



DEFENSE TECHNOLOGY MONITOR

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Related Categories: Arms Control and Proliferation; Europe Military; Military Innovation; Science and Technology; Warfare; SPACE; China; Japan; Russia; Ukraine; United States

GLASS BEATS METAL

Researchers from a consortium of universities have introduced a novel substance with strength properties superior to that of steel — one of the strongest materials around. The glass-based matter, jointly developed by scientists at the University of Connecticut, Columbia University and Brookhaven National Lab, is approximately four times the strength of steel while being only one fifth of the weight. To craft it on the molecular level, researchers had to develop techniques that eliminate imperfections in the glass production process. Traditionally, glass is a relatively weak material that is seldom used in construction or military applications; however, the new substance could have a number of military uses (such as body armor), particularly if researchers are able to fabricate it at larger scale. (*BGR*, October 5, 2023)

MODERNIZING THE F-35'S MISSILE

U.S. military strategy has long been guided by the need to maintain air superiority in combat zones. In the latest effort related to this enduring mission, the United States is working to augment the power of the F-35 fighter jet through a new Stand-in Attack Weapon (SiAW) missile system. The SiAW, designed to expand American anti-access/area denial capabilities, can be carried internally by the F-35 and used to destroy hardened targets at an longer range than traditional missiles (which typically have a range of 30 miles). If design and testing is successful, the SiAW is projected to be operational by 2026. (*Popular Science*, October 7, 2023)

FORGING STEALTHIER STINGERS

The war in Ukraine has highlighted the effectiveness of American-made Stinger shoulder-fired missiles—which are being provided to Kyiv to help deter Russian aerial attacks and surveillance operations. Unfortunately, the U.S. no longer manufactures these weapons, instead relying on the refurbishment of older versions. Over the next five years, however, the Pentagon plans to develop two prototypes as potential replacements for the Stinger, and to beef up the system's existing design by enhancing the ability of the weapons to circumvent electronic warfare and adversarial jamming systems. (*Defense News*, October 9, 2023)

JAPANESE READIES ITS RAILGUNS

Over the past several years, in order to deter Chinese and North Korean aggression, Japan's Maritime Self-Defense Force has sought to develop advanced offensive and defensive capabilities. This line of effort has included innovative programs that focus on unmanned amphibious assault and surface vehicles and anti-torpedo capabilities. Notably, however, Japan is also exploring the potential of deploying and operationalizing railgun technologies. Unlike most kinetic chemically-propelled weapons systems, electromagnetic railguns can fire steel projectiles at hypersonic speeds, posing a direct threat to maritime vessels and land-based features. Once they are operational, Japan will presumably deploy such military systems on its naval destroyers and amphibious assault vessels. (*Asia Times*, October 19, 2023)

CHINA'S PLANS TO UPGRADE ITS QUANTUM SATELLITES

Unlocking the secrets of quantum physics offers immense potential for military communications systems, and governments around the world are increasingly seizing the moment. The People's Republic of China recently announced a planned upgrade to their revolutionary quantum encrypted communications satellite, first launched in 2016. The current Micius satellite system is in low-Earth orbit and has sent quantum encrypted messages distances of several hundred miles. By contrast, the planned system will be placed in a much higher orbit, akin to U.S. GPS satellites with the ability to send quantum encrypted messages several thousand miles. However, several technological hurdles still need to be overcome before the new, more robust system can become operational. (*space.com*, October 30, 2023)