

# OPEN OCEAN TESTING OF THE AZURA PROTOTYPE WAVE ENERGY CONVERTER IN HAWAII

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The Azura scaled prototype has successfully completed 19 months of grid-connected open ocean testing at the US Navy's Wave Energy Test Site (WETS) in Kaneohe, Hawaii. The Azura was deployed from June 2015 to December 2016. Data collection and processing was done by The Hawaii Natural Energy Institute, providing independent data validation. Figure 1 shows the Azura deployed at WETS. The test concluded with some major accomplishments, including validation of computer simulations, demonstration of a robust design, and marine operations experience.



**FIGURE 1. AZURA PROTOTYPE DEPLOYED AT WETS.**

During deployment of the Azura, data was collected from two independent data acquisition systems. A NWEI data system integrated with the device control collected float angle data, power production data, and power take-off parameters at 10 Hz. A Modular Ocean Instrumentation System (MOIS) developed and installed by the National Renewable Energy Laboratory (NREL) collected GPS position, heave, pitch, and roll motions, magnetic heading, and mooring load data. Wave climate data was provided by a nearby WaveRider® buoy that is maintained by the University of Hawaii. Monthly test reports were generated that included power matrix data, operating status, relative capture width data, and response amplitude operators. All data has been uploaded to the MHK Data repository.

An additional six months of testing is planned for the Azura at the same location. A new float shape will be tested, and a heave plate will be added to the vertical spar. These modifications will provide additional motion and performance data to further refine the numerical models of the Azura. This additional information helps to continually improve the performance of the Azura prototype.

**ACKNOWLEDGEMENTS**

This work was supported in part with funding from the U.S. Department of Energy Office of Renewable Energy & Energy Efficiency, the Hawai'i Natural Energy Institute at University of Hawaii, and the U.S. Navy Office of Naval Research. Special thanks to EHL Group for continued support of the Azura, and Eric Nelson of the National Renewable Energy Laboratory for instrumentation support.