



Defense Technology Monitor No. 82

October 27, 2022 **Richard M. Harrison, Samuel Havard**

Related Categories: Cybersecurity and Cyberwarfare; Military Innovation; Missile Defense; Science and Technology; NASA; China; Europe; North America

DEFENDING COMMERCIAL SATELLITES

Commercial satellites are becoming increasingly interconnected with national security and military operations. Look no further than the role of SpaceX's Starlink satellite constellation in Ukraine's defense against the ongoing Russian invasion. Accordingly, both U.S. Space Command (SPACECOM) and the National Reconnaissance Office (NRO) are investigating whether to protect commercial satellites from enemy attacks. Spokespeople from the two agencies have recognized the importance of private space infrastructure to their operations. Moreover, commercial space assets assisting military operations are likely legitimate targets under international law, making a potential attack on them a credible threat. However, there are legitimate doubts if the U.S. military would defend commercial space assets from counterspace attacks, for several reasons. For instance, hacking guidance systems or blinding a kinetic attack could reveal American defensive space capabilities to our adversaries, while developing a resilient architecture nullifies the need to care about losing a few satellites. (*Breaking Defense*, September 1, 2022)

CHINESE SOLAR DRONE TAKES FLIGHT

High in the atmosphere, where the sun's rays are more direct, solar power has the potential to power long-distance flying vehicles, including drones (for more, see *Defense Technology Monitor* no. 69). A new unmanned aerial vehicle design known as QMX50, created by the Aviation Corporation of China, is testing out the feasibility of this concept, with promising results so far. QMX50 is completely solar powered and recently completed a test flight of 26 minutes, landing without any damage to the aircraft's key equipment. QMX50 is intended to operate at high altitudes near the edge of space for long durations. It has a multitude of potential applications, including reconnaissance missions and environmental monitoring. (Xinhua, September 4, 2022)

BRITISH QUANTUM SUBMARINE DETECTION

Given the sensitivity of phenomena at the subatomic level, quantum-based sensing technology has immense promise in detecting the minute disturbances and irregularities in an observed environment. The British military is now interested in exploiting this fact by using quantum clocks in order to detect objects underwater, including submarines. These clocks, which measure time by observing the movement of atoms, are so sensitive that they can detect a subtle gravitational disturbance caused by a nearby enemy submarine. While quantum technology has incredible sensing potential, Defence Science Technology Laboratory (DSTL) principal scientist Dr. Susannah Jones notes that more development is still necessary in order for this technology to be deployed outside of the lab. "You have to shield [the sensor] from all of the other forces to a high degree of accuracy," she explains. (*The Telegraph*, September 7, 2022)

A NEW MISSILE SYSTEM FOR THE ARMY

The U.S. Army is committed to modernization, and is currently in the process of replacing its Tactical Missile System with the Precision Strike Missile (PrSM) – a process slated to be completed by 2023. The new missile system will be deployed in an incremental fashion in order to gradually incorporate the system's evolving capabilities, which include the ability to target moving objects with high precision. According to Hunter Blackwell of the Army Combat Capabilities Development Command's Aviation and Missile Center, "This is really going to be a paradigm change for the artillery community. We're changing from attacking a place — a coordinate — to attacking things: attacking specific targets that may be moving on the battlefield." The first iteration of the PrSM will reach targets in the range of 500 kilometers, but later generations will extend to 1,000 kilometers utilizing supersonic ramjet technology. (*National Defense Magazine*, September 20, 2022)

TARGET PRACTICE IN SPACE

Currently, much of the Space Force's training occurs primarily in virtually simulated environments. However, the service is now looking into more direct ways to train its guardians in the physical dynamics of space. In September, Space Force conducted a training exercise dubbed "Black Skies," which tested the ability of its servicemembers to target and jam satellites in a small swath of space 22,000 miles above the U.S. Midwest. Similarly, the service has an interest in establishing a "testing range" in space to experiment in physically maneuvering satellites and other space assets in order to avoid enemy attacks. (*Task and Purpose*, September 29, 2022)