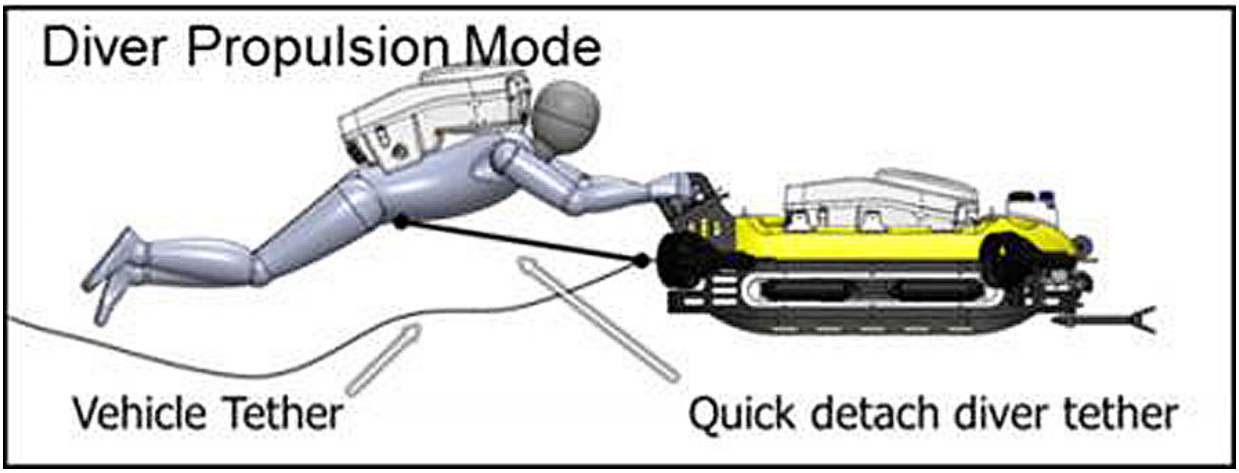
Navy Scientists and Engineers Develop Dive Buddy to Assist Divers

By Katherine Mapp, NSWC PCD Office of Congressional and Public Affairs | April 20, 2016



PANAMA CITY, Florida –Naval Surface Warfare Center Panama City Division's (NSWC PCD) scientists and engineers collaborated with the Naval Post Graduate School and developed a remotely operated vehicle (ROV) as a tool to aid U.S. Navy divers in navigation, communication, search and transportation.

The up-and-coming device is known as the Dive Buddy Remotely Operated Vehicle (DBROV). The Dive Buddy is a purpose-built hybrid vehicle that can be operated as a ROV, a Diver Propulsion Vehicle (DPV), an Autonomous Underwater Vehicle (AUV), or any combination of the three.

Lee Cofer, NSWC PCD electronics engineer and Dive Buddy project lead, says the DBROV has a variety of beneficial aspects which will significantly improve efficiency and effectiveness of the diver's assignments.

"I believe all Navy diving will benefit from the Dive Buddy, in particular, expeditionary diving," said Cofer.

Cofer said the Dive Buddy was created to fulfill the need for a fly-away, agile base unmanned underwater vehicle (UUV) platform with autonomous capabilities that is scalable and adaptable to the diver's needs. Also, there is a need for a platform to have the ability to be outfitted with equipment and sensors that divers need for their specific mission at hand.

The DBROV is able to carry backup life-support systems, tools, items of interest, perform dive site reconnaissance and tagging, navigate and transport the diver to dive sites, perform small area searches and provide forward looking sonar information and voice/video/data communications to the surface.

During the process of developing the DBROV, the team of Navy scientists and engineers met with divers and individuals in the Navy diving community to get their input about what functions they need in a system.

Cofer refers to the need for such an unmanned system capability as three-pronged.

"The first need is for a system that can aid in decision support by providing dive supervisors and their teams with real time sensor feeds providing information on critical aspects of their underwater mission," Cofer said. "The final is the human and machine teaming aspect that multiplies the diver's effectiveness."

Cofer added that while the diver is the most critical and capable component in a dive mission, some tasks that are simple and/or repetitive can be assisted by or offloaded to an unmanned system. By doing this, there is better utilization of the limited bottom time of the diver for the more complex tasks that require greater agility.

The DBROV will not only increase diver safety, but it provides decision support through harvesting a greater situational awareness and command and control for dive supervisors. Command and control is part of a three-tier technology pillar for Initial Response Diving, which also includes thermal management and decompression support. According to Cofer, it is beneficial for the fleet to use this system.

“Navy capability for subsea human intervention that is rapid, low cost, and safe is extremely limited yet critical for all domain access, maritime security, power projection and sea control missions. Divers are necessary for these missions until the situational awareness, adaptability, agility and dexterity of a diver is duplicated in machines, likely decades from now. Meanwhile, unmanned systems are needed to sustain the Navy’s undersea asymmetric advantage,” said Cofer. “Addressing these operations by teaming divers with a specialized UUV has potential to safely achieve greater capability while addressing numerous documented mission needs.”

Examples of missions the DBROV would be useful include disabled submarine escape assessment or assistance and recovery of classified debris before they are reached by hostile forces.

In closing, Cofer stressed the significance of the Dive Buddy development, but explained it is not a replacement for human interaction. “DBROV is not a replacement for a diver, but a tool in their tool belt,” Cofer said. “The DBROV/diver relationship is an example of human and machine symbiosis.”

All manufacturing of the Dive Buddy is completed in-house at NSWC PCD. Along with benefitting the fleet, this project was used as an innovative mentorship tool to allow seasoned scientists and engineers to foster learning with the up and coming workforce.

The DBROV efforts are part of the Navy Innovative Science and Engineering (NISE) program, a sub effort of the Office of Naval Research’s (ONR) N-STAR program. The program was established to seek, build and maintain a robust science and technology (S&T) workforce within the Naval Research Enterprise. The program consists of a broad consortium of naval warfare S&T elements throughout the Department of Navy.

After developing the DBROV project for over three years thus far, Cofer and his team are set to brief attendees about DBROV at NISE/219 demonstration at the Pentagon April 21, 2016. In addition, Water testing is scheduled to begin during the summer of 2016 with a demonstration by the end of this fiscal year (FY).