



Defense Technology Monitor No. 67

August 9, 2021 **Richard M. Harrison, Autumn Kearny**

Related Categories: Military Innovation; SPACE; Israel

U.S. MILITARY EYES TRAVEL-SIZE NUCLEAR REACTORS

In a conflict zone, one of the most difficult logistical problems to solve is how to provide sustainable energy. The Pentagon's proposed budget for the 2022 Fiscal Year hopes to address this problem by including \$60 million for a project to develop a new power source for Department of Defense (DOD) missions. "Project Pele" is specifically researching the possibility of a transportable nuclear microreactor capable of producing one to five megawatts of electricity, and lasting for a minimum of three years. However, while Pentagon officials are optimistic about the project, it still carries familiar risks, such as meltdowns, waste products, the proliferation of these technologies by hostile forces, and other malfunctions that could result in environmental contamination or political issues. Due to these risks, the Department is also exploring other energy technologies, such as space-based solar power beaming and new forms of hydrogen fuel cells, as well as seeking advancements in current technologies. (*The Drive*, June 3, 2021)

TANKER DRONE FUELS NAVY PLANE

In a historic first, the U.S. Navy successfully transferred fuel from a drone tanker to a manned aircraft in mid-flight. The milestone indicates an optimization that could render current refueling scenarios – in which fighter squadrons waste resources on manned jets carrying fuel as opposed to a weapons payload – a thing of the past. The unmanned tanker drone, a Boeing MQ-25 Stingray prototype, was said to be so quiet that the two test pilots could have a conversation while filling up in mid-flight. (*Breaking Defense*, June 7, 2021)

INVISIBILITY APPROACHES REALITY

Israeli defense tech innovator Polaris Solutions is working on acquiring invisibility on the battlefield — and achieving some impressive results. The company's newly designed unique camouflage solution, known as "Kit 300," is capable of nullifying multispectral imaging systems fielded by adversaries, rendering the wearer functionally invisible to digital surveillance. The durable waterproof dual-sided material is customizable, but the standard version has a side for hiding in thick vegetation and another for concealment in a desert environment. In addition to serving as camouflage, the material can also act as a splint, hypothermia blanket, or a stretcher that can support up to 250 kilograms (roughly 550 pounds). The Kit 300, referred to as *Jag Hide* internationally, is now being tested by Israel's defense industry and special forces units in both Canada and the U.S. (*Jerusalem Post*, June 15, 2021)

PENTAGON PLANNERS EYE DIRECTED ENERGY TO MAINTAIN SPACE SUPERIORITY

U.S. Space Command's Gen. James Dickinson captured it perfectly when he stated recently that "space is critical to all nations." "It is a shared interest to create the conditions for a safe, stable and operationally sustainable space environment," the General noted. Indeed, the U.S. relies on space to maintain a military advantage and capitalize on the multibillion-dollar space economy, but American space assets are vulnerable as Russia and China continue to develop anti-satellite (ASAT) weapons with the capability to destroy low-Earth-orbit satellites and deploy on-orbit weapons.

In order to counter these threats, Chief of Space Operations General Jay Raymond has confirmed that the U.S. is working on directed-energy weapons technology, based on the premise that "we have to be able to protect these capabilities that we rely so heavily on." Those plans are highly classified, and the General didn't provide details. Yet the admission is nonetheless notable, as the Space Force has seldom gone on record acknowledging the development of new weapons. (C4ISR.net, June 16, 2021)

PROTECTING AGAINST BULLETS WITH NANOMATERIAL

Bullet-stopping Kevlar vests may soon be a thing of the past. MIT and Caltech researchers have nanoengineered a carbon material composed of 14-sided polyhedrons (known as tetrakaidecahedrons) that may be stronger than steel. The scientists tested the strength of their creation by shooting the carbon structures with silicon oxide bullets traveling faster than the speed of sound. According to MIT's Carlos Portela, the tests demonstrated performance superior to Kevlar because the "shock compaction mechanism of struts at the nanoscale" performs better than "something that's fully dense and monolithic." The end result, he notes, is that "our material would be much more efficient at stopping a projectile than the same amount of mass of Kevlar." While the material is still in the early stages of development, it looks promising as a replacement for current bullet protection body armor systems. (*Tech Crunch*, June 26, 2021)