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Related Categories: Military Innovation; Science and Technology

DOD MAKES PROGRESS ON SPACE NUCLEAR PROPULSION

The Department of Defense has traditionally focused on conducting space domain awareness missions around Earth. But with adversaries increasingly concentrating on Moon missions, the need to quickly transit across space is becoming increasingly urgent. To that end, the Defense Advanced Research Projects Agency (DARPA) is in the process of developing a Demonstration Rocket for Agile Cislunar Operations (DRACO), which uses a nuclear thermal propulsion system to rapidly travel across space. DARPA awarded multiple contracts for the first phase of the DRACO project and requested a \$20 million increase from last year, totaling \$57 million, for the project in FY23. If nuclear propulsion can be achieved, it will "enable the United States to maintain its interests in space and to expand the possibilities for NASA's long-duration human spaceflight missions," the agency says. DARPA is planning to have a proof of concept in FY26. (*Defense News*, May 5, 2022)

NOVEL DEEPPAKE DETECTION NEEDED

Advancements in technology and a society that increasingly relies on social media have presented new vulnerabilities. One need look no further than the repercussions from the fake 2013 tweet about an injury sustained by President Obama that sent the stock market into a temporary tumble. Similarly, companies and foreign governments have suffered billion-dollar losses as a result of scams involving deepfakes (fabricated videos of people in compromising positions or stating falsehoods). Deepfakes in particular pose a serious threat because they can be used to manipulate people for political or monetary gain. According to Aishwarya Srinivasan, an IBM artificial intelligence and machine learning technology leader, deepfakes could be devastating for an individual, since because of "the advanced technology needed to even classify them as fakes, laymen, if caught up in deep fake treachery, would not even be able to prove themselves easily."

Given the increasing frequency and sophistication of deepfakes, it is difficult for detection technology to keep pace. Thankfully, a team of experts at the University of Tokyo found a way to use Self Blended Images as a method for deepfake analysis. The novel technique uses databases of synthetic data, allowing for algorithms to find more forgeries, in contrast to traditional methods that rely on spotting specific known face forgeries. So far, the team is achieving better results using the technology. However, the technique is in its early stages, and more research is clearly necessary in this field. (*Analytics India Mag*, May 7, 2022)

MAKING COMBAT VEHICLES CURRENT

Fortunately, the United States has not had to fight a mechanized war, such as the one taking place in Ukraine today, for several decades now. However, maintaining the ability to travel unhindered across land in any future combat scenario remains an important priority for the military. To that end, the Army's Futures Command Next Generation Combat Vehicles Cross-Functional Team (NGCV CFT) is designing prototypes of next-generation combat vehicles. The division hopes to develop several vehicles, including an Optionally Manned Fighting Vehicle (think a more flexible and lethal Bradley Fighting Vehicle), an Armored Multi-Purpose Vehicle (an updated personal carrier), and the Mobile Protected Firepower (a small tank). As part of the modernization effort, the NGCV CFT is focusing on incorporating feedback from the warfighter and utilizing a modular approach that helps adapt the new vehicles with any future enhancements. (U.S. Army, May 6, 2022)

CHINA ADVANCES THE AUTOMATION OF ITS DRONE SWARMS

Drones have become an essential component of modern warfare, as seen in recent conflicts across Europe and the Middle East. Swarms of drones that can operate in foreign environments, and do so without the support of satellite-based navigation, are the next evolution in the technology. A team of researchers from Zhejiang University has made progress toward creating autonomous drone swarms that use collision avoidance software, allowing them to navigate uncharted terrain without GPS-like guidance. Their particular experiment was geared toward mapping disasters and surveying damage, but if perfected the algorithms for these drones could be used for military purposes as well. (*Interesting Engineering*, May 5, 2022)

WANTED: BIG TECH IN A SMALL PACKAGE

As U.S. adversaries continue to make advancements in their drone capabilities, the DoD is ramping up its investments in counter drone technology. In particular, U.S. Special Operation Command (SOCOM) has requested upgraded electronic warfare (EW) equipment that can prevent the detonation of roadside bombs and mitigate threats from drones that fly, sail, or drive. Current EW systems are too large, too heavy, and consume energy at high rates – limiting their versatility and use. Increasingly, warfighters are requesting a next generation system that is significantly more portable and weighs less than 40 lbs. SOCOM is hoping to have such a new system online in 2025, in order to "reduce [the] burden to our operators and incentivize autonomy as much as possible." (*Defense News*, May 18, 2022)