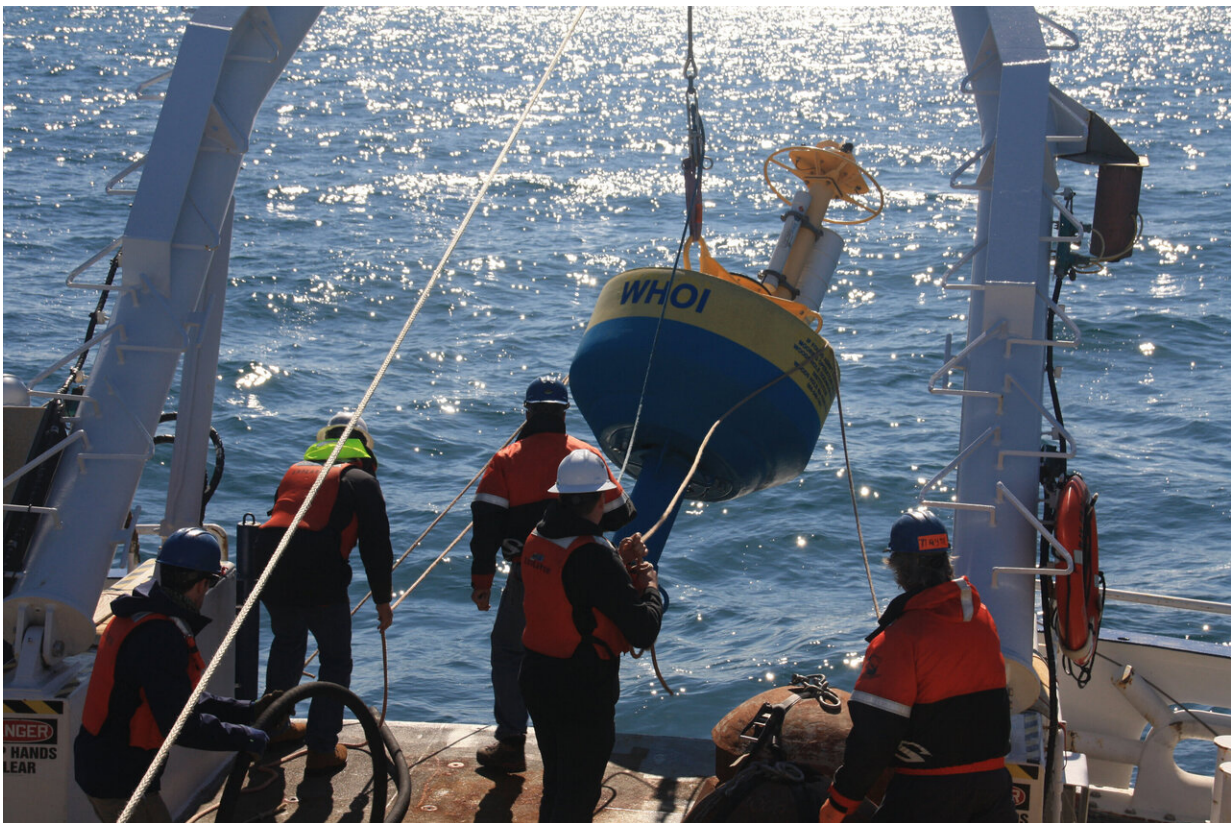


Students develop acoustic device to detect whales near offshore wind farm

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URI engineering students deploy an acoustic device they created for detecting whale sounds near the Block Island Wind Farm. Credit: Luke Puk.

A group of six ocean engineering students at the University of Rhode Island has developed an acoustic device that successfully detects the

sounds made by whales and other marine mammals in the vicinity of the Block Island Wind Farm. The invention was created for the students' senior capstone design class, a yearlong project that requires students to call upon all of the skills and knowledge they learned during their college careers.

The students who developed the device are Drew Adams of Bel Air, Maryland, Jake Bonney of Barrington, Rhode Island, Garrett Connelly of Wakefield, Rhode Island, Max Fullmer of Virginia Beach, Virginia, Luke Puk of Garfield, New Jersey, and Brendan Read of Middletown, Rhode Island. URI Ocean Engineering Professor James Miller was the advisor.

The students call their device MARIMBA or Marine Mammal Monitoring at Block Island Using Acoustics.

"What we were trying to do was detect marine mammals acoustically, using a hydrophone underwater that listens for the sounds of marine mammals, then sends those sounds to a server we have on campus, and we can listen to them live or record them," said Puk.

It wasn't easy. The biggest challenge, the students said, was that they were working from a prototype created by another team of students a year ago, but this year's group had little understanding of the software and electronics the previous group used.

"We didn't know anything about how they did last year's project," said Connelly, "so we had to take it and figure out what they did. We had to research the software code they used and figure out why they coded it the way they did.

"Last year's system was also designed for use on the Narrow River, where there's hardly any current or waves," he added. "We had to make

it an ocean-going system and make sure all the electronics were secured onboard so it would last through big storms."

In November, the students traveled to the wind farm to collect baseline measurements of the underwater noise in the vicinity and to determine the optimal location to place their device.

"We knew that the further offshore we went, the better it would be to hear marine mammals," said Fullmer, "but we also had to be within range of the Verizon cell network. And we had to make sure it would work using the cell network over satellite internet, because it's way cheaper that way."

After spending the winter engineering all of the elements of the device and the communications platform, they deployed two units in Block Island Sound for two weeks in late March and early April. They retrieved them from aboard the R/V Endeavor on April 12. They also collected oceanographic measurements and samples of the seafloor sediments to better understand the environment from which the device was operating.

Best of all, it worked.

"We heard a lot of dolphins, and some sei whales, which were confirmed by people at the Navy," said Read. "We might have detected a fin whale, too, though we need to get that one confirmed. And there were a couple of other unknown sounds that we have to look into a little more. There was a sound file every minute for two weeks, times two because we had two units, so we haven't had time to go through all the data yet."

As pleased as the students are with the success of the project, they all agreed that it was also a tremendous learning experience.

"One of the things I learned was that you have to be able to constantly adapt your plan because things always change," said Fullmer.

"The hands-on aspects were the best part for me," added Puk. "We learned a lot of the physics in the classroom, but doing the work hands-on was a whole other thing."

"And the experience of being on the Endeavor for three days was pretty amazing," Connelly said. "That's a classroom you can't pay for. We were lucky to get that opportunity."

Provided by University of Rhode Island

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