

Using a robot to deploy robots in remote oceans

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A researcher at the University of East Anglia (UEA) has helped design a sea-going robot to deploy research equipment in remote and inaccessible ocean locations.

The AutoNaut—an [unmanned surface vessel](#)—has been specially-adapted to carry and release an underwater Seaglider. The gliders carry a range of sensors to collect data for research on [ocean processes](#) that are important for climate.

The Seagliders are the same size as a small human diver, but can reach depths of 1000 metres and travel the [ocean](#) by itself for months, covering thousands of kilometres. However they are difficult to launch inshore and usually have to be deployed from ships, which can make timing the release of the glider tricky.

It can also take a long time, and a lot of battery life, to reach remote study sites. Other locations can be dangerous to access because of piracy or political tensions.

Built by UK firm AutoNaut Ltd, the five metre long AutoNaut can be deployed from a beach or a ship and it can wait in position until the Seaglider is ready to be released by remote pilots.

The AutoNaut is propelled by the motion of the waves and carries a range of sensors for meteorology and/or oceanography, including atmospheric pressure, air temperature and humidity, [wind speed](#) and sea

surface temperature. Its systems and sensors are powered by solar panels. It is also designed to withstand heavy seas, is self-righting and piloted using satellite communication.

The new vessel has been named 'Caravela' by Prof Karen Heywood, of UEA's Centre for Ocean and Atmospheric Sciences, who came up with the idea of having a robot that could deploy the Seaglider. It is named after the Portuguese man-o'-war—a colony of creatures working together, often incorrectly called a jellyfish—which drifts with surface currents.

The design, build and science missions of Caravela are funded by a €3.5 million research grant from the European Research Council awarded to Prof Heywood.

This month Caravela will be tested in the Atlantic Ocean, off the coast of Barbados, as part of a major international experiment to track the formation of clouds and their role in the climate system. Launched from shore, Caravela will make her way to an ocean area to the east of Barbados, known as Tradewind Alley.

The UEA team will use combined Caravela and glider measurements to understand how the ocean temperatures affect the layer of air above, and how the winds and sunshine affect the top tens of metres of the ocean.

Prof Heywood said: "We are really excited to have worked with AutoNaut UK on the development of Caravela. We can now send a Seaglider into the middle of an ocean basin without having to use a ship, and where it is too dangerous to send one.

"This means we can reserve the glider battery for the science, so it will have longer endurance. It also gives us the ability to more accurately decide when to release the glider, for example ahead of the spring bloom

or an extreme weather event.

She added: "Having sensors on both the AutoNaut and the Seaglider means we'll get simultaneous meteorological and oceanographic measurements, giving us a more detailed picture of conditions at the study site and helping to further our understanding of factors affecting our climate."

Pete Bromley, AutoNaut's Managing Director, said: "It's been a fantastic and rewarding challenge working with Karen and her world-class team at UEA. Deploying an ocean robot on an ocean robot is ground-breaking science. We wish them all the best on this next mission and look forward to future collaborations."

The long term aim is to use Caravela in the Antarctic and anywhere else that is remote or difficult to access.

Provided by University of East Anglia

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