

The future for defense drones may be under the oceans

November 2 2017, by Mike Freeman, The San Diego Union-Tribune

The next frontier for unmanned military drones may not be solely in the skies. It could be undersea.

The U.S. Navy and defense contractors such as Boeing, Lockheed Martin and others are increasingly focusing on ocean drones as the next big market for unmanned technology.

Lockheed Martin Ventures in September month invested an undisclosed amount in San Diego-based Ocean Aero, a 25-employee startup that is developing the Submaran—a solar and wind powered ocean drone capable of operating above and below the surface.

"The ability to be environmentally powered allows us to maneuver at great persistence because it's renewable," said Eric Patten, chief executive of Ocean Aero and a former Navy officer. "And then to be able to transition that vehicle from the surface to a sub-surface vehicle that has significant capability under water, that is truly unique."

Lockheed Martin Ventures typically invests \$1 million to \$5 million in young companies. "Ocean Aero represents the next generation of environmentally powered autonomous systems," said Chris Moran, executive director of Lockheed Martin Ventures, in a statement. "Our investment will allow us to better respond to customers' maritime needs with technology solutions for a diverse set of missions."

Other companies are betting on ocean drones. Last year Boeing bought a

Bay Area startup, Liquid Robotics, which is developing unmanned submarine technology. General Dynamics and L3 Technologies also have acquired [ocean](#) unmanned systems firms over the past 18 months. The U.S. military has plans to invest as much as \$3 billion into undersea systems over the coming years, according to a report last year by the Washington Post.

"Blue Tech for the maritime defense sector feels like where Clean Tech was a decade ago," said Greg Murphy, executive director of The Maritime Alliance, a San Diego trade group for the Blue Tech industry. "There is momentum. The Navy is increasingly using autonomous systems, and the large defense contractors are starting to buy up smaller Blue Tech companies that are developing systems."

Boeing and Lockheed Martin recently were named finalists in the U.S. Navy's Orca Extra-Large Unmanned Underwater vehicle project, which aims to develop big submersible drones capable of handling long-distance missions with significant payloads.

Ocean Aero is not part of Lockheed's work on the Orca project. But the companies are working together more generally on underwater drone technology, Patten said.

"We have a strategic cooperation agreement with Lockheed as part of our recent deal," he said. "They have great expertise in a variety of things."

Last year, Lockheed partnered with Ocean Aero for a technology demonstration at the Naval Undersea Warfare Center in Newport, R.I.

A version of Ocean Aero's Submaran patrolled the surface above a Lockheed undersea [drone](#) - the Marlin - providing communications gateway from the shore to the submerged vessel. The link between the

shore and the Submaran used radio frequency [technology](#), while the link between the Submaran and the Marlin used acoustic communications.

"That communications gateway mission is critical for a ton of folks," Patten said. "Defense is great use case, but commercial use cases are just the same. If you are operating a wind farm off the coast and you have things underneath the surface and you want to communicate with that equipment, there are only a couple of ways to do it."

Ocean Aero, which is also backed by Teledyne Technologies, makes three different drones. Its S10 Submaran is a 14-foot-long craft with an 8-foot solar-wind wing. It can dive about 30 feet and glide underwater. Its rechargeable lithium batteries allow it to spend months at sea and targets the research and commercial markets.

A sister vessel is the same size but can dive 660 feet and maneuver under the surface.

Ocean Aero's big boat, called the Silent Aero, is 40 feet long, can dive 660 feet and carry a payload of 2,000 pounds.

About two years ago, Ocean Aero received a Defense Department Rapid Innovation Fund grant to develop a hybrid unmanned underwater-surface vehicle that can travel long distances on the surface and then submerge to avoid surface traffic and conduct intelligence, surveillance and reconnaissance operations.

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