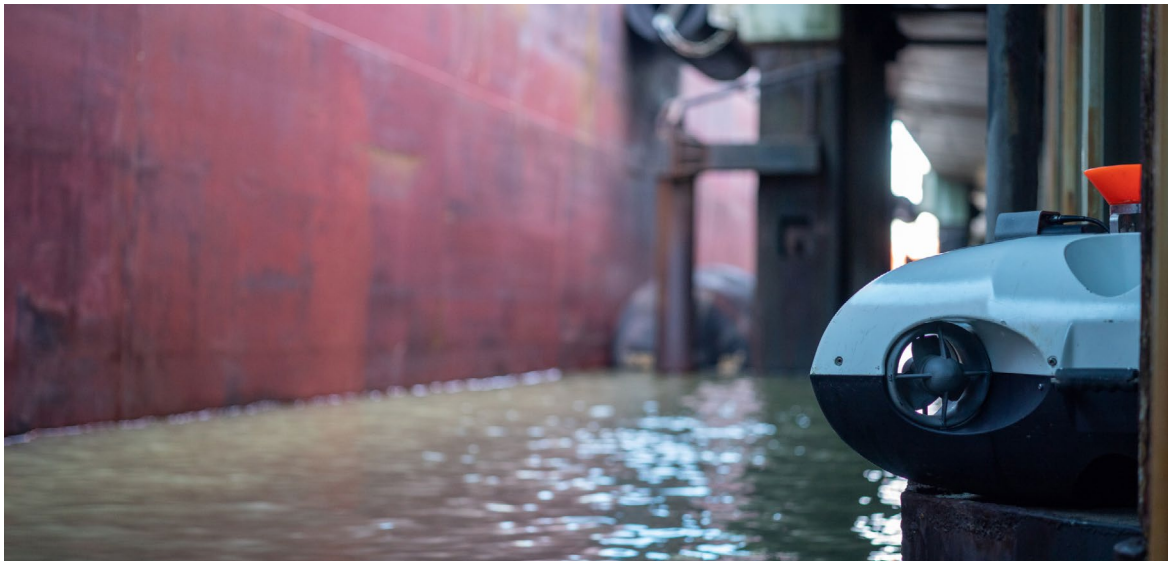


Hovering Autonomous Underwater Vehicle (HAUV) for underwater inspection applications

A.IKANBILIS

Unlock new levels operational efficiency using AI controlled tetherless operation and state-of-the-art sensor fusion



Harnessing a powerful AI controller, A.IKANBILIS is designed to simplify and reduce the risk and cost of underwater inspections using a fully autonomous workflow, through planning and subsea operations to producing actionable reports with geo-referenced hydrographic data and video, without human intervention.

A.IKANBILIS is built to deliver multi-layered geo-referenced datasets with unmatched efficiency in diverse applications by using trained behaviours for specific mission types such as pile inspection, anode capacity monitoring and thickness measurements.

The system is capable of conducting these tasks without a human actively in the loop, saving time and producing high quality, actionable data. For example, a visual inspection at a port with 107 jetties required ~10 diver-days but the same job took A.IKANBILIS just two days to complete.

KEY FEATURES

- ✓ **True 'launch & leave' autonomous underwater inspection** allows for significant cost savings and the use of existing infrastructure instead of specialised vessels
- ✓ **Tetherless operation across the six degrees-of-freedom** reduces operational risks of entanglement while extending agility underwater
- ✓ **Autonomous re-tasking delivers in mission flexibility** that allows for unplanned discoveries and issues to be addressed and added to the original mission parameters
- ✓ **Current fighting capabilities extend the window of operation** so that inspection can continue even as conditions underwater become tougher to work in
- ✓ **Battery-powered operations increases speed of mobilisation** and enables significant reduction in CO2 emissions



A.IKANBILIS SPECIFICATIONS

PHYSICAL

Dimensions	0.9 x 0.8 x 0.4 m
Weight in Air	55-65 kg depending on sensor payload
Operating Depth	300 metres
Propulsion	4 vectored (45 degrees), 3 depth, 90% linear capable in lateral currents of 2 knots with tether and 3 knots without

NAVIGATION

Dead Reckoning Drift	600KHz Doppler Velocity Log and Single Axis Fibre Optic Gyro CEP 50 0.2% distance travelled (optional upgrade to 0.04%). IxBlue Octans Nano Gyrocompass integrated for autonomous missions near large metallic structures
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Absolute Positioning	Vehicle GPS (+/- 1-3m on surface), Topside DGPS/RTK aided by Sonardyne Micro USBL
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DOMAIN AWARENESS

Multibeam	750/1200KHz Dual frequency 2D imaging sonar or 1200/2100KHz
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Camera	HD 1920 x 1080 Front Camera
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Tilt	Up to +/- 90deg
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LED	2 x 1500 lumens front
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ELECTRICAL

Battery	2 x 500Wh Li-ion in subsea housings, hot-swappable on deck. Zero current 8 hours of work; 1 knot current 2-3 hours of work
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Computing	i7 CPU + GPU for real-time perception and navigation
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COMMUNICATION LINK

Wired	VDSL tether on hand reel
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Wireless	Wifi/Radio/4G link. Acoustics modem is used for in-water re-tasking
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Emergency beacon	Iridium satellite beacon with strobe light
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BASIC SOFTWARE CAPABILITIES

Hovering	Remain on station in any xyz position
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Mission Planning	Set waypoints, generate patterns for vehicle to follow in water
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Tracking	E.g., piles, walls, vessel hulls
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Range to target	Fixed offset for user-defined structure
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Back to Home	Execute reverse command by tracing back navigation path
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AUTONOMOUS CAPABILITIES

Site data (dimensions, weather parameters, previous inspection data if available) are required to train up the model prior to autonomous mission. Autonomous behaviour can only be carried out after initial data is collected and verified by BeeX vehicles.

Pile following	Search for pile from user-defined offset. Once locked-on, covers 360 degrees by performing 2-3 vertical line scans, centralising to pile, e.g.: https://youtu.be/e-FS8-g0h1o
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Anode capacity measurements	Search for anode, centralise, generate 3D model real-time to estimate % depletion. Activate probe for contact measurement. https://youtu.be/HxYJ0uFrexo
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Thickness measurements	Define stab points, centralise, activate probe to achieve contact measurement. For redundancy and increased measurement reliability, multiple readings can be obtained
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In-water mission re-tasking	User can provide inputs to enable real-time re-tasking, e.g., if vehicle finds an anode while tracking the pile, carry out anode measurements
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OTHER CONSIDERATIONS

Launch and Recovery	Imenco micro Seasnap, hand-deployed
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Inspection Data	Available securely on Microsoft Azure
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Light Tooling	Non-destructive testing (NDT) probes, optional small rope cutter for severing tangled lines and recovery operations.
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CONTACT SUBSEA EUROPE SERVICES

Get in touch to discuss how the innovative A.IKANBILIS solution can transform your underwater inspection operational efficiency.

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