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Acoustic Sensor Systems on a Flying Wing Underwater Glider and Two Prop-Driven Autonomous Underwater Vehicles

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The Marine Physical Laboratory, Scripps Institution of Oceanography operates several underwater vehicles including an autonomous underwater glider based on a flying wing design and two prop-driven autonomous underwater vehicles (AUV) manufactured by Bluefin Robotics. The objective of this presentation is to describe the acoustic sensor systems on these platforms and provide sample results from the at-sea data. The glider, with a 6.1-m wing span, was developed jointly by the Marine Physical Lab and the Applied Physics Laboratory, University of Washington. It is designed to maximize the horizontal distance traveled between changes in buoyancy (i.e., maximize its "finesse") while quietly listening to sounds in the ocean. A 27-element hydrophone array with 5 kHz per channel bandwidth is located in the sonar dome all along the wing's leading edge. In addition, it has a four-component acoustic vector sensor in its nose. The two prop-driven AUVs have been equipped with hull-mounted hydrophone arrays with 10 kHz bandwidth for passive synthetic aperture studies, an acoustic vector sensor, and active acoustic imaging systems for ocean bottom/subbottom mapping. Results from the data processing illustrate the tight coupling between acoustic sensor systems, signal/array processing methods, and vehicle behavior. [Work supported by the Office of Naval Research].