Students Vie for Autonomous Maritime System Dominance

ARLINGTON, Va. – Fifteen teams from three continents met on the beaches of Honolulu last week for the 2018 Maritime RobotX Challenge. The week-long biennial autonomous maritime system competition – co-sponsored by the Office of Naval Research (ONR), the Association of Unmanned Vehicles International Foundation and NAVATEK, a Hawaii-based company that designs ships, small crafts and other amphibious vehicles – wrapped up Dec. 15.

Like ONR's other sponsored robotic events – RoboBoat and RoboSub – this competition is designed to foster student interest in autonomous systems.

"This event rounds out the trifecta of maritime robotics competitions that ONR supports," said Kelly Cooper, a program officer in ONR's Ocean Battlespace Sensing Department and RobotX judge. "Each of these events is designed to build upon skills learned in previous competitions, and participation in all can help build a solid foundation of engineering skills."

Using a common boat platform called the Wave Adaptive Modular Vessel (WAM-V) surface craft, all teams must outfit their vessel with propulsion, sensor and control systems. These systems must be programmed to recognize and compute various data, to help the WAM-V make decisions autonomously as it traverses a course of seven increasingly difficult, maritime-related tasks.

"Besides having to accomplish a series of seven tasks without human interference, the vessels also have to deal with environmental issues like wind, rain and sun glare," said Cooper. "Being in an open maritime environment like the North Pacific Ocean provides teams with more challenges than just

what is laid out on paper in the mission requirements."

The vessels – without human or computer interaction – had to demonstrate navigation and control; obstacle avoidance; location and sequence; identification and docking; detection and delivery; underwater recovery; and situational awareness.

Teams also needed to create a website and video, write a technical design paper outlining their work and give a presentation.

Each task tested students' mechanical, electrical, computer and systems engineering skills – as well as their presentation prowess and teamwork – while competing for cash prizes totaling nearly $100,000 (which go directly to the school, usually to a robotic club or program).

"RobotX brings together the international student engineering community to showcase their know-how and help find new solutions to autonomous challenges faced by industry and the military," said Cooper. "In fact, they are truly helping to advance autonomous maritime technology through their fresh ideas."

National University of Singapore took this year's top prize, while Australia's Queensland University of Technology and Embry-Riddle Aeronautical University placed second and third, respectively.

U.S. teams included: Florida Atlantic University, Georgia Institute of Technology, Old Dominion University, University of Florida, University of Hawaii at Manoa, and University of Michigan.

International teams included: Australia's University of Newcastle and University of Sydney, China's Harbin Engineering University, Japan's Osaka Prefecture University, Singapore's Nanyang Technological University, and Taiwan's National Chiao Tung University.