

YUCO TRIALS

In recent years, RS Aqua has grown from beyond its trademark ecological monitoring and instrument development to a new specialism – autonomy and robotics. One of the partners it has started working with is the French company SEABER and its micro-AUV, YUCO. RS Aqua has recently carried out three projects to demonstrate the advantages of such a system, particularly in coastal environments, areas which can be challenging to navigate when science and data collecting.

"Traditionally, there have been three ways of collecting data," said Ocean Scientist Nathan Hunt at RS Aqua speaking at the recent MATS conference in Southampton.

"Fixed point observatories such as ocean buoys provide a large array of sensors on a stable and reliable platform but there are limitations in spatial variability as well as large upfront costs and difficulties associated with installation and maintenance. The second, vessel-based monitoring, increases the amount of sensors and offers spatial variability, however, it takes time to conduct with high capital and personnel costs.

"The third are buoyancy vehicles such as gliders. These have spatial variability but data may take a long time to download and retrieve data. There are also practical issues when working in shallow waters. This has opened the door for a fourth option – small shallow water AUVs."

The YUCO weighs 10Kg and measures a metre in length, however, it is still powerful enough to support missions

8 to 10hrs in length. It operates at around 2.5kts but can reach speeds of up to 6kts if necessary. The vehicles are quiet, reliable and can navigate with INX, SEABER's proprietary navigational algorithm. The WaterLinked Doppler velocity log it helps achieve the navigational accuracy to ~1% error.

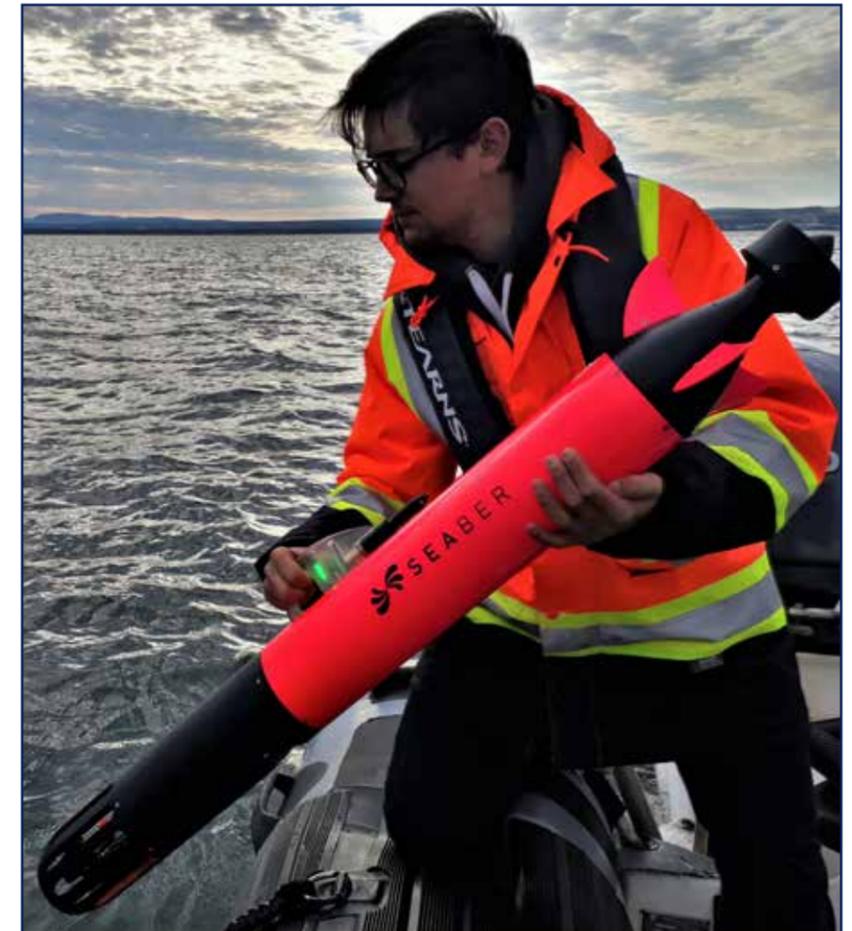
The platform also supports quick battery recharge and mission planning uploading via Wi-Fi. They can be launched from small vessels deployed from beaches and pontoons.

One recent trial was carried out in the Gulf of St. Lawrence in which Dalhousie university, supported by Réseau Québec maritime and the MEOPAR network looked to examine marine dispersion operations to improve the response of maritime instruments such as oil spills and harmful algal blooms.

"We carried out dye tracing studies by releasing Rhodamine and measured its passage with a YUCO Physico vehicle with its CTD and integrated fluorometry optics," explained Hunt. "Over four days, the YUCO carried out more than 15 deployments taking transects up and down through the cloud.

"Through a variety of survey patterns the AUV collected valuable data of the Rhodamine cloud."

Another project was at the SmartBay Observatory in Galway Bay, Ireland through the JERICO project. The infrastructure is very useful to the national and international community to validate



The YUCO being launched from a boat

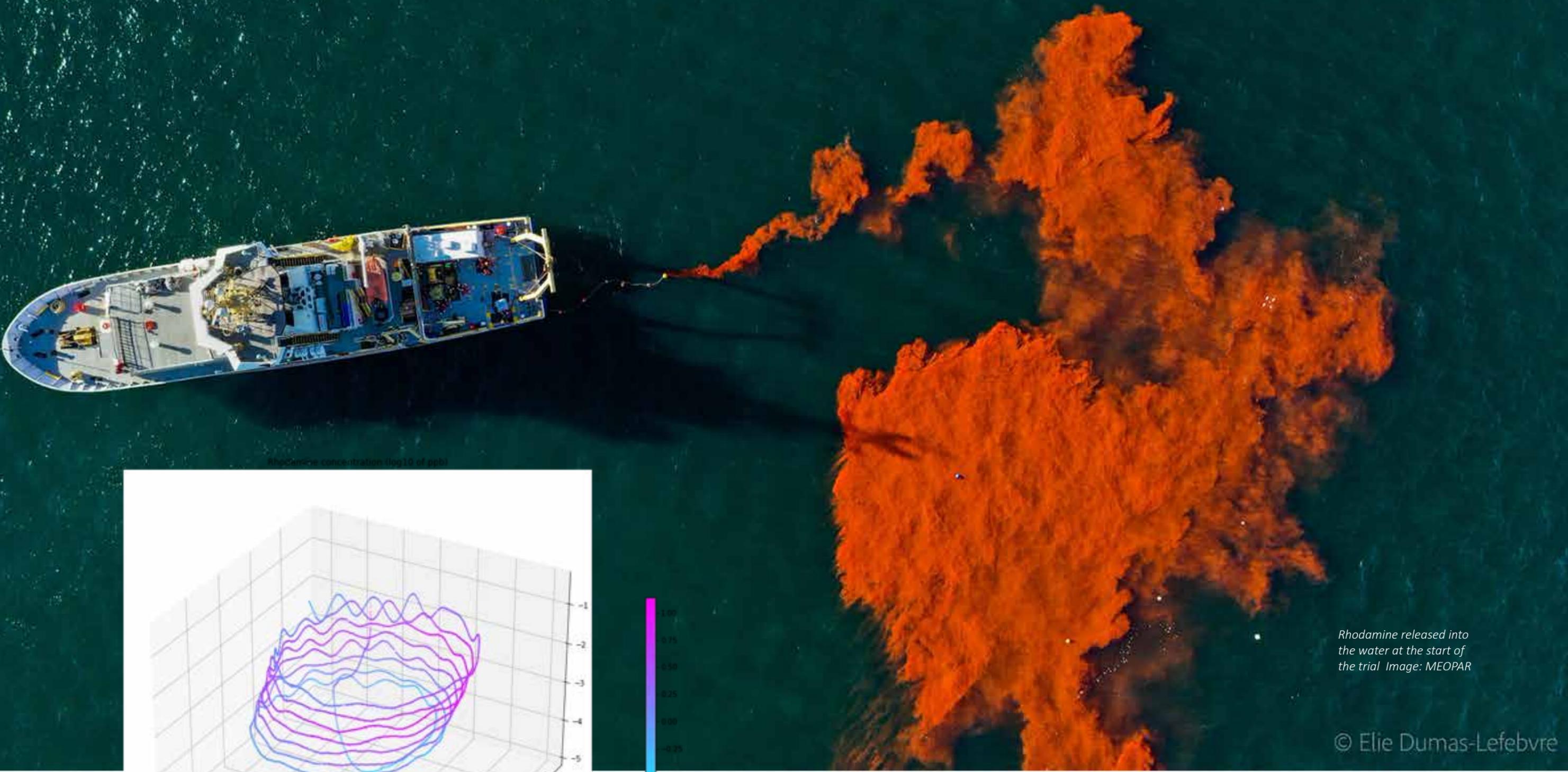
new systems such as YUCO in real sea conditions.

"The main objective of the work was to demonstrate the AUV's capabilities in gathering salinity data in an environment where wave currents and tides are all present," said Hunt.

"It consists of six subsea stations with the vehicle conducting shallow and deep water passes, sometimes adopting a classic sawtooth profile, in between travelling to each of the

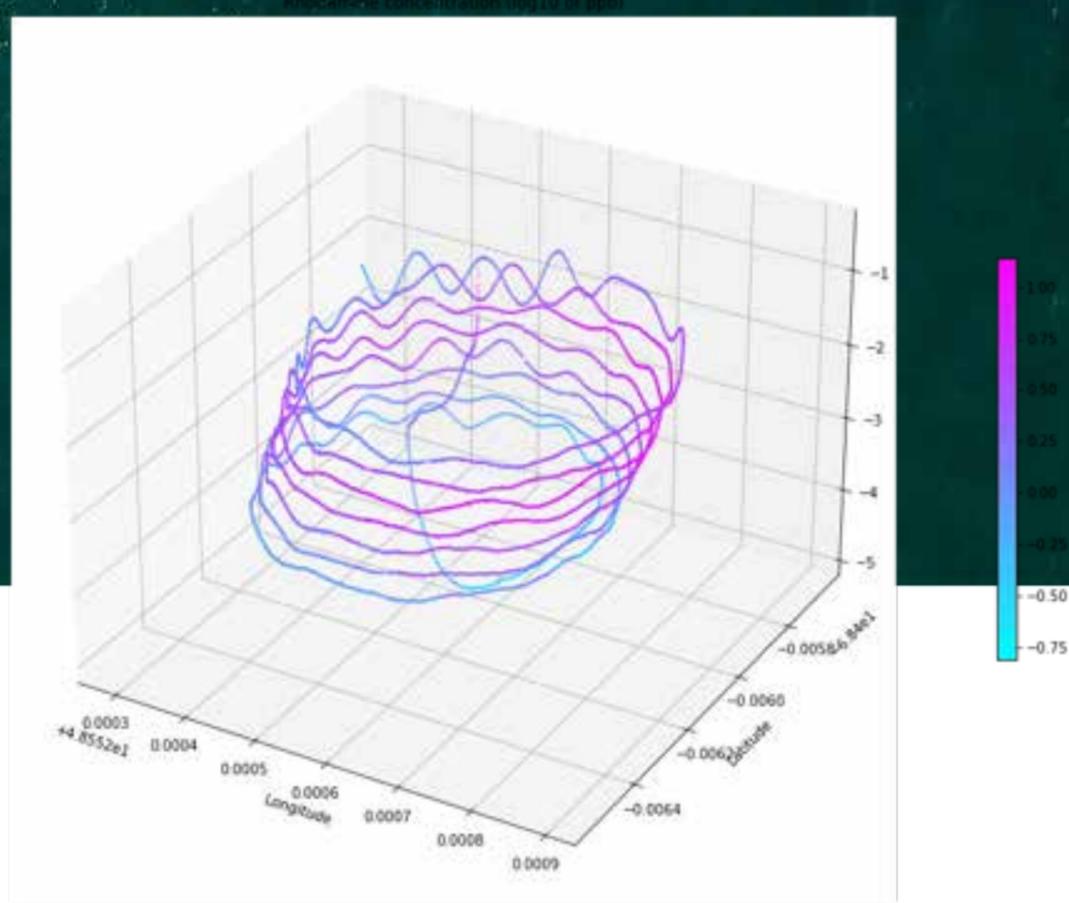
fixed observatories. It provided a great insight for salinity data with good navigational accuracy"

The most recent project occurred earlier this year in Lisbon with support of the Royal Navy and the University of Plymouth under the Program for the Future Data Gathering in Portugal – REPMUS. This saw four micro-AUVs, with various payloads- deep vision sidescan sonar, Multiparameter sonde and Passive Acoustic recorder



Rhodamine released into the water at the start of the trial Image: MEOPAR

© Elie Dumas-Lefebvre



Left: The colour of the line in the patterns denotes the concentration of Rhodamine in the water column. It also provided the local area with details of how the water currents moved.

carrying out oceanographic and hydrographic transects.

“Apart from collecting data, it demonstrated the ease of mission

planning and vehicle recovery It collected some very high quality data which could be very accurately matched with previously gathered navionics profiles.