

EXPERIMENTAL RESULTS; THE AUSI/IMTP SOLAR POWERED AUV PROJECT

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Abstract

The Autonomous Undersea Systems Institute (AUSI) is currently working on the development of a solar powered Autonomous Underwater Vehicle (AUV) in cooperation with the Institute of Marine Technology Problems of the Russian Academy of Sciences. This program is aimed at investigating those technologies that will enable the use of solar energy to power autonomous vehicles. It also includes the development of an experimental prototype as well as at-sea experiments of the system. The results of a variety of experiments of the solar energy collection, charging, monitoring and control system components which are presently underway will be presented. Also, the results of in-water testing of a prototype system will be presented.

Introduction

The Autonomous Undersea Systems Institute (AUSI) along with the Institute for Marine Technology Problems (IMTP) in Vladivostok has been investigating the use of a solar energy system as an energy source for a long endurance AUVs. The ultimate AUSI program objective is to develop a small, low cost, solar powered AUV system for the marine community with an endurance in excess of one year. A prototype solar powered AUV test bed has been developed. A second vehicle platform, has been fabricated to evaluate the effect of wave action on the amount of energy collected by a solar AUV. This document reports on the status of three experiments; in-water testing of the solar AUV prototype, the results of in-water testing to determine the effect of wave action on energy acquisition, and the results of initial in-water tests to understand the effect of bio-fouling on the solar powered AUV arrays. These results begin to answer questions such as; What does a solar AUV look like? How far will it go? How is it affected by the ocean environment?

Background

In July of 1997, a cooperative research program was undertaken between the Autonomous Undersea Systems Institute and the Institute for Marine Technology Problems (IMTP), Russian Academy of Sciences, Far Eastern Branch, in Vladivostok. In January of 1998, the Office of Naval Research NICOP program funded a joint proposal to evaluate the technologies required for a solar powered AUV. This program was to investigate a number of issues that would impact a vehicle that was to be powered using available environmental energy. [Jal 97]

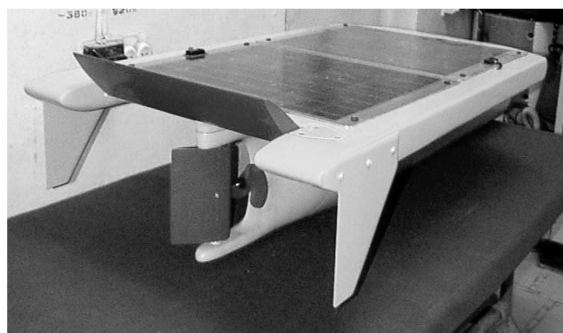


Figure 1 Prototype Solar Powered AUV

Vehicle Platforms

Two vehicle platforms were fabricated; one in Vladivostok and a second at AUSI. The first vehicle; a solar AUV engineering prototype was designed and fabricated by IMTP in coordination with AUSI. The 90 kg. vehicle is 1.7 meters in length, 0.7 meter wide with a pressure case diameter of .24 meters. It has two Solarex (MSX30L) 30 watt solar panels and 32 NiCd cells in a four battery (8 cells in series) configuration. The onboard computer system controls all vehicle functions and records engineering data. [AGEE98].