

Autonomous Underwater Vehicles and Sensors Powered by Ocean Thermal Energy

Yi Chao

Seatrec, Inc.
Pasadena, California, USA

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Abstract

This talk will describe a new stand-alone power system to harvest temperature differentials in the ocean. This is a unique power source underwater in the absence of solar and wave energy. The current state-of-the-art autonomous underwater vehicles and sensors are all powered by primary battery, and therefore have limited lifetime. Harvesting the ocean thermal energy associated with vertical temperature differentials between the warm surface and cold deep water has the potential to power these autonomous underwater vehicles and sensors indefinitely. Results from the development, deployment and recovery of a prototype thermal recharging underwater float (known as SOLO-TREC) in the ocean will be presented. With eight hours energy harvesting and sampling interval, SOLO-TREC has made more than a thousand dives between the ocean surface and 500 meters water depth over a period of 1.5 years. Recent progress to commercialize this thermal recharging technology in support of several climate and oceanographic initiatives will be presented. Future applications of this thermal energy harvesting technology to power autonomous underwater vehicles such as gliders and propeller-driven AUVs will also be discussed.

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