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Underwater 'gliders' monitor ocean health

17:58 11 August 2006
NewScientist.com news service
Tom Simonite

A group of underwater "gliders" patrolling off the coast of California, US, could help oceanographers remotely collect valuable real-time information about water currents, pollution and ocean organisms.

The 10 submersibles are exploring an area of water 20 kilometres by 40 km off Point Año Nuevo, about 100 km south of San Francisco, US. They control their depth by inflating and deflating a bladder to alter their buoyancy and shift two internal weights to steer themselves. They have no internal means of propulsion.

As they require little power, the gliders can remain out at sea for months at a time, but they can easily drift off course in the grip of a strong current.

The gliders are fitted with instruments that monitor temperature, salinity, and water currents and must resurface every 3 hours in order to send their position and collected data back to base via satellite. They could also carry sensors capable of detecting the proximity of tagged ocean creatures, such as whales.

Ocean modelling

Information transmitted by the gliders is received by a central computer located at Princeton University, in New Jersey, US, which maintains detailed models of the ocean and of the position of each of the gliders. The computer tries to predict the underwater movements of the gliders and transmits revised instructions based on its simulations when each submersible surfaces.

The gliders are coordinated in a way designed to cover the area comprehensively. The aim is to minimise gaps in the coverage or overlaps caused if they move too close together. "What the control system is trying to do is make the data coming in the richest possible," says Naomi Leonard at Princeton University, who is co-leading the project.

A video of the [gliders' movements](#) (avi, 6,4MB) is updated every few hours and a live [project control panel](#) can also be viewed online.

Strong currents

Gwyn Griffiths, who works on autonomous submarines at the National Oceanography Centre in Southampton, UK, describes the ability to update ocean models so rapidly as "groundbreaking".

Having schools of submarines work together could solve one of the greatest problems facing oceanographers, he says. "You never have enough data-collecting assets," he told **New Scientist**.

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The submersible craft are fitted with instruments that monitor temperature, salinity, and water currents (Image: David Benet)

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But lessons learnt through operating the gliders could have applications outside of oceanic research. "The principles can be applied to mobile sensors in any kind of ecosystem or environment," Leonard says. "People are even talking about using gliders in the atmosphere of various moons of Jupiter."

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