

Research submersible Alvin completes depth certification to 4500 meters

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The submersible Alvin has achieved certification from the U. S. Naval Sea Systems Command (NAVSEA) for operations to its rated depth of 4,500 meters (approx. 2.8 miles). Credit: Chris Linder, Woods Hole Oceanographic Institution

The Woods Hole Oceanographic Institution (WHOI) announces that the Human Occupied Vehicle (HOV) Alvin has achieved certification from the U. S. Naval Sea Systems Command (NAVSEA) for operations to its rated depth of 4,500 meters (approx. 2.8 miles). Two certification dives were conducted in the waters off Arica, Chile, on January 26-27 from the research vessel Atlantis, to demonstrate vehicle performance. Navy representatives were on hand to monitor the process and participate in the dives.

Certification of Alvin to 4,500 meters represents the successful culmination of the \$41-million, multi-year upgrade of the submersible funded by the National Science Foundation with a significant cost share by WHOI. In January 2014, NAVSEA certified Alvin to a depth of 3,800 meters, clearing the vehicle to return to service. In March 2014 a group of scientists put Alvin through its paces in the Gulf of Mexico, test-driving the upgraded vehicle and its new sampling, imaging, surveying and navigation systems. Alvin has subsequently made 99 dives during missions to the Gulf of Mexico, Juan de Fuca Ridge, and East Pacific Rise. Alvin was positioned in early 2015 off Chile, where depths of 4,500 meters were readily available to complete the certification trials to its full design depth.

"Alvin's performance on the certification dives was near flawless and readily met our requirements for certification," said NAVSEA System Certification Authority Representative Greg Sorrells, who participated in the final certification dive, along with Pilot Bob Waters and Pilot-in-Training Jefferson Grau. "In addition, I thoroughly enjoyed the dive and working with the WHOI team."



NAVSEA System Certification Authority Representative Greg Sorrells participated in Alvin's final certification dive, and, afterward, received the traditional dousing in cold sea water given to first-time Alvin divers. Credit: Lisa Smith, Woods Hole Oceanographic Institution

Alvin is operated as part of the National Deep Submergence Facility (NDSF), which is managed by WHOI on behalf of a consortium of universities and research organizations that conduct deep ocean research known as the University National Oceanographic Laboratory System (UNOLS). Alvin is owned by the US Navy and its sponsoring agency is the Office of Naval Research (ONR).

Bruce Strickrott oversees Alvin operations for WHOI and served as the expedition leader for the certification mission. "The [certification](#) dives accomplished a detailed set of sea trials developed by NAVSEA and WHOI," Strickrott said. "The excellent results confirm that the upgraded

vehicle and the WHOI operating team are ready in all respects to continue science and exploration to the submersible's full 4,500meter depth rating."

"I am delighted Alvin passed this final milestone for resuming operations at the full design depth," said Brian Midson, the NSF program manager responsible for the Alvin upgrade project. "I know there is exciting science planned that will benefit from working down to 4500 meters."

The upgrade of Alvin involved a number of key systems including a new, enlarged titanium personnel sphere, the addition of two viewports to bring the total to five, a new command and control system, new syntactic foam floatation, new lighting and imaging systems and improved ergonomics. The designs, testing protocols and operational procedures were made in accordance with NAVSEA standards and subject to rigorous audits and performance metrics.

"Although WHOI has been operating Alvin for over 50 years and completed 4,787 dives, every dive is a serious undertaking requiring attention to detail and focus on safety," said WHOI Vice President for Marine Facilities and Operations Rob Munier. "Our collaboration with NAVSEA provides a rigorous system of checks and balances that ensure our record of safe and productive Alvin operations will continue for years to come. I am extremely proud of the Alvin team – including the at-sea operations group as well as the engineering support staff ashore – for their hard work and dedication that enabled this significant milestone."

The Woods Hole Oceanographic Institution is a private, non-profit organization on Cape Cod, Mass., dedicated to marine research, engineering, and higher education. Established in 1930 on a recommendation from the National Academy of Sciences, its primary mission is to understand the ocean and its interaction with the Earth as a whole, and to communicate a basic understanding of the ocean's role in

the changing global environment. For more information, please visit www.who.edu.

Provided by Woods Hole Oceanographic Institution

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