**Researching Technologies for Multidomain Battles**

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**For the fight of the future, the Army's investments in science and technology target soldier performance and protection.**

Army leaders have outlined the battlefield of tomorrow. It isn't a static war, like the fight of the last 17 years in a counterinsurgency environment. The battle will involve smaller, more dispersed mobile Army teams operating in dense urban environments. Soldiers will have to manage in megacities, with hundreds of thousands or millions of people competing for the same electromagnetic spectrum, water, food and roads. The gear that they rely on for protection, as well as their own abilities to perform—their warfighter lethality—needs to reflect the demands of this future battlefield.

To improve lethality, Army Science and Technology is focusing on several key areas, including soldier and squad weapons; soldier protection and equipment; situational awareness; soldier-optimized performance; prolonged field medical care; and training, according to a recent report from the U.S. Army Acquisition Support Center, The Changing Face of Soldier Lethality. The report was prepared by two Army researchers, Karen Burke and Col. Eric Wagar, USA. Burke is the acting director of the soldier lethality portfolio, Office of the Deputy Assistant Secretary of the Army for Research and Technology (DASA R&T) and program analyst, U.S. Army Research, Development and Engineering Command. Col. Wagar is the director of the DASA R&T Office of the Deputy for Medical Systems and the medical portfolio director.

"Soldiers will operate with shorter lines of sight and a reduced standoff advantage in their intelligence, surveillance and reconnaissance and long-range strike capabilities," the researchers stated. "Soldiers will face large, culturally diverse populations of noncombatants with whom they will need to communicate and who they will have to monitor for threats and protect from engagements, particularly in increasingly crowded urban regions such as coastal cities. Dense electromagnetic environments also will make it difficult to establish and maintain persistent, trusted communication links."

Army Science and Technology (S&T) has the responsibility to modernize the service's legacy weapons ammunition and accessories. However, the researchers warned that any improved weapons would be competing against adversaries that employ partial and full defilade, which protects their adversarial positions and equipment and limits the Army's effectiveness under small arms direct fire and indirect fire systems. To combat this threat, the Army will invest in research into lighter-weight materials, enhanced ammunition design and penetration, modular component designs and integrated enabling technologies, including fire controls, optics and powered rails. Army researchers will work to reduce the accuracy, size and weight of these adversarial counter-defilade capabilities. The researchers also will develop counter-defilade for Army soldiers and small units, alongside more lethal weapons.

As emerging directed-energy and ballistic threats increase, and the need to improve warfighter protection increases, the Army will examine bio-enabled and protective materials for clothing and equipment. Researchers will also look into so-called signature management technologies that reduce the probability of a warfighter "being seen and heard because of the thermal, electromagnetic or visual characteristics of the gear they wear and carry," the report noted.



Army Spc. Hayden Harnek (l) aims an M240B machine gun as Army Spc. Josh Rowe assists during training at Fort Polk, Louisiana, on February 15. The Army is looking into lighter-weight materials, enhanced ammunition design and integrated technologies, all to increase warfighter lethality. Army photo by Staff Sgt. Armando R. Limon



With an M3 anti-tank weapon on his shoulder, Army Spc. Austin Helms stands guard at Fort Polk, Louisiana, on February 15. The Army's science and technology research is focusing on increasing soldier lethality through improved situational awareness, among other strategies. Army photo by Staff Sgt. Armando R. Limon