



Coastal Acoustic Buoy for Offshore Wind

ESW&G – Environmental Research

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SMRU Consulting

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FY21 Peer Review - Project Overview

Project Summary:

- Significant concerns about the acoustic impact of offshore wind construction on endangered right whales
- Risks will be mitigated in real time by ensuring exclusion zones (~10 km) are clear of right whales prior to pile driving.
- Current available technology does not meet these requirements and/or can be cost prohibitive.
- We are developing a passive acoustic monitoring system that detects right whale calls, provides spatial information to Marine Mammal Observers, and minimizes unnecessary operational shutdowns due to false positive detections
- Key project partners: University of St Andrews, Smultea Sciences.

Project Objective(s) 2019-2020:

- Design/build/test hardware and software of the PAM mitigation system in Washington offshore waters.

Project Objective(s) 2019-2020:

- Conduct final evaluation of real time PAM system in East Coast waters representative of offshore wind sites.

Overall Project Objectives (life of project):

- Develop cost-effective and robust exclusion zone PAM mitigation approach.

Project Start: August 2019

Expected Completion: July 2022

Period of Performance: 3 years

DOE Share: \$716,681

Cost Share: \$505,589

Total Project Budget: \$1,222,270

Key Project Personnel: Jason Wood, Kaitlin Palmer, Paul King, Jesse Turner, Sam Tabbutt, Doug Gillespie

Key DOE Personnel: Eric Garcia, Jocelyn Brown-Saracino



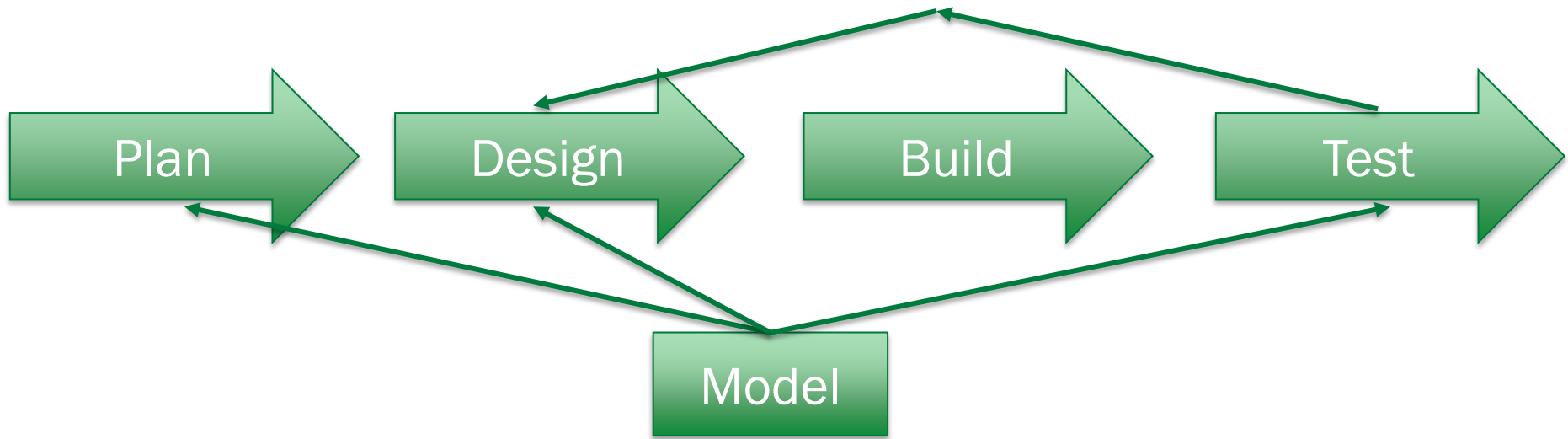
Project Impact

Advancing the state of technology with the Coastal Acoustic Buoy for Offshore Wind (CABOW)

CABOW Must be:

Cost Effective	<ul style="list-style-type: none">• Reduce per unit cost by an order of magnitude
Robust	<ul style="list-style-type: none">• Keep system design as simple as possible to maintain uptime of >99%
Reliable	<ul style="list-style-type: none">• Maximize acoustic detections of right whale calls (<1% missed calls)• Minimize false detections (<5% false positives)

Program Performance – Scope, Schedule, Execution



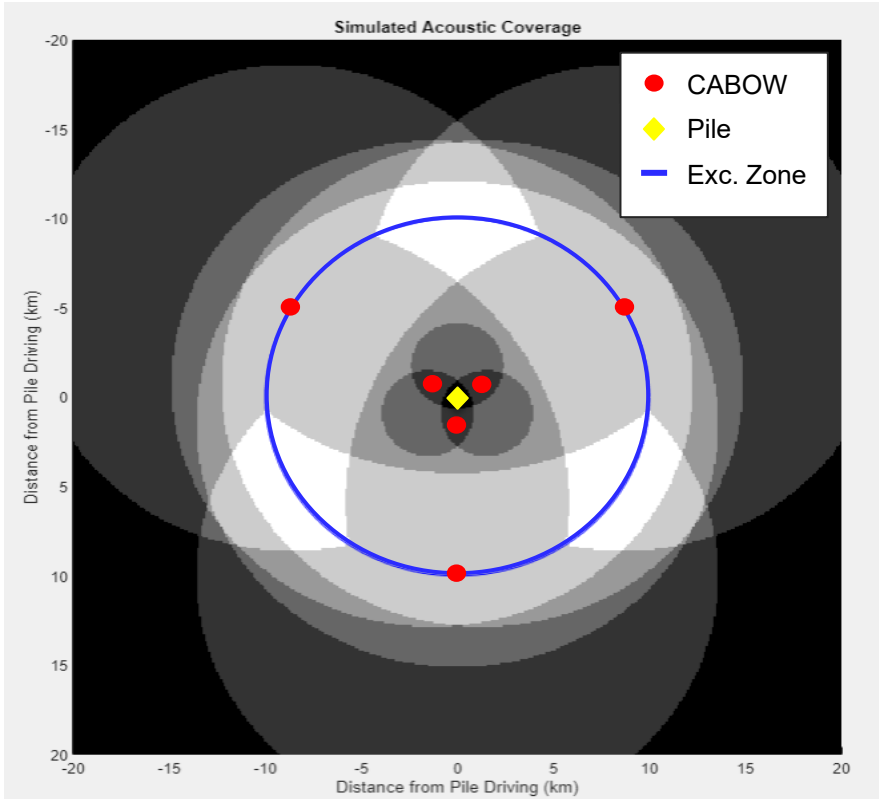
Aug 2019
Apr 2020 ✓

Sep 2019
Jan 2021 ✓

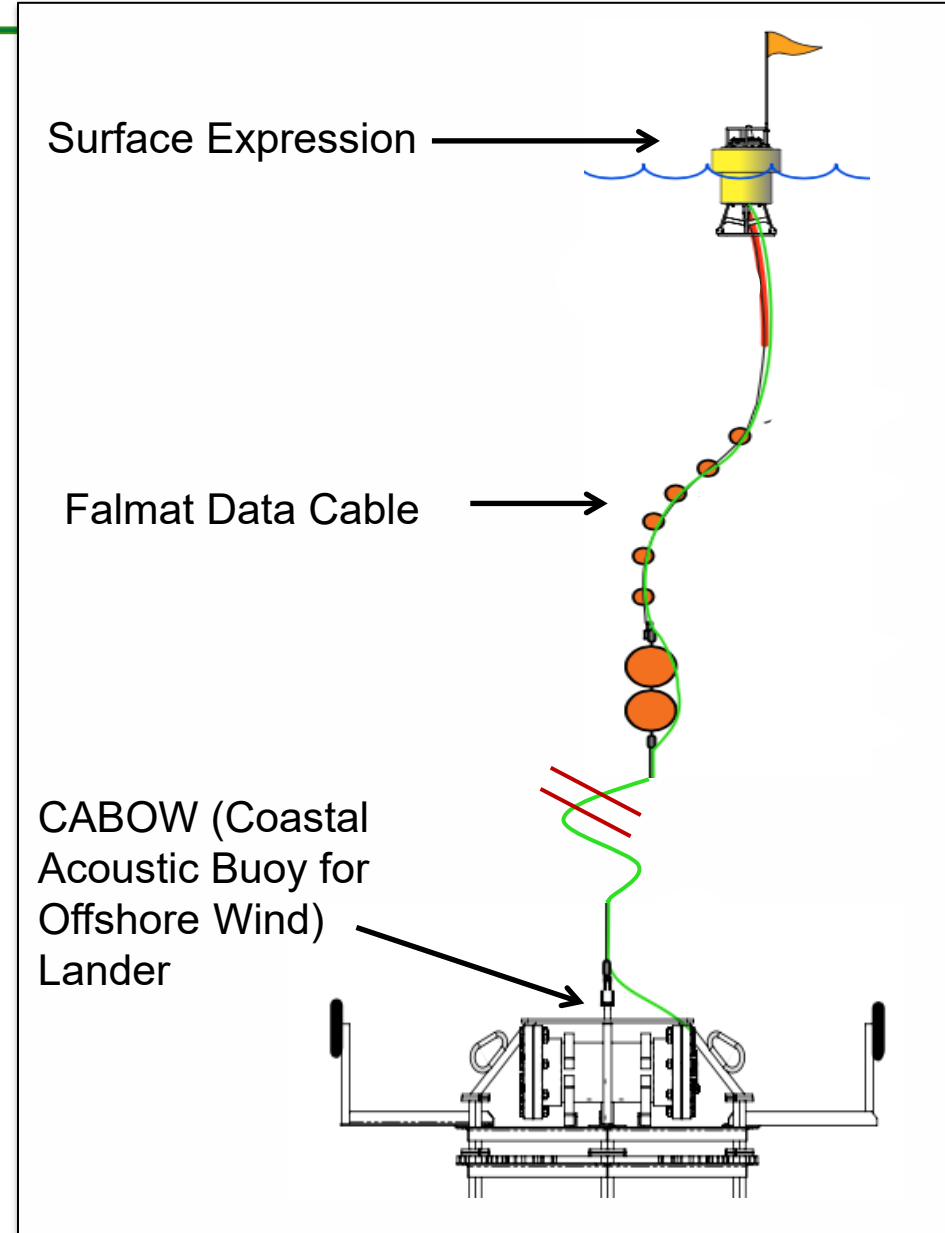
Oct 2019
May 2021 ✓

May 2020
May 2021

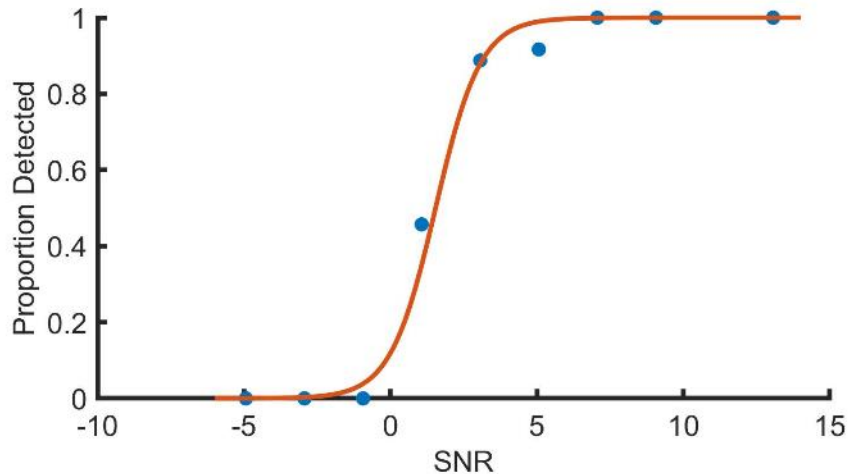
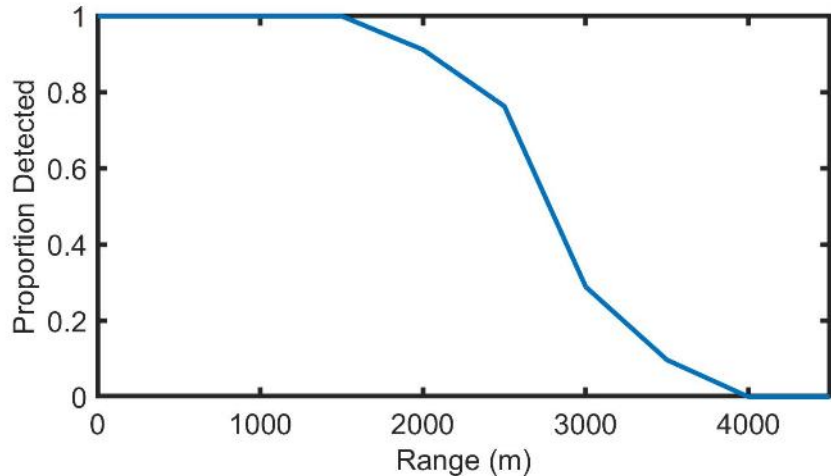
Program Performance – Accomplishments & Progress



- Exclusion zone monitoring method selected
- Instrument design completed
- Buoys built



Detection Function and performance



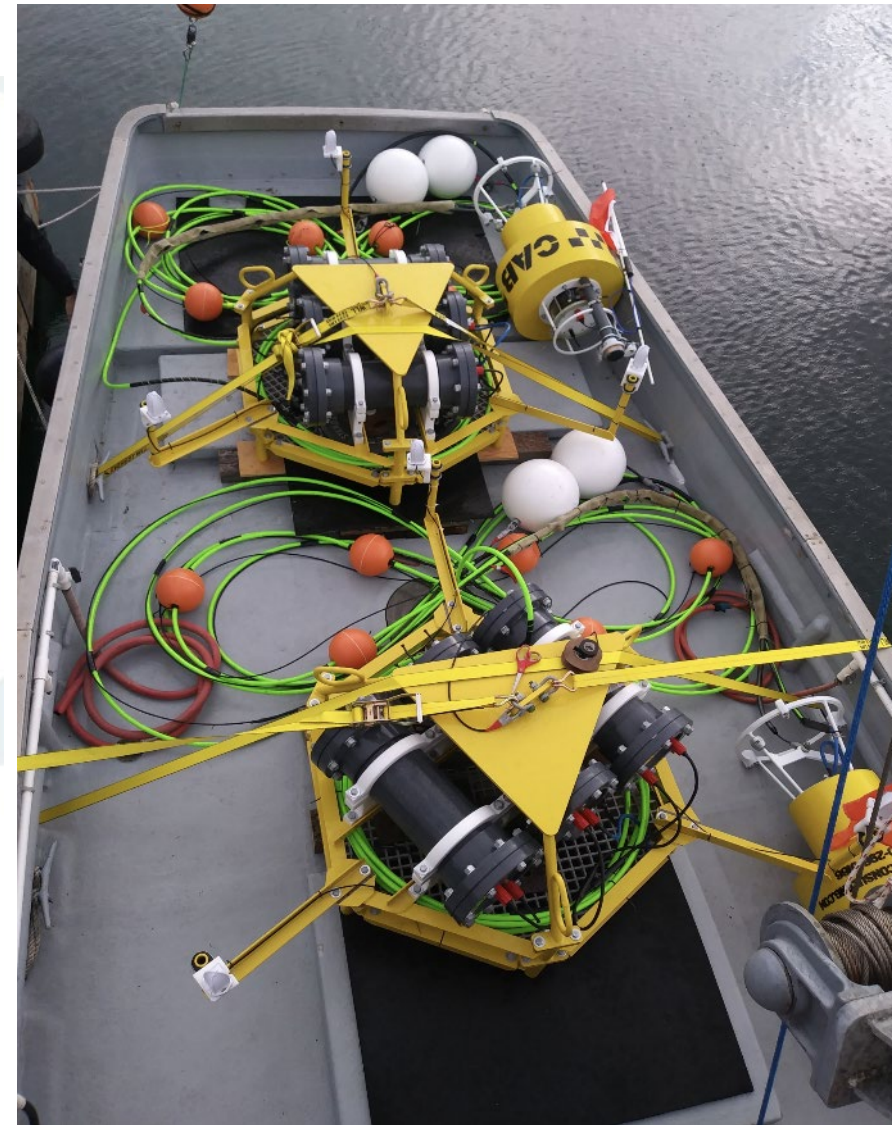
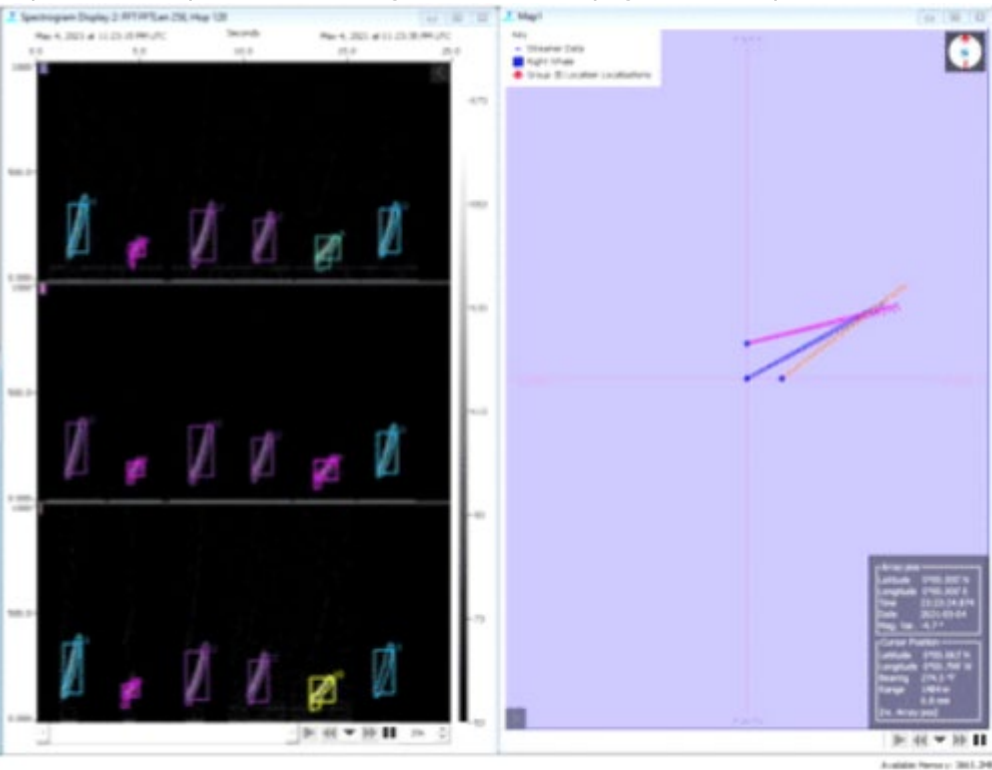
Optimal Placement for Acoustic Coverage Requires:

- Detector performance (how sensitive is the system?)
- Physics of the environment
 - How loud is the animal calling?
 - How does sound disperse?
 - How much other noise is present?

Evaluation of the detection range under a specific acoustic conditions (top) and performance of the detector as a function of call SNR (Signal to Noise Ratio) (bottom)

Program Performance – Accomplishments & Progress

Software testing with simulated upcalls. Upcall detections (left panel) and bearing estimates (right panel)



Loaded CABOW units ready for deployment

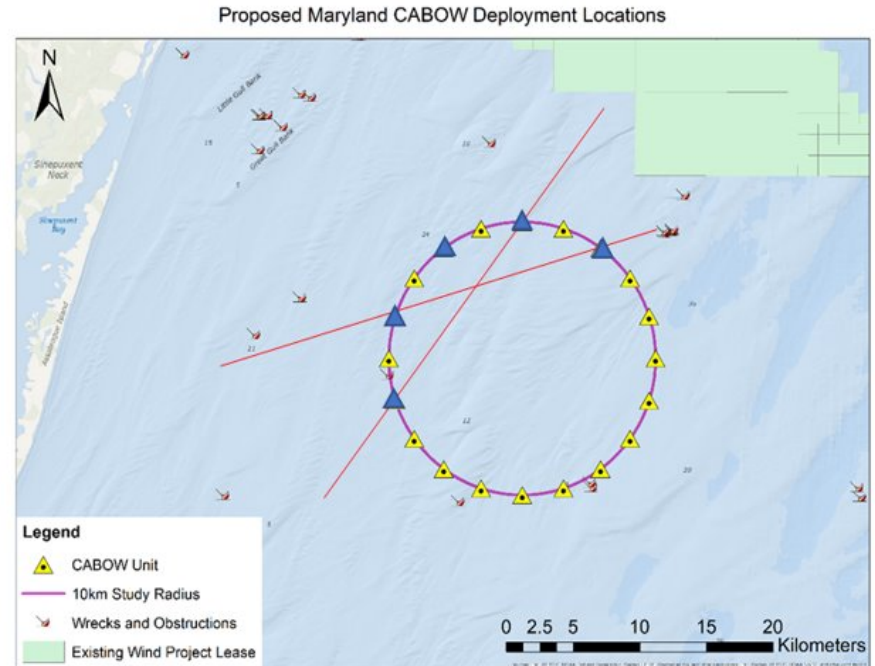
- Simulations and software updated
- 3,000 field playbacks conducted
- 4 Months of field deployments

Project Performance - Upcoming Activities

- East Coast Trials: Sep 2021
- Reporting of final technical achievements
- Peer reviewed journal article(s)



Deployment vessel sourced and reserved



Planned deployment of 5 CABOW units and intended playback tracks. Selected to maximize data collection

Stakeholder Engagement & Information Sharing

- National Wind Coordinating Collaborative Webinar on Offshore Wind Monitoring: Coastal Acoustic Buoy for Offshore Wind (CABOW). 16 Jan 2020.
- Wind Energy Technologies Office: Wind R&D Newsletter: 2 Jun 2021
- Interactions with regulatory agencies (BOEM, NOAA) and industry (Vineyard Wind, Ørsted) regarding entanglement risk and archaeological permitting.
- Planned conference presentation and publication.
- Commercialization planned through lease agreements.

