Marine Warfighting Lab Develops Roadmap on Robotic Experiments

Recognizing the impact that the rapidly expanding capabilities of robotic systems will have in all the warfighting domains, the Marine Corps Warfighting Laboratory (MCWL) has developed a draft roadmap to prioritize its experimentation on the most immediate threats in a resource-constrained environment.

“We prioritize based on the perceived threat. … And the biggest threat right now is to the infantry squad,” said Jeff Tomczac, the deputy director of the science and technology division at MCWL.

The roadmap emphasizes interoperability, modularity and providing “enhancements” to the squads, because “we don’t want to go after something that will be a liability. You want a battle buddy and you want something that is as good or better than what you have,” Tomczac said in a conference call with two reporters.

In the quest for interoperability, MCWL has created the Tactical Robotic Controller, “the universal controller for all the unmanned, robotic, or autonomous systems that we experiment with,” for air, ground, water surface and subsurface systems, he said.

To illustrate the scope of that controller, Tomczac said, “we have an effort down in Norfolk with our connecters. It’s an LCM-8, a Mike boat, that is now fully autonomous.” They are working with the landing craft because “we see an important role for autonomy,” with surface connectors, Tomczac said.

The Marine Corps is working with the U.S. Army on the

controller “to create a set of standards that industry is going to have to adhere to for different robotic systems,” he said.

Tomczac said MCWL is working closely with the Army on other programs, which is important because the Army can buy systems in larger numbers, which increases the support for programs and reduces the cost for the Marines.

The need for a common controller has been recognized for years, he said, “otherwise your squad leader can have 10 different controllers in his pocket for each different type of system out there.”

The infantry squads already are operating a small quadcopter unmanned aerial system.

Part of the focus on interoperability is to ensure the various robotic systems can communicate with each other, know where the others are and “can work sometimes in tandem.”

The MCWL strategy also emphasizes “working on systems that are modular, so you can put systems on, take them off, depending on the mission, depending on what you want to do,” he said.

An example of that is a current program called the Expeditionary Modular Autonomous Vehicle (EMAV), which is a tracked, flattop vehicle, that can carry up to 7,000 pounds of supplies or infantry gear, Tomczac said. It also “allows us to put on different types of sensors, communications equipment, different kinds of weapons.”

It also can carry casualties from the battle line to a safe area or aid station, with only one Marine ensuring the wounded are “taken care of and protected,” rather than the two or more Marines needed to manually transport a casualty, he said. The unwounded Marine then “can return with supplies, ammunition and gear.”

MCWL has two EMAVs, will get two more shortly and has asked for another 10, which “will go out to an operational unit to conduct an extended user evaluation,” to help refine the requirements to move the prototypes into a program of record for acquisition, he explained.

MCWL already has deployed the vehicle multiple times with operational units for limited evaluations, mounting sensors and even weapons on it, he said.

The EMAV can be controlled by an operator or programmed to make runs between supply spots and infantry Marines forward. But the emphasis is on using artificial intelligence and machine learning to develop greater autonomy, Tomczac said.

However, when the robotic system is armed, “the goal is always a man in the loop. A man will make the decision whether an engagement occurs,” he said.

While MCWL works toward new robotic systems, Marine explosive ordnance disposal specialists and engineers already are using five unmanned ground systems, which range from a 600-pound ordnance neutralizer down to the Ultra-Light Robot, a seven-pound remote sensor that can be thrown into a room or sent into a tunnel to look for enemy soldiers or improvised explosive devices.