



Mobile Ocean Test Berth Support

Cooperative Research and Development Final Report

CRADA Number: CRD-10-413

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In accordance with Requirements set forth in Article XI, A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

Parties to the Agreement: Oregon State University

CRADA Number: CRD-10-413

CRADA Title: Mobile Ocean Test Berth Support

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$ 60,000.00
Year 2	\$ 60,000.00
TOTALS	\$ 120,000.00

Abstract of CRADA Work:

The Northwest National Marine Renewable Energy Center (NNMREC), headquartered at the Oregon State University, is establishing the capabilities to test prototype wave energy conversion devices in the ocean. This CRADA will leverage the technical expertise and resources at NREL in the wind industry and in ocean engineering to support and enhance the development of the NNMREC Mobile Ocean Test Berth (MOTB). This CRADA will provide direct support to NNMREC by providing design evaluation and review of the MOTB, developing effective protocols for testing of the MOTB and wave energy conversion devices in the ocean, assisting in the specification of appropriate instrumentation and data acquisition packages, and providing guidance on obtaining and maintaining A2LA (American Association for Laboratory Accreditation) accreditation.

Summary of Research Results:

Mobile Ocean Test Berth/Ocean Sentinel

NREL provided design review and feedback to NNMREC on the development of a mobile wave energy testing buoy and the design, incorporation, and utilization of relevant instrumentation. NREL contributed to a NNMREC design review meeting comparing a mobile and fixed location testing facility. NREL provided detailed feedback to NNMREC in a draft document, reviewed NNMREC's summary review document, and provided input during the meeting.

Test Protocols

To support the establishment of open-water test facilities for marine and hydrokinetic technologies, NREL collaborated with NNMREC to create draft guidelines for testing wave energy converters at sea, including pre-deployment readiness assessment and preparation.

A2LA Accreditation Support

To support the establishment of open-water test facilities for marine and hydrokinetic technologies, NREL provided guidance and experience with establishing A2LA accreditation along with the details of running an A2LA accredited testing program.

Grid Simulator Support

NREL leveraged knowledge and experience gained designing the Controllable Grid Interface (CGI) facility at NREL's National Wind Technology Center to support the design of a grid simulator for integration testing of wave energy conversion devices. NREL also provided results of analyses of CGI testing of wind turbines to inform NNMREC design, as well as design review and guidance on interconnection planning for the wave test center. The ability to simulate the interaction between ocean energy technologies and the nation's electricity grid will increase the understanding of the economic and operation effects of ocean energy on the electric supply system, thus lowering barriers to commercialization and deployment of wave technology. As demonstrated by wind energy technologies, the turbulent inflow environment is a key design and fatigue life driver, and the ability to integrate variable resources such as wind and ocean energy into the grid can create barriers to deployment. Accurate characterization of the turbulent inflow environment is key to designing reliable ocean current energy devices that can survive the turbulent marine environment.

Subject Inventions Listing:

N/A

Report Date:

8/24/15

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