The Autonomous Vehicle Validation Experiment

Britain's Autosub-1a AUV Completes Its Final Mission of the AVVEX Experiment; Success Augurs Development of Autosub-2, Host of New Missions

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At 1620Z on September 6, 1998, the Autosub-1a autonomous underwater vehicle (AUV) completed the final mission of the Autonomous Vehicle Validation Experiment (AVVEX). It was Autosub's 145th mission and the longest and deepest to date. Mission 145 covered a total of 263 kilometers; during one segment the AUV traveled at 504 meters for 6.7 kilometers and 42 profiles were made between the surface and 400 meters.

To date, Autosub has completed 216 missions with more than 422 hours of in-water operations.

AVVEX was a collaborative project between the Southampton Oceanography Centre (SOC) and the Bermuda Biological Station for Research (BBSR), with associated investigators from the University of California at Santa Barbara (UCSB), Florida Atlantic University (FAU), and the University of South Florida (USF). The project, sponsored by the U.S. National Science Foundation and the U.K. Natural Environment Research Council had a number of objectives:

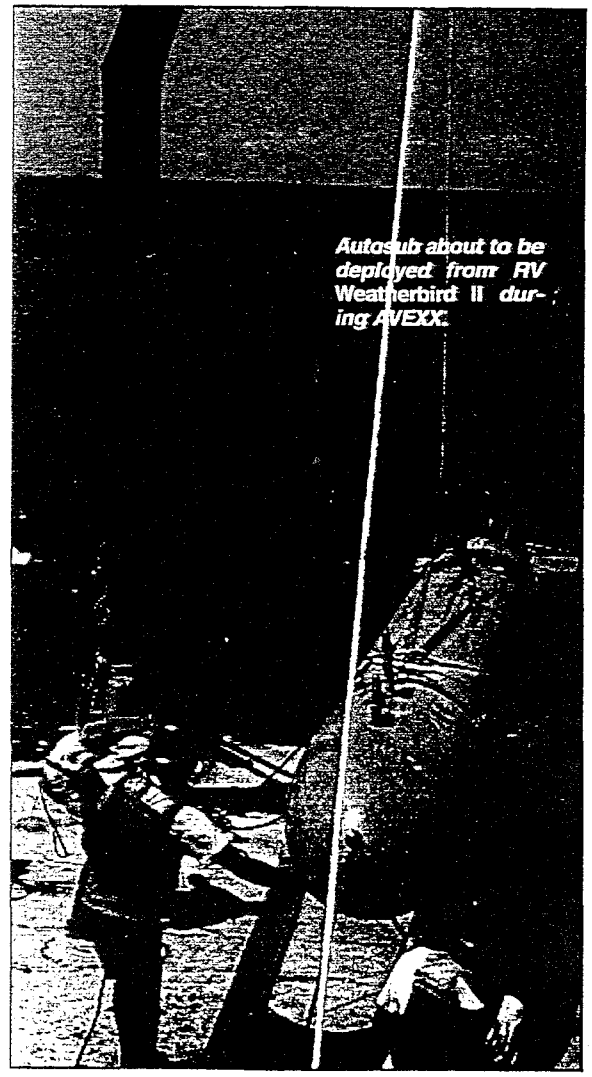
- Demonstrate an Autosub mission of 250 kilometers, profiling to 400 meters
- Demonstrate ease of integration of experimental as well as COTS (commercial off the shelf) sensors
- Demonstrate gathering of multidisciplinary data from an AUV in a number of survey modes
- Demonstrate added value of AUV spatial survey to on-station data
- Demonstrate the use of a medium-endurance AUV as an adjunct to time-series upper ocean data collected from the Bermuda testbed mooring
- Verify that such operations could become routine and cost-effective.

This article focuses on describing how the first three objectives were demonstrated during AVVEX.

Autosub Revealed

Autosub-1a is a large AUV, 6.8 meters long and 0.9 meter in diameter weighing 1,700 kilograms in air and displacing 3,000 kilograms. The vehicle has been specifically designed for ocean science applications. In its present form, it is best suited to study the physical, biological, and chemical oceanography of the upper 500 meters of the ocean on missions of up to 48 hours or 260 kilometers. Upgrades scheduled for late 1999 were to quadruple the range and depth capability and result in a vehicle able to undertake geophysical seabed surveys as well as deep multidisciplinary ocean science.

Energy for propulsion, command and control systems, and science payload comes from a manganese-alkaline battery pack of 35 kilowatt-hours. The batteries are housed in a filament-wound glass fiber-reinforced pressure vessel with an internal volume of 383



Autosub about to be deployed from RV Weatherbird II during AVEXX.

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