Rutgers submersible robot glider embarks on 100th flight

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Marine scientists from Rutgers, The State University of New Jersey, deployed a submersible robot glider for the 100th time this morning.If all goes well, they will pick up the glider again off the coast of New Jersey next month. In the meantime, the scientists have established a blog that will allow the public to follow the glider's zig-zag course: http://gliderflight100.blogspot.com/.

Rutgers scientists have been using such gliders for nearly a decade. They have logged more than 25,000 kilometers - not only off the coast of New Jersey but as far away as Australia and, most recently, Antarctica. Manufactured by Webb Research Corp. of Falmouth, Mass., the Slocum electric glider is one of several ocean-observing systems used by scientists at Rutgers' Institute of Marine and Coastal Sciences. The glider provides data in close to real time, and scientists use it at the same time as other ocean-observing systems - high-frequency radar, satellite imagery, buoys and sea-floor sensors - to "observe" a patch of ocean whole.

In this case, the patch is the stretch of ocean along the edge of the continental shelf, extending from Nantucket Island in the northeast, to Tuckerton in the southwest. "We hope to start a new ‘endurance line,' running from New England to New Jersey," said Josh Kohut, director of the Institute's Coastal Ocean Observation Laboratory (COOL). Kohut said that the institute's current line runs from just off Tuckerton to the edge of the continental shelf, about 80 kilometers out.

"We call it an ‘endurance line' because we want to have a glider in the water along that line every month of the year, he said. "That way we get continuous data, or pretty close to it, which is very important for understanding things like climate change. Also, we want to be able to forecast conditions under the water - underwater weather, if you like."

The glider was deployed from the R.V. Lucky Lady, a research vessel belonging to the School of Marine Science and Technology at the University of Massachusetts-Dartmouth. From a few minutes after its deployment until it is picked up next month, the glider will be under the control of Rutgers scientists from their laboratory in New Brunswick. It will carry sensors in its science bay to read the temperature, conductivity and density of the water. Shaped like a dolphin, the glider swims like one, as well - only much more slowly. It moves by changing its buoyancy - sucking water into the nose to descend, forcing the water out to ascend, using its wings to turn vertical motion into forward motion. It travels through the water like a very slow roller-coaster, no more than about one knot. Researchers describe the glider's travels as flying, not swimming. Researchers program the glider's on-board computer with a destination, or "way point," a maximum depth and how often it should surface. Once the glider surfaces, it literally "phones home," using a satellite phone mounted in its tail that sends data back to the scientists at COOL, who then tell it where to go next. Kohut, who did his graduate work at Rutgers, remembers the earliest days with the glider, back in 1998. "When we first started working with the glider, it was my job to hang onto a rope that was attached to the tail," he recalled "We were sure we could make it go down, but we weren't sure it would come back up again."

The 100 flights have generated a great deal of good data - very detailed, nearly continuous information. They've also had their miscues. Once, when a glider had trouble surfacing on a flight in the Caribbean, researchers discovered that remoras, small fish that fasten themselves with suckers to sharks in the hope of free food, had attached themselves to a the glider in the misapprehension it was a shark.

Off the coast of Australia, while the glider was on loan to Australian researchers, but being monitored in New Brunswick, Kohut and his colleagues noticed the glider's global positioning system (GPS) showed it going off course - then, way off course. It left the ocean, went up the beach, and headed inland on a highway, coming to rest some distance from the ocean.

"We typed in the last latitude and longitude into Google Earth and were able to pinpoint a street address," Kohut said. "Then, we called our Australian colleagues and told them, ‘You might want to check this out.'" A neighbor also called the police, thinking the beeping, blinking missile-shaped thing on his neighbor's lawn might be a bomb. Eventually, the police and the Australian researchers saved the glider from a career as an Australian lawn ornament and returned it to its mission.