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Related Categories: Energy Security; Europe Military; Military Innovation; Science and Technology; Global Health; United Kingdom ; United States

TALKATIVE COMBATANTS, POWERED BY AI

The trendline for military training has leaned heavily into virtual environments of late. This is so for good reason, given their reduced cost and availability. However, real world training exercises are still very necessary to prepare the warfighter for combat scenarios, and work is progressing in this domain as well – albeit with upgrades. The UK Ministry of Defense has been utilizing the SimStriker robotic target system, developed by manufacturer 4GD, to capture the accuracy and effectiveness of simulated combat. SimStriker robots are capable of responding vocally to attacking soldiers, and even retaliating with non-lethal rounds. To make the simulated engagements even more realistic, the robotic adversary will incorporate OpenAI's ChatGPT language model to provide more lifelike conversational interactions, harnessing advanced AI language technology to improve military readiness. (*Interesting Engineering*, December 1, 2023)

TRAINING VIA ENHANCED LASER TAG

The U.S. Army is seeking to replace its decades-old MILES laser-based training system with new technology. The existing system, which operates in similar fashion to the wildly popular recreation game "laser tag," has come under criticism for its limitations, such as not properly modeling indirect fire and only supporting around 45% of a brigade combat team's training capabilities. To fill the gap, Lockheed Martin is developing a GPS-based system called SIMRES that uses lightweight sensors mounted on weapons and soldiers' helmets. This would provide more data on shooter performance like target acquisition time and friendly fire incidents, in addition to more accurately simulating force-on-force engagements. Ideally, a new system will be in place by 2027. (*National Defense Magazine*, December 29, 2023)

THE PROMISE OF QUANTUM BATTERIES

With all the hype surrounding quantum technology typically focused on the benefits of advanced computing power and speed, it's easy to overlook another potential gain: the vast energy storage potential of quantum batteries. However, a novel technology under development by Planckian, an Italian startup, uses qubits for energy storage, promising exceptionally rapid charging speeds. These devices differ from traditional batteries in their potential to charge faster as they scale up in size, due to a phenomenon known as super-absorption. Interestingly, the battery size is inversely proportional to the speed at which the battery charges, so to get a really quick charge all you require is a big battery. This emerging field, supported by significant pre-seed funding for Planckian, could revolutionize energy storage across various applications, ranging from commercial and military grade phones to vehicles to weapon systems. (*EETimes*, December 21, 2023)

NEW, MORE VERSATILE VACCINES

Emerging technologies aren't just spurring advances in battlefield capabilities. Related sectors and industries are also benefiting. In health care, for instance, technology is propelling advances in things like vaccine manufacture, with researchers from the Chinese Academy of Sciences developing a non-invasive, inhalable powdered vaccine that provides enhanced protection against respiratory viruses. The vaccine, which can be used to guard against COVID-19, is administered in an aerosol form, delivering microcapsules of the antigen deep into the lungs. Ironically, the concept is based on how small particulates resulting from burning fossil fuels remain resident in human lungs for long durations of time and cause irritation. The major benefit of the new vaccine is its versatility. Its powder form, as well as its capacity to be stored at room temperature, make it a cost-effective alternative to traditional vaccines, potentially increasing accessibility, especially in remote areas. (*South China Morning Post*, December 17, 2023)

DRONES OF INFINITE DURATION

Microwave energy and wireless power transfer have made major advances in recent years, setting the stage for significant improvements in a variety of fields. Drone capabilities are one of them. As part of DARPA's Persistent Optical Wireless Energy Relay (POWER) program, contractors are attempting to create a system of "webs" for powering drones via a network of ground-based lasers, potentially enabling them to stay airborne indefinitely. The reason for the program is simple, according to DARPA representatives: "Offboarding energy storage and generation from platforms opens up a novel design space where platform capabilities are no longer dependent on the quantity of fuel carried. This provides an opportunity for small, inexpensive distributed platforms with significant capabilities such as unlimited range or endurance." If successful, the capability could revolutionize the use of drones for intelligence, surveillance, communications and other applications requiring extremely long endurance flights. (*Defense One*, December 19, 2023)

