



DEFENSE TECHNOLOGY MONITOR

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

THE PENTAGON'S PLANS FOR SYNTHETIC BIOLOGY

The Department of Defense is constantly searching for methods to maintain America's technological advantage, and at times turns to nature (or synthetic biology) for help. The U.S. military has reportedly committed \$45 million to fund research to "engineer genetic responses into organisms" for use in various military applications. Uses include sensing for biohazards, the potential development of living camouflage, and self-healing paint. According to Dimitra Stratis-Cullum, who leads the biomaterials team at the U.S. Army Research Laboratory, "We're looking to build next-generation coatings where we can dovetail into additive manufacturing [essentially 3D printing] and other more point-of-need production technologies." However, Navy researchers are particularly focused on the ability to breed synthetic organism that can help facilitate the detection of enemy submarines. (*Defense One*, December 1, 2018)

MYSTERY SURROUNDS NEW RUSSIAN LASER

Russian President Vladimir Putin, usually boastful about his government's military advances, has been curiously tight lipped about the country's newest weapon. In December, the Russian military deployed a new laser system known as *Peresvet*. Little is known about the weapon, and its use largely depends on its wattage output; a lower powered laser would only be useful for targeting small drones and blinding electro-optical devices, while a higher powered one could be used for larger drones and small manned aircraft. Based on the available pictures, however, the *Peresvet* resembles the U.S. Navy's LaWS, or Laser Weapons System, a solid-state 30 kW laser deployed on warships to destroy adversary drones or small boats. (*Popular Mechanics*, December 5, 2018)

IMPROVING AMERICA'S RESILIENCE TO EMP

The feasibility of an EMP attack by a hostile power - entailing the detonation of a nuclear weapon high in the atmosphere above the U.S. in order to generate an electromagnetic pulse that could disable electrical infrastructure - remains hotly debated by policymakers in Washington. However, national security professionals are not taking any chances; California's Sandia National Laboratories has developed a massive EMP emitter, known as an ElectroMagnetic Environment Simulator, in order to test the effects of EMPs on electric devices. The non-nuclear device operates by firing stored energy at electrical components inside its test chamber in a simulation of an EMP attack. Depending on the effects, modifications can subsequently be made to the devices to make them more resistant to subsequent blasts. Some military equipment is already hardened against EMP, but the project is progressing based on the theory that modifying more electronic devices to become resistant to EMPs will reduce the likelihood adversaries will see the use of EMP against the U.S. as an attractive strategic option. (*Digital Trends*, December 13, 2018)

HOW CHINA AND RUSSIA HOPE TO OWN THE IONOSPHERE

China and Russia are teaming on experiments that heat Earth's upper atmosphere — a project with distinct military applications. During the Cold War, the Soviet Union developed the Sura atomic heating facility to modify the ionosphere by sending microwaves skyward along large antennae. Reportedly, the high-energy microwaves interact with the atmosphere and create low frequency radio signals that radiate toward the ground and even deep into the ocean, allowing for a method of submarine communication. During the recent Russian tests, conducted above the town of Vasilsursk in Nizhny Novgorod Oblast, China's Zhangheng-1 satellite captured data as the Russian side pelted the sky with energy.

The U.S. military ran a similar (and larger) High Frequency Active Auroral Research Program, or HAARP, in Alaska, but the project has since lost funding. Meanwhile, China is in the process of constructing a much larger facility allegedly capable of affecting the ionosphere above the whole South China Sea. The possible effects of ionosphere alteration are the subject of debate, but it has been posited that the technology could have a range of consequences, from altering the weather to affecting human brains. (*South China Morning Post*, December 18, 2018)