

Coordination of Experiments Using AUVs at the South Florida Test Facility

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LONG-TERM GOALS

The long-term goal of this project was to provide for ship time to support two experiments using Autonomous Underwater Vehicles. The purpose of these experiments is to provide new scientific information on the performance of acoustic mine hunting sensors and AUV communication systems as well as to demonstrate the capabilities and limitations of AUVs, especially in the near shore environment. The first experiment proposes the deployment of an AUV and multiple sensor systems in adverse weather conditions. The second experiment proposes the use of multiple low cost vehicles to detect and map targets in a specific area. These experiments are planned to take place in the South Florida Test Facility (SFTF) which is located just south of the Fort Lauderdale inlet. This proposal is for the cost of the infrastructure (range costs and ship time) to carryout this work. Proposals from individual investigators will include more detail on the scientific objectives of the experiments.

This effort was expanded to include part of the development of the underwater communication infrastructure in the enhancement program for SFTF, which is known as the South Florida Ocean Measurement Center (SFOMC) program. In SFOMC a number of infrastructure enhancements to SFTF have been approved for installations in approximately 20 meters of water including the development and installation of environmental arrays, underwater acoustic communications systems, and an underwater dock for AUV long term operations. A critical part of this effort to be addressed by this effort expansion is the development of the hard wire communications and power link from the SFTF shore site to the offshore, underwater node that serves as gathering point for the above mentioned additions.

In addition, it has been recognized that the realities of supporting AUV operations in support of sensor development and experimental operation requires the creation of a capable infrastructure of equipment and staff. The goal of this element is to create an effective, reliable, and responsive AUV operations capability to interface with user scientists and other Navy clients, to carry out AUV based missions, and to support AUVs over the course of time.

OBJECTIVES

The objectives of this project are to support AUV operations in specific Navy relevant research and demonstration missions in the near shore, shallow water. It is also the objective of this project to develop critical elements of the offshore underwater enhancements planned for SFTF, specifically in

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the communications with and powering of an offshore underwater node. Further, it is the objective of this project to begin to forge an infrastructure in terms of staff and systems to provide for AUV mission support over the long term.

APPROACH

Ship time has been scheduled to support the missions to be carried out in December of this year. Additional ship time will be anticipated for follow-on operations, infrastructure support at SFOMC related to these experiments, and additional operations in the first half of 1999. In addition, an AUV operations director has been selected who will come aboard in November. This project will support that individual. Coordination and management for these efforts is also provided for in this project.

WORK COMPLETED

Planning for mine deployment has been completed. Mine deployment is anticipated in the first weeks of November. Ship time has been scheduled for the December time frame adverse weather and mine hunting exercise. An AUV operations director has been hired.

IMPACT/APPLICATION

The efforts under this project will:

- 1) Serve to support single and multiple AUV operations in adverse weather and mine hunting exercises. This will assist in furthering the technology of these areas. Presently it is difficult to gain synoptic data about the ocean environment during adverse weather conditions. The experiment that this project supports will take steps to improve the ability of ocean scientists to do this. Similarly, there is much to be discovered and developed in the effort to carryout simultaneous, multiple vehicle mine hunting using AUVs. The effort that this supports will further that understanding.
- 2) The enhancement of the SFTF infrastructure to support the creation of a well-instrumented near shore test environment for AUV operations will contribute directly to the Navy's capabilities in this area. With the installation and operation of SFOMC the Navy will be afforded a cost effective near land subsea test and demonstration environment as part of its overall strategy for ocean systems development and deployment.
- 3) The beginnings of a dedicated AUV operations capability for research and development is being started. A director has been hired to assume responsibilities of presently planned for tests and to begin to build an organization for AUV operations that will be dedicated to responding to and supporting ocean science and Navy operations needs.

TRANSITIONS

FAU AUVs are scheduled to support the ACOMS project. The SFOMC range as well as the vehicles will be available to support current near land, underwater programs other than those currently underway at FAU. Scientific data on the near shore acquired during the adverse weather experiments will be available to other scientists through the Internet. Eventually, interactive scientist-AUV operations will be possible with the SFOMC underwater acoustic communications network.

RELATED PROJECTS

Related projects include ONR programs on ocean surface current radar measurements and internal currents measurements using AUVs with the University of Miami, ocean chemistry measurements using AUV platforms with the University of South Florida, AUV dynamics and sensor system performance at FAU, ACOMS through NUWC, and the NICOP program with the United Kingdom on ocean turbulence measurements.