

Force Transformation

10-14 Science and Technology

The Army's Science and Technology strategy is to develop technologies that will ensure that the Army has overmatching technical capabilities now, and remains dominant in the future. The synchronization between the Army's Science and Technology (S&T) strategy and the Warfighter's needs enhances the Army's ability to execute contingency operations, and its ability to simultaneously organize into full spectrum organizations with the speed and agility necessary to create a modular force capable of moving strategically as part of a Joint Force. Success in current operations requires the enhancement of the capabilities of our Current Force in real time. The Army Science and Technology program is developing technologies that will enhance the Current Force while enabling the Future Force.

The Soldier remains the centerpiece of the S&T strategy to mature emerging technologies for the Future Force and, where feasible, to "spin out" selected technologies directly to the Current Force.

Army S&T supports deployed Soldiers through three mechanisms: capitalizing on future technology; exploiting transition opportunities from on-going S&T efforts; and leveraging the expertise of scientists and engineers to develop solutions for unforeseen problems. The following are examples of the three approaches:

Capitalizing on future technology. Although the Army does not have a Directed Energy (DE) Application Program of Record, the Army does support funding efforts to mature and demonstrate DE technologies as potential solutions for identified capability gaps in counter-IED (Improvised Explosive Device) and platform/area protection, with a goal of minimizing and/or eliminating the threats posed by rockets, artillery, mortars (RAM) and IEDs.

Exploiting technologies from current investments. Radio frequency (RF) jamming technology solutions from investments in our electronic warfare technology program have been incorporated into the family of Warlock systems being used to defeat radio-controlled IEDs today.

Leveraging S&T expertise to solve unforeseen problems. Engineers at the Army Research Laboratory (ARL) and the Tank-automotive and Armaments Command's (TACOM) Research Development and Engineering Center (RDEC), using their extensive experience in designing armor for Army combat vehicles, rapidly responded to a critical need by designing and demonstrating add-on armor survivability kits for High Mobility Multipurpose Wheeled Vehicles (HMMWVs) and Mine Resistant Ambush Protected (MRAP) vehicles, in order to provide enhanced survivability.

The mid-term priority is the development and demonstration of technologies for spiral insertions into Current and Future Forces focusing on network enabled Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR); lighter weight materials; more energetic lethality; increased survivability; advanced networks; and hybrid propulsion.

In the far-term, Army S&T will provide revolutionary new technology concepts for completely autonomous ground and air vehicles; immersive training and simulation environments with "Holodeck" potential; compact power sources that are a factor of 20 times smaller and lighter than current power sources; and investment in nanoscience, biotechnology, smart structures and materials-by-design.

U.S. forces encounter IEDs every day in Afghanistan, Iraq, and other locations. The IED has become the preferred weapon for terrorists. The current methods of detection, identification, and destruction bring Explosive Ordnance Disposal (EOD) personnel within deadly range of the

IED. There are a number of technical solutions that have demonstrated their effectiveness in the current Areas of Operations (AOs). These systems use new technologies to detect, identify, and destroy a wide range of IEDs and Explosively Formed Penetrators (EFPs). These systems can be produced and delivered to the field to reduce the threat to operational forces within theater.

The Army's applied research efforts in Directed Energy are exploring technologies that will address Force Protection and Force Application by providing ultra-precise IED and EFP engagement at effective stand-off ranges.

The terrorist adversary has demonstrated a willingness to expose noncombatants and cultural icons to damage in order to strike at U.S. forces. U.S. military forces have relied on both lethal and non-lethal kinetic weapons to provide crowd control, area use denial, and protection of designated assets. Nonlethal kinetic systems have potential lethality within specific ranges of engagement but are limited in capability beyond certain ranges. Often they cannot be used to defend to the maximum effective range of adversaries' personal weapons. Directed energy solutions, on the other hand, give U.S. forces safe, manageable, scalable, and non-lethal methods to control areas of interest and disperse threatening crowds as viable alternatives to the use of both lethal and non-lethal kinetic weapons.

In recent years, there have been advances in directed energy applications, research, and development. In 2001, the Army initiated a technology development program, with the goal of demonstrating Solid State Laser (SSL) technology to weapon scale powers of greater than 100 kilowatts (kW). These SSLs have the potential to defeat rockets, artillery, and mortars (RAM) and precision guided munitions. In 2009, the Army, in collaboration with the Air Force and the OSD High Energy Laser Joint Technology Office (HEL JTO), demonstrated the 100 kW SSLs. Solid State Lasers have the potential to precisely focus high energy to defeat RAM.

The sense of Congress is that Defense laboratories are critical to national defense. The central theme of emerging legislation has been that special attention must be given to authorities and processes to enhance the laboratory director's ability to operate in a fast moving environment of discovery, development and rapid technology transition to the Warfighter. Successful efforts within Army laboratories demonstrate the success of local control by laboratory directors over infrastructure issues, and in particular personnel issues.

WE THEREFORE RESOLVE to urge the Administration and Congress to:

- Support and fund Advanced Technology Development focusing on maturing critical Future Force modular technology enablers:
- Unmanned Systems (ground and air)
- Directed Energy applications
- Countermeasures for IEDs and EFPs
- Counter-Rockets, Artillery, and Mortars
- Network Battle Command Systems
- Support Applied Research to provide spiral insertion technologies to Future Force systems:
- Solid State Lasers
- Lightweight Armor
- Kinetic Energy Active Protection System
- Strengthen the infrastructure of Defense laboratories, and in particular, Army laboratories, through legislation and delegated authorities that optimize the ability of laboratory directors and commanders to provide rapid and timely technology solutions to Warfighter needs.