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Related Categories: Cybersecurity and Cyberwarfare; Military Innovation; Missile Defense; Science and Technology; China

STARGAZING MAKES A COMEBACK
In the era of enhanced electronic warfare, the U.S. military has its fighters looking upward to figure out where they are headed. Typically, fighter jets have been guided by information from a constellation of highly precise global positioning satellites. However, with the growing ease by which adversaries can spoof GPS signals (sending false coordinates or jamming the signal altogether), celestial navigation has once again increased in relevance. The ability to manufacture increasingly capable and compact star sensor systems has likewise made the method more attractive. Currently, celestial tracking is being used mostly by aircraft, but the practice could also be added to missiles and other weapon system that operate in contested environments in the future. (*International Business Times*, January 3, 2018)

WHAT DRONES CAN LEARN FROM... BATS?
Traditional quad copter and fixed wing drones have become increasingly ubiquitous in both commercial and military use. But these vehicles remain limited in their maneuverability, and there is room to innovate. Enter the DoD's Defense Enterprise Science Initiative, which seeks to foster collaboration between academia and the private sector "with the aim of discovering novel solutions to challenging defense and national security problems." And this mashup is producing interesting results. By analyzing the flight of bats, one team from Caltech University has developed a drone that mimics the animal's agile body to enhance the maneuverability of unmanned autonomous systems. The military grant has also worked to solve the problem of limited power sources for smaller UAVs. Unlike having to carry a traditional power cell, researchers are developing ways to transfer power wirelessly through "power beams." Instead of having to return to a charging station, drones may soon be recharged by a laser pointed at an onboard receptor. (*Newsweek*, January 5, 2018)

DRONE SWARMS ARE COMING
Increasingly, U.S. military planners will need to be prepared to combat new drone tactics. Earlier this year, the Global Fortune Forum in China showcased the largest swarm of drones ever on record, with 1,180 drones flying in sync for nine minutes in formation with mere centimeters separating the drones. The impressive display demonstrated the military applicability of drone swarm use. The company responsible for the swarm, Ehang UAVs, has stated that the drones are capable of flying autonomously, landing if there is a problem, and self repair. Reportedly, China is developing applications for drone swarms, including to seek and destroy enemy missile launchers during urban combat and high altitude missions, where the swarm would accompany spy planes to map terrain and identify electromagnetic activity. (*Popular Science*, January 8, 2018)

CHINA PROPOSES DUAL USE SPACE LASER
Space is literally littered with junk, particularly in low Earth orbit, that poses a risk to both U.S. civilian and military satellites, and there are few effective methods to remove space debris. Recently scholars from the Chinese Air Force Engineering University sparked some controversy after they advocated using a space-based laser to destroy space junk - something NASA contemplated back in 1996. In theory, the laser would burn off part of a piece of space junk and the resulting force would send the majority of the object on a de-orbital trajectory, allowing it to burn up as it enters the Earth's atmosphere. The problem inherent in the concept, however, is that China could also use a space laser on targets such as U.S. military satellites in high orbit regimes, which are currently out of the range of ground-based lasers. (*Popular Mechanics*, January 17, 2018)

IRON MAN EN ROUTE
The U.S. military's Special Operations Command (USSOCOM) is paging Tony Stark. Since 2013, the military has had an open proposal seeking requests to design an Iron Man-inspired body armor suit. The goal is to provide special operations soldiers with enhanced abilities - including superhuman strength, bullet mitigation, and extrasensory systems - while being able to maintain agility. There are several exoskeleton programs currently under development in the U.S. military, and SOCOM hopes to have one - a prototype of the Tactical Assault Light Operator Suit (Talos) - available this year.

Meanwhile, new technological developments have led to promising types of armor, including one that turns from liquid to solid when a current is applied. The incorporation of artificial intelligence and advanced sensory systems may also lead to future performance enhancements. (London *Daily Mail*, January 24, 2018)