

## GO Science Releases RHyVAU, A New UUV Class For Maritime Remote Sensing

*GO Science's RHyVAU is an alternative class* of low energy unmanned sensor platform that offers low cost automation across a broad spectrum of maritime, industrial and utility applications. *RHyVAU* variants include thrust vector control propulsion, buoyancy powered glider and hybrid configurations augmented by patent protection where deployment from submarine, surface ship, airborne or land platforms is simple and cost effective.

*Our solutions release better energy efficiency*, agility, stability and perception using novel hull forms, propulsion, attitude control, imaging and audio-sensory processing. Our modular family includes operation via fibre-optic tether, or autonomous control, or swarms where group behaviours become important.

*Awarded a grant for Research and Development* by the United Kingdom's South West Regional Development Agency (SWRDA) in 2006, GO Science has now completed a proof of concept development phase which confirmed novel scientific and engineering aspects of this technology. This culminated in un-tethered in-water demonstration and characterisation tests of development models of both the glider and powered *RHyVAU* variants, in addition to novel sensor sub-system elements.

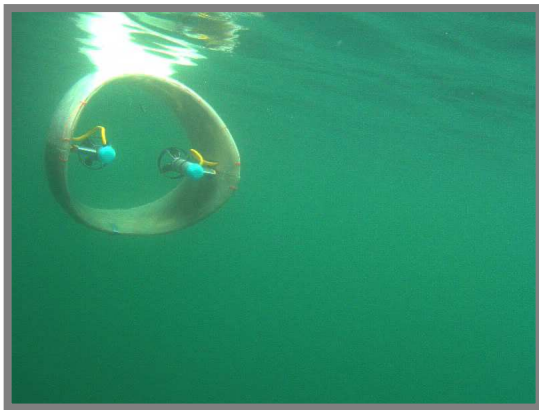
*Our goal was to improve* upon the performance of legacy unmanned underwater vehicles (UUVs), and GO Science

has now corroborated this by successful field demonstrations and trials. Using *RHyVAU* customers now have greater degrees of freedom in selection of range, endurance or speed parameters within demanding mission plans.

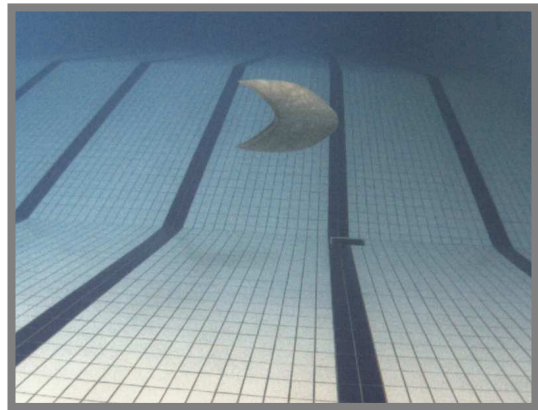
*RHyVAU is designed to provide low cost remote operation* in many roles where divers or alternative vehicles may fail to meet goals through some combination of cost, safety, risk, schedule or performance parameters. Our solution is fully scalable, and so may be used inside narrow pipes for inspection, or on the sea bed for sensing or power services. *RHyVAU* is under development to serve the offshore oil & gas, renewable energy, homeland security and utility energy sectors.

*Our modular UUV family includes:*

- (i) *RHyVAU Indago* - a buoyancy powered glider variant capable of 4,500 km range and extended mission periods;
- (ii) *RHyVAU Contueor* - a dual thrust vector control propulsor variant configured with autonomous power and communications, capable of 150 km mission range, with endurance up to 48 hours; and,
- (iii) *RHyVAU Aspicere* - a low cost tethered variant with audio-visual data-link that may be deployed from a wide range of platforms including yachts, tenders, and offshore structures.



*RHyVAU Contueor - a dual thrust vector control (TVC) propulsor UUV.*



*RHyVAU Indago - a buoyancy powered glider UUV.*

*RHyVAU may be deployed:*

- using legacy 200 / 324 / 533 tubes & hard points
- safely & cost-effectively from submarine, surface ship, fixed or rotary wing aircraft, or land vehicles
- in difficult weather, seas, tides or currents
- on sea beds, the sea surface, or in the sky
- in shallow water surf zones
- around and under structures
- in or around pipelines, vessels or umbilicals.

**Key Features of RHyVAU solution:**

- highly efficient hydrodynamic performance
- resilient toroidal pressure vessel technology
- can accommodate all underwater sensor types
- no protruding parts, so can operate very close to the sea bed or walls without snagging
- can settle, motionless, on the sea bed to gather data and lift off again to continue its journey or rise to a waypoint to be recovered
- fully scalable in size and number, to provide for flexible operations in isolation or co-operative groups
- underwater docking capability, to provide waypoint re-charging facilities either as power sink or source

**Preliminary Performance Results for RHyVAU Indago Glider UUV:**

| <i>Endurance</i> | <i>Velocity (m/s)</i> | <i>Glide Slope (re:1)</i> | <i>Comments</i>   |
|------------------|-----------------------|---------------------------|---|
| 4,500 km         | 0.38 to 0.57          | 4.7 to 13.5               | Data was collected using 533mm OD and smaller gliders at a variety of test facilities, including: tanks, pools, lakes and a deepwater quarry. |

**Preliminary Performance Results for RHyVAU Contueor Dual TVC UUV:**

| <i>Endurance</i> | <i>Velocity (kts)</i> | <i>Energy Capacity (kWh)</i> | <i>Comments</i>  |
|------------------|-----------------------|------------------------------|--|
| 150 km           | 0 to 10+              | 1 to 2                       | Data was collected using a 533mm OD UUV at a variety of test facilities, including: pools, lakes and a deepwater quarry. |

**Key Benefits of RHyVAU solution:**

- dramatic reduction in time and costs to deploy fields of underwater sensors for survey, surveillance and communications
- removes expensive winch, umbilicals and ROV from host assets, or may re-use legacy infrastructure
- energy efficient design significantly extends mission performance envelope
- elegant, intuitive design matches airborne, deep or shallow survey applications
- reduces duration, costs and number of support ships required for survey operations.

**GO Science was founded in late 2002** by the CEO as an SME technology company providing innovative Smart Sensor services, products and expertise to blue chip customers within the marine, offshore and aerospace sectors. The company maintains office and laboratory facilities on campus at the University of Bristol, within a

technology centre operated by Set Squared. Professional skills include business and programme management, electronics, software and systems design, antennae, communications, sensors, autonomous vehicles, AIT and trials.



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