

# Navy, Marine Corps spotlight the future of amphibious, autonomous warfare

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An unmanned aerial vehicle launches from a multi-utility tactical transport vehicle after exiting an autonomous assault amphibious vehicle during the Ship-to-Shore Maneuver Exploration and Experimentation (S2ME2) Advanced Naval Technology Exercise (ANTX) 2017 at Marine Corps Base Camp Pendleton, Calif. S2ME2 ANTX brought together industry, academia and the Naval Research and Development Establishment to demonstrate emerging technology and engineering innovations. Credit: (U.S. Navy photo by John F. Williams/Released)

Autonomous vehicles, augmented reality systems and advanced wireless networks were among over 50 new technologies showcased during the Ship-to-Shore Maneuver Exploration and Experimentation Advanced Naval Technology Exercise (S2ME2 ANTX) 2017—a series of amphibious beach landings held recently at Marine Corps Base Camp Pendleton in California.

S2ME2 ANTX brought together industry, academia and the Naval Research and Development Establishment—which includes the Office of Naval Research (ONR) and various research laboratories associated with the Department of the Navy—to demonstrate emerging technology innovations. The exercise involved hundreds of Sailors, Marines and Department of Defense civilian employees and contractors.

By using direct feedback and technical evaluations from participating warfighters and senior leadership in attendance, S2ME2 ANTX also may change the way the U.S. Navy and Marine Corps look at prototyping and rapidly acquiring technology.

"The large scope of this exercise allows the Navy and Marine Corps to make informed decisions about future generations of technology for use by the warfighter," said Dr. David E. Walker, ONR's director of technology. "This pairing of Sailors and Marines with scientists and technologists will help move innovation at a faster pace."

S2ME2 ANTX focused on five capability areas of amphibious operations: ship-to-shore maneuver; weapons fire support and effects; clearing assault lanes; command and control; and information warfare. Demonstrated technologies included unmanned and [autonomous vehicles](#) equipped with sensors to gather intelligence in the air, on land and underwater.

During each amphibious beach demonstration, unmanned surface and underwater vehicles approached the shore first, collecting intelligence about battlespace conditions—including threats and obstacles—providing an accurate picture of what warfighters would face when leaving their vessels and vehicles.

Several ONR- and Naval Research Laboratory-sponsored systems were demonstrated at S2ME2 ANTX, including:

- **BEMR Lab:** BEMR stands for Battlespace Exploitation of Mixed Reality. This cutting-edge [technology](#) merges virtual reality (complete immersion in a simulated/virtual world) and augmented reality (where virtual objects are imposed onto real-world vision), through the use of Oculus Rift goggles.
- **Mine Warfare Rapid Assessment Capability (MIW RAC):** A small quadcopter is outfitted with an ultra-sensitive magnetometer and sensors to detect mines and provide real-time data to a handheld Android device.
- **Coalition Tactical Awareness and Response (CTAR):** This system uses satellite imagery to conduct surveillance of large areas of open ocean. CTAR processes image data to generate detailed reports about maritime activity in these ocean areas, and can share this information with partners and allies.

Technologies that performed well at S2ME2 ANTX potentially could be featured at Bold Alligator 2017, a multinational series of amphibious exercises led by U.S. Fleet Forces Command and U.S. Marine Corps Forces Command, scheduled for the fall.

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