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Feature Article

High-Speed Unmanned Craft Eyed for Surveillance Role

by Roxana Tiron

The U.S. Navy is investing \$55 million over six years to develop an unmanned surface craft that would conduct a wide array of missions in various marine environments.



The system, called Spartan, is a high-speed vehicle that can be operated remotely or run autonomously. Its missions would include littoral antisubmarine warfare, mine warfare, torpedo defense, and intelligence, surveillance and reconnaissance. Research and development work on Spartan has been underway for three years at the Naval Undersea Warfare Center.

Joseph Monti, head of the surface undersea warfare strategic planning and development office, said Spartan will use existing high-speed craft—seven or 11-meter Rigid Hull Inflatable Boats (RHIBs)—and integrate defense and weapon systems into those RHIBs.

Spartan, Monti said during an industry conference, is “only one component of the net-centric battle force that we are going to try to move forward. ... By using USVs [unmanned surface vehicles], we are really trying to take the operator out of harm’s way.”

Spartan was one of the programs selected by the Defense Department for the Advanced Concept Technology Demonstration, or ACTD program. Monti said he expects to have three or four Spartans, with multiple modules, by the 2006-2007 time frame. The program is sponsored by the U.S. Navy, the secretary of defense and the Singapore navy.

Contractors working on the program include Raytheon and Northrop Grumman.

Monti said the Spartan concept started three years ago. “We really wanted to see what were the requirements for unmanned surface vehicles,” he said.

“What we were trying to do was look at asymmetric threats—knowing what the UAV [unmanned aerial vehicle] programs were developing, knowing what the UUV [unmanned undersea vehicle] programs were developing—and how USVs could fit into the overall picture,” he said.

Depending on the length of the RHIB, Spartan can operate anywhere from eight to 48 hours on station with a range of 150-1,000 nautical miles. Its speed varies from 28 knots, up to about 50 knots. “Compared to a manned vehicle, it has a much higher speed and can operate at night,” Monti noted. It can carry payloads between 2,600 and 5,000 pounds.

“We’ve developed the core system, which we call the truck,” said Monti. “From that, we added a reconfigurable mission module and we have a plug-and-play environment.” The plug-and-play capability would allow a single surface combatant to control one or more USVs, either in remote or autonomous mode. Core subsystems will include surface search radar and advanced communications.

The surface search radar, required for navigation, can also detect incoming threats. The communications system is designed to allow any USV to act as a node for over-the-horizon communications. The truck also has a line-of-sight antenna. All the technologies on the core system, Monti said, are off-the-shelf products. “There are really no developments in those pieces, the development will be integration modules and signals we sent back to the mother ship,” he noted.

Mission Modules

The mission modules may include more robust communications equipment to support the high bandwidth required for data transmission and relay. Mission-specific modules would include intelligence, surveillance, reconnaissance, force protection, mine warfare and precision strike.

Spartan would inspect all incoming vessels and “sniff” for explosives, chemicals or other threats, said Monti. “With the force protection capability, you can not only watch it [the USV] from a ship, but you should be able to watch it from land, from a port or harbor.”

For the mine warfare module, the program office is planning to take existing technologies and figure out how to integrate them onboard the platform, according to Monti. “When you start to peel off the onion and look at the concept, it starts to become clear that if you want to do any kind of [mine] search, you need multiple USVs,” he said.

For precision strike, the idea is to integrate the surveillance and reconnaissance sensors with a missile system, said Monti. At this point, the Hellfire missile appears to be the likely choice. The U.S. Army has also expressed interest in a USV with precision strike capability for riverine operations.

The littoral antisubmarine warfare module “is constantly evolving,” said Monti. It would have a LHT/MK54 torpedo, dipping sonar and sonobuoy, among other subsystems. Later in the development cycle, Spartan may get rolling airframe missiles, 5-to 20-mm guns or the Avenger air-defense system, as well as mine neutralization packages.

However, figuring out how to swap one module for another is still an unanswered question for the program. So is affordability.

“If we can get to a point when a Spartan unmanned vehicle with sensors and weapons can get into a core figure of a million dollars or less, then if a sea-level combatant loses that asset it is not a major mishap,” he said. “We drive the cost, no doubt, of the sensors and weapons that we put on board.”

One concept being discussed is to launch USVs from the DD-X surface combatant, which the Navy plans to start buying next decade. The USV could itself deploy smaller UUVs or even UAVs depending on the need. Monti said that the biggest challenge would be to get all types of unmanned vehicles to coordinate their actions with each other.