

US\$1M to Enhance Autonomous Vehicle for Monitoring Harmful Algal Blooms Project



As part of the NOAA-led Integrated Ocean Observing System (IOOS) Ocean Technology Transition (OTT) project, the University of Washington, Oregon State University, Ocean Aero, the Northwest Association of Networked Ocean Observing Systems (NANOOS) and NOAA Northwest Fisheries Science Center partners will receive US\$1M in funding over the next three years to

enhance and deploy Ocean Aero's Triton Class autonomous vehicle to augment HAB sampling at remote offshore locations on the Oregon and Washington coasts.

"Harmful Algal Blooms can cause severe environmental, economic and societal damage, and the water sampling system we are developing with the University of Washington Applied Physics Laboratory (UWAPL) increases the ability to detect and mitigate the effects of HABs," said Neil Trenaman, executive vice president of strategic business development at Ocean Aero. "NOAA, IOOS and the other partners in this project are demonstrating scientific leadership by incorporating intelligent autonomy into its efforts."

Challenging Conditions

Unlike vessel-based sampling that is often hampered by rough weather conditions common during seasons when HABs are of the greatest concern – namely the early spring and the autumn – Ocean Aero's Triton can survive extreme ocean conditions and operate in sea states of up to 15 feet with 30 knot winds. The Triton can conduct sampling when smaller human-operated vessels cannot. The Triton is also wind and solar powered and has a significantly lower carbon footprint than conventional sampling methods.

"Collecting offshore HAB samples in critical HAB source regions has always been challenging due to the remoteness of these regions and because of typically inclement weather in HAB seasons," said John Mickett, project lead at UWAPL. "We are hopeful that the Triton will largely overcome these issues to provide invaluable HAB samples that will significantly improve HAB monitoring and forecasts in the Pacific Northwest."



Ocean Aero designs, builds, tests, and manufactures a hybrid, wind and solar-powered, surface and subsurface vehicle for extended ocean observation and data collection. (Courtesy: Ocean Aero)

Improved Offshore HAB Sampling

With the ability to travel at an average speed of 2-3kts, the Triton will be launched from a marina, travel offshore for roughly 12-24 hours (~40-70 km), and then return to port collecting up to 10-15 georeferenced, time-stamped water samples at designated waypoints along the way. Once ashore, the samples will be rapidly analysed for HAB species types and cell concentrations as well as toxin (domoic acid) concentrations. Processing will be completed within ~24-30 hours of the first sample collected, with the results transferred to an online data display developed by NANOOS on the [HABs website](#).

"NANOOS will aid the project to ensure that end-user groups can access the data and information for informed decisions," said Jan Newton, NANOOS executive director.

The improved offshore HAB sampling by the [Ocean Aero Triton](#) will provide valuable measurements to the Pacific Northwest (PNW) HAB Bulletin, ground-truthing HAB forecasts, significantly enhancing HAB forecast accuracy, and providing essential measurements of toxin concentration, which presently cannot be modelled with skill. Additionally, for several days to a week following the deployments, the rapid measurements will act as an early warning system, allowing the detection (within 36 hours of sampling) of offshore HABs and toxins prior

to them reaching inshore areas where there is an increased risk to human health and fisheries. Both of these results will significantly reduce the risk and the economic impacts of HABs in the PNW.

This project will rely heavily on existing partnerships to carry out the proposed deployments. These include NANOOS, which is the Pacific Northwest IOOS Regional Association, the Olympic Regional Harmful Algal Bloom (ORHAB) Partnership, the Oregon State University (OSU)-NOAA (CIMRS) partnership and collaboration with the Oregon Department of Fish and Wildlife. This approach will both ensure close integration with existing HAB monitoring efforts and facilitate the transition to long-term operations.

About Ocean Aero

Ocean Aero is an award-winning creator and builder of environmentally-powered, intelligent, autonomous, underwater and surface vehicles. We have developed the only hybrid wind and solar-powered vehicle that both sails and submerges to provide first-rate extended ocean observation and data collection. For more information, visit us at www.oceanaero.com.

<https://www.hydro-international.com/content/news/us-1m-to-enhance-autonomous-vehicle-for-monitoring-harmful-algal-blooms-project>
