Yellow submarine: Unmanned sub studies ocean

Associated Press

AP Photo: This undated handout photo provided by Rutgers University shows a little yellow remote-controlled submarine in...

By RANDOLPH E. SCHMID, AP Science Writer

Sat Jul 12, 7:59 AM ET

WASHINGTON - Far out in the Atlantic, a little yellow submarine is trying to slip from current to current, gliding across the ocean beneath the waves.

The unmanned sub is nearing the halfway mark in its effort to travel from New Jersey to Spain, collecting scientific data along the way.

It isn't a first trip for the device, but it will be the longest, a proving effort to show that an undersea glider can take its place in a global ocean observing system.

"The big advantage is, it's totally unmanned," explained Conrad Lautenbacher, head of the National Oceanic and Atmospheric Administration, a sponsor of the sub developed and operated by Rutgers University. "It's very efficient and can be used to obtain the same kind of data we gather from ships."

"It can be done totally remotely," added Lautenbacher. "It can be controlled from a rec room in Ohio if necessary."

Like a glider airplane, the sub doesn't have a motor to drive it. Dubbed "Scarlet Knight" after the school mascot — never mind its color — the sub uses wings to fly through the water as it dives and rises, seeking currents that will carry it where the researchers want it to go, explained Scott Glenn, a marine sciences professor at Rutgers.

Instead of looking for thermals of rising air, however, the undersea glider sucks water in to dive and then pushes it out again to rise, spending most of its time between 15 feet and 300 feet deep. It's crammed with batteries, and one thing Glenn hopes to learn is just how long they will last.

At the surface, it sends data to a satellite and can be controlled remotely, operating a rudder or shifting the position of its batteries from side to side.

On this trip, the glider is focusing on the temperature and salinity of the ocean, Glenn said in a telephone interview, but all sorts of sensors can be attached to make various scientific measurements.

The actual operation and monitoring is being done by Rutgers students in the COOL room, formally known as the Coastal Ocean Observation Laboratory.

The little yellow sub has been following the giant ocean current known as the Gulf Stream, but as it moves on, picking the best new current will become more of an art.

Each time it dives, the students estimate by dead reckoning where it will reappear, Glenn explained. Then when it checks in again they compare that expectation with its new Global Positioning System location to see how their steering efforts are working.

Glenn has called the process sort of like "building a road while you're driving on it."

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Making it to Spain as planned means covering more than 3,800 miles, for a glider that is less than 8 feet long and weighs about 130 pounds. Its longest previous trip was 1,616 miles to Halifax, Canada, last year.

Scientific information from the glider is shared with the Navy and other agencies and is expected to help answer some major questions in the next few years, Glenn said.

The oceans are still largely unknown, he explained, and gliders can carry new instruments to gather information and help increase understanding both of aquatic life forms and of the dynamics of the changing seas.

Such information can help improve management of coastal areas — regions with the largest fish stocks — which also feel the impact of runoff and other pollution from rapidly rising human populations along the coasts, Glenn said.

In addition, be added, the North Atlantic plays a very important role in the dynamics of climate change.

The circulation of the global oceans starts in the North Atlantic, where cold winter water sinks down deep to begin its trip around the world. "This is the start of the conveyor belt," he said. "The concept of rapid climate change depends on what melt water from the Arctic is doing. ... Rapid climate change makes the North Atlantic a very important thing to study."

That doesn't mean the ocean and its inhabitants will be all that cooperative, though.

The glider began behaving oddly at one point, Glenn said, sinking faster than expected and then rising slowly. Curiously, the problem would go away in the daytime.

It appeared that it was being caused by suckerfish that attach themselves to sharks and turtles.

The suckerfish apparently swim free in the daytime looking for food, Glenn explained, then at night attach themselves to the glider for a free ride.

Once the glider left a particular eddy the problems went away, he said.

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