

DEFENCE & SECURITY

SYSTEMS INTERNATIONAL

VOL. 1 2015



www.defence-and-security.com

- Latvian president bolsters Baltic defence to deter Russians
- FRONTEX ups European border surveillance as migrants multiply
- The role of M&S technologies in a fast-changing security environment



15 - 18 SEPTEMBER 2015
EXCEL LONDON | DSEI.CO.UK

**VISITOR
REGISTRATION
NOW OPEN**



LAND OPERATIONS ■ NAVAL CAPABILITIES ■ FUTURE SOLDIER

An AUV unlike any other

A joint venture between **Gabri** and **Zenatek** has produced an autonomous underwater vehicle (AUV) that goes above and beyond others of its kind.

Seastick, although it shares basic functionalities with more traditional autonomous underwater vehicles is an innovative and unconventional AUV solution. Its unique design and revolutionary features enable it to perform a wide range of tasks in marine, submarine and coastal environments. It is perfect for virtually any application, and is readily adaptable to critical civil or military missions in contexts as diverse as mining, petroleum, oceanography, reconnaissance and research. Its small form makes it ideal for carrying out tasks in which precise and variable manoeuvres (normally difficult for traditional AUVs) are critical. It can also transmit data – from sonar bearings to onboard configurable sensor sampling – in real time.

Seastick is the product of a joint venture between Gabri and Zenatek that has distinguishing features in terms of its design, motors, propulsion, and range of applications.

Unique design

Seastick's variable and highly configurable options, as enabled by its unique design and practical structure, are key elements in its ability to adapt a vehicle specifically to a purchaser's requirements. This flexibility in configuration gives Seastick an unprecedented level of AUV versatility in applications. Gabri and Zenatek have considerable experience working with the primary global producers of sonar, DVL, sub-bottom profilers and specific sensors, and have the background and expertise to guarantee Seastick's high quality, precision manufacture and functionality.

“ Seastick's flexibility in configuration gives it an unprecedented level of AUV versatility in applications. ”

It is also noteworthy that Seastick can be customised on order or at any time during its product life. It can therefore be adapted to multiple sequential projects with minimal constraint or regard for its initial configuration on purchase.

Despite its small size, Seastick consists of three parts: the bow, the mid-ship and the stern. Each part is virtually self-contained and can be replaced with a similar unit containing a different sensor array or setting. The mid-ship has an internal system of sliding drawers that allow easy and secure access for replacement or maintenance of the electronics and batteries.



Seastick's unique design and revolutionary features enable it to perform a wide range of tasks in marine, submarine and coastal environments.

Maintenance is made easier through the tele-assistance service provided by Gabri. Through this service, Gabri can perform checks and verifications with the software supplied by Zenatek, monitoring Seastick on demand through any available Wi-Fi network worldwide. This ensures efficient and regular operational analyses and lowers maintenance costs considerably.

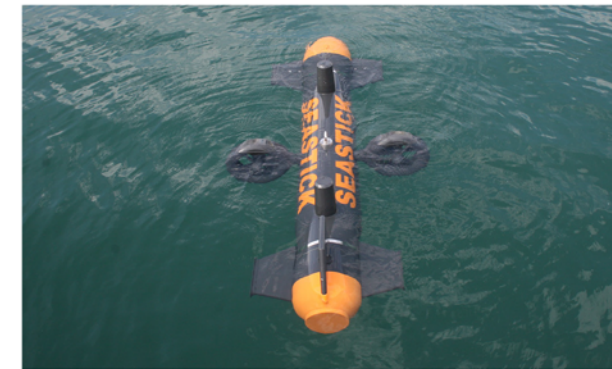
Motors and propulsion

In addition to its ability to host diverse electronics and sensor configurations, Seastick also has unique mechanical features. One of the most critical of these – and one that distinguishes it from other AUVs – is its propulsion system, which employs brushless magnetic induction motors.

These motors offer many advantages, especially relative to their size and variable power consumption based on demand. They function by way of a rotating magnetic flow that transfers energy to the propellers, but without gears or any other mechanical transfer. Since the motors work on a surrounding magnetic field alone, there is no wear, less noise and low power consumption based on variable demand. Moreover, the motors are able to work completely under water, thus eliminating the typical concerns caused by motors held in a conventional AUV's watertight compartment. Seastick thereby also allows more internal space for the electronic sensors and/or batteries, and for thermal dissipation of the motors' parasite currents.

The motors' power can be regulated via the Seastick software. The power can be increased from the control station when necessary – for example in the presence of strong currents. In such cases, the control station can set the speed and torque limits by increasing the power, either to maintain a constant speed or to increase speed at will.

The producers of Seastick have also paid particular attention to the vehicle's dynamics in water. Seastick's design allows the motors, together with the anterior and posterior



Operators can rotate the motors from the control station to manoeuvre the Seastick and change its submersion level.

helms, to accomplish movements only associated with remotely operated vehicles (ROVs) until now. From the control station, an operator can rotate the motors to accomplish manoeuvres that readily change the vehicle's submersion level. The motors can be rotated until their drive is orthogonal to the vehicle, so that it can dive or ascend rapidly. When the motors are thus rotated, they can counterbalance the vehicle's buoyancy, thereby enabling the control station to maintain the vehicle at hovering position or speed.

In addition, the speed and/or direction of rotation of each motor can be managed independently on demand. This means that Seastick can turn on its axis, giving it a major strategic advantage in a variety of applications.

Range of applications

As noted, there is a potentially wide range of applications for which Seastick is the optimal product. It is ideal for underwater reconnaissance, and everything that may involve. With the appropriate sensor array, Seastick can conduct reconnaissance for minerals, conduits, naval device searches and much more.

“ Seastick's design allows the motors to accomplish movements only associated with remotely operated vehicles until now. ”

Its manoeuvrability also allows it to be effective in mapping, locating landing points and checking coastlines. Video cameras, either highly luminous or infrared, can be mounted adjacent to the sensors on the higher rear helm. As the vehicle is remote-controlled and manoeuvrable, the helm can be remotely rotated on its x axis by 360°. Furthermore, just as data may be transmitted and recorded in real time, it can also be acquired through detailed night-time perspectives for landing-site viability (where the presence of troops may be required) or for docking possibilities. These perspectives are not unlike protracted submarine periscope viewings; they have the same scope and objectives, but Seastick achieves them far more easily.

CUSTOMIZABLE PAYLOAD

- Side-scan sonar
- Sub-bottom profiler
- Water samplers
- ADCP
- Hydrophone
- USBL
- Acoustic Modem
- Obstacle avoidance sonar

In addition to on-board instrumentation, the Seastick is also able to house any type of sensor on customer demand. Thanks to the interior drawers, its modular nature allows the user to install the desired sensors and modify their configuration as well as a quick replacement of the rechargeable battery pack on site.
(Battery pack grants 10 hours of autonomy)

Seastick is readily adaptable to critical civil or military missions in diverse contexts.

Seastick's ability to transmit data in real time is truly innovative. The onboard electronics allow it to transmit over a range of one, ten and 20 miles in VHF, UHF and Wi-Fi, respectively.

On the vehicle's underbelly there is a mechanical structure that may hold an explosive device to be released at a desired target. Given their nature, such operations may be carried out only by the operator in real time, and may be filmed by two video cameras fixed to the explosive device itself.

The operator, for important and sensitive missions, can connect to Seastick directly by cable. This enables him or her to operate the vehicle and see all the stages of an operation as they happen. The cable transmits pictures live at Ethernet speed, or the equivalent of at least 200MBd a second.

Client-manufacturer collaboration

The Seastick project prioritises the purchaser's requirements. The joint venture is committed to consistent and complete product support and customer service that reflect milestones achieved in its ongoing research and development. The purchase of Seastick therefore becomes a collaboration between the client, who can obtain the latest upgrades for the whole system as necessary, and the manufacturer.

The original hardware is no obstacle to client access to any future product developments. A primary goal of the project is for clients to receive the best possible access to upgrades and product expansions. Consistency and uniformity, together with the highest possible product quality, are the project's keystones. The methodology used to produce Seastick means today's product will have the same base features as the product that will be available in two years' time – your Seastick will not become a 'legacy' product.

Currently, Seastick is the only vehicle of its kind available on the market with all the features mentioned above. Seastick will become a reference point worldwide for the civilian and military underwater robot markets. Innovation, research and precision – these are the elements behind the success of Seastick, the future of AUVs. ■

Further information

Zenatek
www.zenatek.com
www.seastick.it

