

Cyclops Begins Sea Trials OceanGate – APL-UW Joint Venture Reaches Milestone

Narrator: Into the water. And then under the water. *Cyclops*, a new manned submersible, is now undergoing sea trials.

Stockton Rush: She's doing great. It's been a very pleasant surprise. When you put a sub in, you don't know if she's gonna handle as well. You aren't certain if you're gonna have systems with failures. But she's been a great machine.

Narrator: *Cyclops* is the newest creation of OceanGate – a for-profit private company in partnership with the University of Washington's Applied Physics Laboratory.

Rush: We couldn't have done it without that partnership. The Applied Physics Laboratory has effectively been our engineering partner.

Narrator: APL-UW's David Dyer explains how the Lab works with OceanGate.

Dave Dyer: We had to get creative on how we can actually pull this work off and be able to have a reasonably priced project output for OceanGate.

Narrator: The key: APL-UW provides brainpower as needed.

Dyer: We've been able to move people in and out of this project. And that got back to one of those financial challenges: how do we get Stockton the expertise he needs in an affordable manner so he's not having to carry this huge overhead on the project. We can bring someone in and charge a couple of hours to it and let them go off and they go back to their own projects and work on that.

Narrator: APL-UW scientists and engineers faced major challenges. Starting with how to design a deep-diving submersible that you don't have to be a U.S. Navy submarine skipper to operate.

Dyer: Stockton is very interested in being able to quickly train pilots – have pilots be able to come in and use this thing without having to go through weeks of training.

Narrator: Solution: this video game controller.

Pete Brodsky: Our combination steering wheel and gas power. This is a Sony Playstation PS3 gaming controller, which has two thumbsticks, a series of buttons on the top, and a series of buttons on the front. And with this device, we can drive the submarine – making it go up, down, left, right, forward and backwards.

Narrator: APL'S Pete Brodsky designed the *Cyclops* control system and the complex electronic paths from the controller to the submersible's thrusters.

- Brodsky:** In a nutshell, the electrons from here have to make it through about ten different channels of a computer, out through fiber optics, and into another device, which turns it into an analog signal out to a motor drive, which then generates high-power electrical signals out to the thrusters. Getting all that connectivity right was – interesting. And challenging. But we believe we have it down now.
- Dyer:** There's aspects of it that are groundbreaking.
- Narrator:** David Dyer tackled the impact of hull design on efficient energy use – an evolution from earlier “boxier” OceanGate submersibles.
- Dyer:** When you look at the *Cyclops* shape, there was a lot of effort put into it to make it look neat and cool but also to make it so that it was functionally hydrodynamically efficient.
- Narrator:** Efficient without compromising the pressure hull.
- Dyer:** Taking a pretty significant exoskeleton structure – having to attach it to the primary pressure hull. You can't put holes in it. We didn't want to weld to it. We had to do it in such a way that we didn't impact the functionality of that pressure hull. So technically that was a big challenge for us.
- Narrator:** With *Cyclops* nearing operational status, the next step is the market place. The basic pitch?
- Rush:** *Cyclops* is going to be a very useful tool for any organization, company or institution that needs to go underwater and perform tasks at depth without requiring a very expensive support ship and other apparatus that would be associated with a remotely operated vehicle.
- Narrator:** To help get the word out – a *Cyclops* roadshow is planned.
- Rush:** It will include dives in the Gulf of Mexico, off the east coast and off the west coast – as well as dives here in Puget Sound.
- Narrator:** And expect media events along the way similar to Seattle rap star Macklemore's dive aboard OceanGate's *Antipodes* submersible for the Discovery Network.
- The spotlight will be on *Cyclops* – and the business partnership with APL-UW that made it happen.
- Dyer:** The way that we've structured this portion of the Lab at the University of Washington is to make it so that companies like OceanGate can have an entrance into the University – get exposure to all that resource that's out there – that technical ability. It's actually a model that we can then hold up and say, 'Look, this is not something that only works for OceanGate,' this will also work for other people who are trying to do this in the marine industry, or renewable energy or something like that.

This is APL The Applied Physics Laboratory at the University of Washington in Seattle.