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Related Categories: Cybersecurity and Cyberwarfare; Military Innovation; Science and Technology

ROBOT DOGS MAY BE A SOLDIER'S BEST FRIEND

Scenes of four-legged machines assisting soldiers in battle are no longer strictly the realm of science fiction. At a recent event held at Nellis Air Force base, robotic dogs were deployed from an Air Force C-130 to demonstrate the ability to land in a conflict zone and perform scouting operations. A member of the Air Force's 621st Contingency Response Group has explained the utility of the exercise. According to Master Sgt. Lee Boston, "the dogs give us visuals of the area, all while keeping our defenders closer to the aircraft." The robotic canines, called Vision 60 UGVs (autonomous unmanned ground vehicles), are part of the military's Advanced Battle Management System, and are capable of serving as a platform for an array of sensors designed to augment warfighter capabilities. (*Asia Times*, September 10, 2020)

"SMART" BULLET DESTROYS CRUISE MISSILE

A recent test of the U.S. military's advanced battle management system concluded with an impressive demonstration. During a simulated battle, an Air Force bomber played the role of a near-peer adversary and fired a BQM-167 cruise missile; multiple sensors targeted the weapon and fed the information to a tank's Hyper Velocity Gun Weapon System. For the first time, a "smart" bullet shot from the tank was able to down the cruise missile. The test has generated tremendous enthusiasm among Pentagon brass, who previously viewed the capability as nothing short of "sci-fi." (*Air Force Magazine*, September 4, 2020)

3-D PRINTING NEURAL IMPLANTS

Brain computer interfaces, recently popularized by Neuralink, Elon Musk's computer brain interface company, (see *Defense Technology Monitor no. 16*) will have wide ranging applications for defense and, in particular, medical purposes. Yet constructing neural implant prototypes to help alleviate medical conditions such as spinal cord injuries is typically a time intensive, cumbersome, and extremely expensive process. Thankfully, an international team of researchers has developed a new method for building neural implants. Ivan Minev, Professor of Intelligent Healthcare Technologies at the University of Sheffield's Department of Automatic Control and Systems Engineering, said that the group's research "has demonstrated how 3-D printing can be harnessed to produce prototype implants at a speed and cost that hasn't been done before, all whilst maintaining the standards needed to develop a useful device." "The power of 3-D printing means the prototype implants can be quickly changed and reproduced again as needed to help drive forward research and innovation in neural interfaces," Minev said. (*Medical XPress*, September 22, 2020)

DIRECTED ENERGY COULD ADVANCE HYPERSONIC WEAPONS

Two of the Pentagon's prized cutting-edge military technologies, hypersonic weapons and directed energy (DE) capabilities, may be able to work together. Hypersonic weapons are restricted by drag and the heat produced by their velocity, which damages the structural integrity of the projectiles. Moreover, the structural integrity also limits how much hypersonic weapons can be altered in order to reduce such thermal stress.

Here, however, DE systems may be able to help. For close to half a century, the U.S. government has been experimenting with "energy deposition," the concept of beaming laser or microwave energy directly in front of a craft, thereby conditioning the air to allow for increased speeds and maneuverability. With vast improvements in miniaturizing DE systems, that technology may soon come to fruition. But, according to Dr. David Van Wie of the Johns Hopkins Applied Physics Laboratory, the technology - while promising - still presents challenges associated with weight and power requirements. (*The Drive*, September 24, 2020)

GHOST FLEET SUB HUNTERS?

Similar to the other branches of the U.S. military, the Navy is determining how unmanned craft can be incorporated to optimize its operations in times of war and peace. Some robotic ships have been used to hunt mines and conduct reconnaissance (see *Defense Technology Monitor* no. 22), and others to distribute sensor payloads across the fleet (See *Defense Technology Monitor* no. 38). However, as the service considers procurement of the next 40 medium unmanned surface vehicles (MUSVs), it is considering a new role for the robotic craft: to track and pursue enemy submarines. If the technology is mature enough, the planned "ghost fleet" of autonomous vessels would be much better suited for anti-submarine warfare (ASW) than are manned craft, since they could be active 24/7 in poor weather conditions. Additionally, the ships could free up the manned vessels for alternate purposes while reducing costs. (*Popular Mechanics*, September 24, 2020)