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Related Categories: Military Innovation; Science and Technology; Warfare; SPACE; China; Russia; Taiwan

NAVY DEVELOPING PORTABLE LASER WEAPON

Directed energy weapons have seen a spike in usage against drones over the last half decade, due to their success and near unlimited magazines. Now, the U.S. Office of Naval Research would like to develop a small, easily transportable system it is calling the Counter-Unmanned Air Systems High Energy Laser Weapon System (C-UAS HELWS) to add to its counter drone arsenal. Reportedly, the system will be approximately the same size as a .50-caliber machine gun and boast a 10-kilowatt laser. The Navy envisions the C-UAS being mounted on a small boat or tactical vehicle, with the system becoming operational between 2023-2025. (*Popular Mechanics*, October 8, 2021)

ISRAELI RIFLE OFFERS SIGHT BEYOND SIGHT

Networked components and Artificial Intelligence continue to permeate all facets of warfare — as demonstrated by infantry assault rifles in Israel, which just received a major upgrade. Defense contractor Elbit Systems has developed an ARCAS computer system that integrates data from an electro-optical rifle sight into a soldier's helmet-mounted eyepiece to provide enhanced real-time combat data. The system is capable of assimilating targeting information from other ARCAS users, identifying adversaries and allies, and providing enhanced range information, among other capabilities. The system can be used during the day and at night, and its abilities can be expanded using third party applications. (*Military & Aerospace*, October 8, 2021)

CHINESE SATELLITE IMPLOSION DEVICES?

Russia's recent anti-satellite missile test, which destroyed a satellite while leaving a significant amount of debris in orbit, was highly criticized by the international community. China, however, is working on the same sort of capability, albeit of a more sophisticated sort. The PRC has been testing an array of methods to destroy or disable satellites for years, and may have developed a technique to destroy a satellite while reducing the risk of careless debris fields. Rather than overt methods like lasering a satellite, using a robotic arm to hit or capture one, or destroying it with a kinetic missile, researchers from the Hunan Defence Industry Polytechnic in Xiangtan have outlined a new technology that can blow up a satellite in a controlled explosion from the inside — leaving the structure intact and causing no debris. Essentially, a small robotic bullet-shaped device carrying an explosive charge enters the target satellite's de Laval nozzle (the opening of the thruster used for orbit adjustments). Once inside, the device makes a "time-controlled, steady explosion" that resembles an engine failure. The maturity of the technology is not clear, but if fielded it would present a major threat to U.S. and allied satellites. (*South China Morning Post*, October 21, 2021)

ONE STEP CLOSER TO 3D PRINTED BATTERIES

While batteries have yet to take the same major strides as other technologies, 3D printed batteries are nonetheless making incremental progress (See *Defense Technology Monitor* no. 57). Scientists from the Swiss Federal Laboratories for Materials Science and Technology (EMPA) are developing 3D printed eco-friendly batteries capable of thousands of charging cycles and which are biodegradable after final use. Researchers claim the battery efficiency is "in-line with that of state-of-the-art carbon-based supercapacitors." "The new technology is not yet ready to go to market, but testing has demonstrated that the batteries remain functional after several months in storage and at a wide range of temperatures. (3DPrinting Industry, October 22, 2021)

"TAIWAN IRONMAN PROGRAM" TAKES OFF

Troops in Taiwan will have some extra weight lifted off their shoulders thanks to engineers at the National Chung-Shan Institute of Science and Technology. As part of the "Taiwan Ironman Program," researchers have produced a battery-powered exoskeleton that straps to a soldier's legs, providing increased speed, endurance, and ability to transport heavy objects. According to lead developer Jen Kuo-Kuang, the suits "can be used in field operations and movement of ammunition and heavy-duty weapons, and can increase the mobility and efficiency of the troops in wartime and post-disaster rescue missions." The follow-on version of the suit will permit wearers to increase the carrying weight to 220lbs. (*Wonderful Engineering*, October 27, 2021)