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TEAMER - DAISY Flow-noise Testing (Abstract)

CRADA 578 (PNNL 80600)

November 2022

Nichole K Sather

University of Washington

U.S. DEPARTMENT OF ENERGY

Prepared for the U.S. Department of Energy
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Abstract

Evaluating impacts of marine energy devices is generally difficult given the dynamic environment where these devices need to be placed. The University of Washington's (UW) DAISY (The Drifting Acoustic Instrumentation SYstem) is designed to measure radiated noise around marine energy converters operating in energetic waves and currents. In currents, a primary limitation for measurement fidelity at low frequencies (< 100 Hz) is the potential for non-propagating "flow-noise" to mask propagating sound and inflate estimates of the radiated noise from marine energy converters at frequencies that overlap with hearing sensitivities of fish and some marine mammals. While free-drifting measurements help to minimize the relative velocity that produces flow-noise, significant levels were still observed during initial DAISY tests. This motivated the development of a fabric "flow shield" around the hydrophone that disrupts both flow-noise generation mechanisms proposed by the initial tests. First, the flow shield is a source of substantial drag which keeps the hydrophone package moving with the approximate velocity of the surrounding water, compensating for differential wind or current forcing on the surface expression. By minimizing relative velocity around the hydrophone, turbulence shed by the hydrophone is also minimized. Second, the flow shield creates a largely quiescent pocket around the hydrophone, minimizing advection of free stream turbulence over the hydrophone element. Field data collected in these experiments will test effectiveness of these flow shields and provide quantitative data use and deployment.

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