

Robots measure flow of Sacramento River

By: David Perlman, San Francisco Chronicle science editor

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A fleet of 100 robots floated down the Sacramento River on Wednesday to demonstrate their ability to measure the pace of the river's flow and to navigate the delta's water.

The foot-long devices, 40 of them fitted with propellers, are designed to serve as unique water-borne sensors to detect pollutants in a river, measure changes in salinity, monitor fish life and signal downstream in emergencies to warn of levee breaks, oil spills or other hazards, said the fleet's developers.

The demonstration of the "Floating Sensor Network" marked the first public display of a project long in the making by a research team headed by UC Berkeley's Alexandre Bayen, a civil and environmental engineer, and Andrew Tinka, a graduate student in Bayen's laboratory.

The robots floated along their 2-mile course successfully, demonstrating their ability to navigate the water route from their launch site at Walnut Grove (Sacramento County) and beyond the river's intersection with nearby Georgiana slough, Tinka said.



Andrew Tinka (left) and Kevin Weekly place the robotic units along the Sacramento River during the demonstration. (Photo by Jerome Thai)

"It was all very successful," Bayen said when the day was done. "The floaters did their job beautifully."

Mini-computers in each robot programmed with a map of the river enabled them to avoid both riverbanks as well as a barge-mounted crane in midstream, he said.

The robots were equipped with GPS-enabled cell phones to transmit data about water flow and their precise location every few seconds to the Lawrence Berkeley National Laboratory's National Energy Research Scientific Computing Center.

Those devices could be equipped with an almost endless variety of sensors to monitor any river's health, Bayen said. They will soon be tested in more experiments.

Bayen has led two earlier experimental projects that used GPS-linked cell phones. One, called "Mobile Millennium," recruited 3,000 Bay Area volunteer drivers to install the devices in their cars. The phones automatically transmitted their location and degree of traffic congestion.

That project's computer programs, first tested 2006, are now the basis of the information used daily in television traffic reports, Bayen said.

Two years earlier, another Bayen-led experiment, called "Mobile Century," demonstrated how 100 cars equipped with the GPS-linked smart phones could report traffic flow and congestion along a 10-mile stretch of Interstate 880 between Hayward and Fremont. "Century" remains experimental, Bayen said.

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This article appeared on page C - 1 of the San Francisco Chronicle