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Related Categories: Cybersecurity and Cyberwarfare; Intelligence and Counterintelligence; Military Innovation; Missile Defense; Science and Technology; Warfare

EAR-SILENT DRONES ON THE HORIZON?

In a major breakthrough, researchers at MIT University have demonstrated a prototype aircraft that can fly quietly using a propulsion system without any moving parts. According to the craft's developers, wires on the front of the plane generate an electrical field that removes electrons from air molecules, creating positive particles called ions. As the ions disperse, they crash into - and transfer energy to - normal air molecules, allowing the prototype to fly via "ionic wind" without relying on propellers. The proof of concept has already been tested, and once further developed the craft design could prove useful for military surveillance applications. (*U.S. News & World Report*, November 21, 2018)

RUSSIA'S DREAM OF A HYPERSONIC BULLET

The United States and other nations are increasingly concerned by the challenge of hypersonic missiles. However, Russia is already working on the next iteration of the hypersonic threat: smaller-scale hypersonic bullets. Russian defense contractor Lobaev Arms claims that, with Kremlin support, the company will be able to manufacture sniper rounds capable of traveling over Mach 5 within a year. If true, the development would give Russian snipers a major advantage in combat, because the speed of the round would eliminate the need to make any of the typical minor adjustments now necessary for sharpshooters to employ to improve accuracy. However, hurdles remain; according to experts, in order to be effective, a weapon capable of shooting hypersonic munitions would need to overcome added weapon weight, increased noise, and greater recoil. (*The National Interest*, November 22, 2018)

DIAMONDS IMPROVE DRONE FUEL

Private sector companies and the U.S. military often struggle to keep drones aloft for long durations. Refueling them with ground-based lasers is becoming a regularly explored option (see *Defense Technology Monitor* No. 34), but one of the limitations of such a recharge is maintaining tight beam control. Here, researchers believe that diamonds may be able to help. Swiss company LakeDiamond has demonstrated that shooting the laser beam through a manufactured diamond helps retain beam quality, preventing atrophy over long distances. To date, tests have been conducted on smaller scale systems, but are expected to scale up in power over the next several years. The company has already secured funding to attempt powering satellites traveling in low earth orbit. (*Wired*, November 24, 2018)

NON-LETHAL LASER TALKS AND BURNS

Not all directed energy systems are designed to destroy or dazzle targets. The Pentagon is now investing in a non-lethal directed-energy weapon known as the Scalable Compact Ultra-short Pulse Laser Systems (SCUPLS) for use in crowd control. The dual laser systems has one component that shoots ultra short pulses, which generates a ball of plasma near the target, and a second that then hits the plasma, creating an audible simulation of human speech or mimicking the effect of a flash bang grenade. If adversaries are noncompliant, the lasers are also capable of heating the skin as a final deterrent measure — although they do so without causing any lasting effects. The weapon system has a range of 330 feet, and is designed for deployment on a tactical vehicle. (*Newsweek*, November 29, 2018)

INFANTRY TO GET UPGRADED HEADSETS

The Army could soon supply infantry troops with innovative heads up displays to improve combat awareness. The service is in the process of designing Integrated Vision Augmentation Systems (IVAS) — similar to "Google Glass" or Microsoft's "HoloLens" project — that provide soldiers with several relevant data streams projected onto a visor, including superimposing targets on the field of view and aiding in night vision. However, one of the most impressive capabilities of the IVAS isn't yet available; when fully realized, the personal display helmets will use Artificial Intelligence (AI) to identify priority targets and automatically disseminate the message via secure communication to cue a soldier with a preferable weapon to handle the threat. (*Breaking Defense*, November 30, 2018)