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STATEMENT BY

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COMMANDING GENERAL
U.S. ARMY MATERIEL COMMAND

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Introduction

Mr. Chairman and Members of the Committee, thank you for the opportunity to appear before you to discuss the Army's laboratories and Science and Technology (S&T) efforts. I want to thank the Members of this Committee for your valuable role in making our Army the preeminent land combat force in the world. Your support of our Transformation goals has been vital to our progress. We welcome your continued advice and support.

Army Transformation is multi-faceted. Comprising many of those facets are the numerous science and technology efforts being pursued across our Army, in collaboration with academia and industry. Those efforts do not stop at our shores. We are working closely with our allies on projects for mutual benefit. From sensors to simulators, from bullets to batteries, from ammo to armor, Army Transformation is being accelerated through integrated efforts, creating invaluable synergy to ensure we provide our nation a dominant land force capability as well as support our homeland defense.

Out of the lab and into the hands of our soldiers is the number one priority of our S&T work. Faster is better. We are reaching out and connecting with experts in fields that a few years ago might not have been associated with the United States Army. For example, we approached

Hollywood, the game and entertainment industry a few years ago, to create a center where simulation would really be “outside the box.” Another great example is the Institute for Soldier Nanotechnology at the Massachusetts Institute of Technology, where we are researching a wide range of possibilities, from climate control clothing to biomedical monitoring.

It would take several books to cover all we are doing in S&T and expect to do in the future. Therefore, it becomes practical to focus on three areas for discussion at this time – Efforts, Infrastructure and People. First, we will define some of the critical efforts that are key to Army Transformation – to the Objective Force, and within that, the Future Combat System (FCS). Secondly, we will lay out the extraordinary capabilities that reside in our S&T infrastructure, which includes our in-house laboratories and our research, development and engineering centers. The third area that significantly impacts all areas is the people arena, as well as how we organize our people.

Efforts Supporting Army Transformation

The Army is fundamentally changing the way we fight and is creating a force that is more responsive to the strategic requirements facing our Nation. We are building a joint precision maneuver capability that can enter a theater at the time and place of our choosing, maneuver at will to gain positional advantage, deliver precise joint fires and, if necessary, to close with and destroy the enemy.

The Objective Force is an army designed from the bottom up around a single, networked, integrated Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) architecture that will enable us to link with joint,

interagency, and multi-national forces. It will be a rapidly deployable, mounted formation, seamlessly integrated into the joint force and capable of delivering decisive victory across the broad spectrum of military operations.

The Objective Force will leverage and deliver with precision the combat power of joint and strategic assets. It is a capabilities-based force that rapidly responds to the requirements of the strategic environment, no matter what the mission, the threats, or the risks. The Objective Force will be responsive, deployable, agile, versatile, lethal, survivable and sustainable.

A critical piece of the Objective Force is the Future Combat Systems (FCS) which is on track to be fielded by the end of this decade. There will be a Milestone B decision in May 2003. FCS is being developed in partnership with the Defense Advance Research Projects Agency (DARPA). In addition, the Army has selected and employed an industry team to serve in the role of Lead System Integrator (LSI), which will ensure that all the best and most innovative sources of technology are leveraged and exploited. The FCS is a synergistic mix of manned and unmanned systems being developed and fielded as a complete family to achieve the warfighting capabilities the Nation requires to defeat adaptive, asymmetric, conventional, and unconventional adversaries.

The Army is placing similar emphasis on the soldier of the Objective Force. The Objective Force Warrior program is the Army's flagship Science & Technology soldier system effort led by the Army Material Command (AMC) to provide revolutionary improvements in warfighting capabilities for the soldier and small team. The program takes advantage of ongoing Army S&T integrated with the technological expertise of the private sector to provide our soldiers with overwhelming

advantages, both with respect to soldier safety and survivability as well as lethality capability.

S&T is the enabler of the Objective Force. The S&T community inside the Army consists of laboratories belonging to AMC, the Medical Research and Material Command, the Corps of Engineers, and the Space and Missile Defense Command. The total Army S&T funding for FY04 is over $1.8 billion, of which 98 percent is focused on the Objective Force, including FCS. The work of Army laboratories is highly leveraged with activities in industry, academia, other government agencies, and foreign countries. The scope of efforts spans the spectrum from vehicle platforms and munitions to drinking water and food.

Priorities in the Army labs in support of the Objective Force include protection of the soldier; reduction of the logistics footprint; improvements in network centric command, control and communications; development of unmanned capabilities; and increasing the lethality and survivability of the overall force. In addition to support to the Objective Force, the Army S&T community has contributed significantly to Homeland Defense initiatives.

Soldier protection is always a major concern. Efforts in improved body armor, lightweight vehicle armor, active protection systems, and signature management ensure that soldiers are hard to find and even harder to defeat. A significant transition success story is the Interceptor Body Armor and Small Arms Protective Insert developed by the Natick Soldier Center (NSC) for the U.S. Marine Corps and leveraged by the Army. Through advancement of new, lightweight ceramic composite materials, the NSC was successful in achieving a 13 percent weight reduction in the ballistic vest and over a 40 percent weight reduction in the ballistic insert, without performance degradation and while addressing a new blunt trauma requirement. NSC also successfully executed a

Manufacturing Technology Program that evaluated the different ballistic plate materials and manufacturing processes. The end result is a technology that is not only mass producible, but reduces the cost by 25 percent. Another recent transfer from S&T was a crack arrestor technology that improves the multiple hit capability of the ceramic composites used in SAPI. Undoubtedly the most meaningful result is the soldiers' lives saved by this technology advancement. As the Honorable Pete Aldridge, USDAT&L, noted, "Every bullet deflected by advanced body armor, represents a visit not paid to a spouse or parent by a military chaplain."

The Edgewood Chemical Biological Center (ECBC) is well known for its contributions to CB agent detection equipment, such as the Joint Biological Point Detection System, which is currently in its third generation in ten years. Each new version has been smaller, lighter, more durable and more capable—in a word, better. ECBC is now hard at work on the fourth generation of this biotechnology application. Recently, ECBC design and technology development supported full-scale development transition of the Joint Service General Purpose Mask (JSGPM) program. The JSGPM satisfies all joint service chemical/biological mask field and combat vehicle applications for the next generation soldier and is significantly influencing future civilian respiratory protection systems.

Transformation in logistics requires a reduction in the logistical footprint. A fighting force expends large amounts of materiel, from food to ammunition to batteries. All of this needs to be brought into theater and maintained if the force is to be effective. The S&T Community continues to invest in smaller, more reliable ammunition and armament, more nutritious and long lasting foods, and more efficient energy sources. There are several efforts underway to reduce the amount of water that needs to be transported. Current efforts include recovery of usable water

from vehicle exhaust and finding efficient ways of drawing water from the atmosphere, even in desert climates.

See First, Understand First, Finish Decisively! Sensor technology and information fusion is critical to situational understanding. Modern warfare depends highly on accurate timely transfer of information to the warfighter. The highly mobile, lighter force envisioned in the Army Transformation will depend on this ability more than ever. Investments in self-healing networks, remote and robotic sensors, data fusion techniques, and leader development help insure that up-to-date information is always available and decisions can be made quickly and accurately. Many of the technologies developed by the Communications Electronics Research Development and Engineering Center to support the Army's war-fighting capabilities will, it is believed, be adapted for homeland security needs. Sensors, including infrared, acoustic and radar – used singly or in combination – can provide intrusion detection and perimeter security. Multi-spectral x-ray technology can facilitate real time inspection of baggage and small crates at security checkpoints. Hyper-spectral infrared imaging can detect chemical and biological agents, while Armaments Research Development and Engineering Center improved non-lethal munitions can increase security perimeters by stopping threats at a greater range and incapacitating antagonists if required. High value targets can be protected by layered defenses incorporating acoustic cannons and hypersonic sound devices, while smart audio and video surveillance systems can more effectively control crowds and yield intelligence about hostile threats.

A recent major technical accomplishment is the integration of a HELLFIRE laser-guided missile with an Air Force Predator UAV and its improvements/modifications to give the Predator the capability not only to identify targets of opportunity on the battlefield but also to engage and

destroy these targets in real-time. The Aviation and Missile Research Development and Engineering Center (AMRDEC) quickly developed critical technologies for the HELLFIRE MOD-K to meet an urgent operational need to provide fragmentation lethality against a broad range of targets. The primary urgency was related to Global Military Operations involving the U.S. The MOD-K is an excellent example of AMRDEC transitioning advanced technology to deployment in a very short time at minimal cost. The MOD-K effort, including simulation, design, fabrication, test, and deployment, provided a joint service capability in less than eight weeks. In addition, the RDEC supported urgent requirements for deployed forces, designing, producing and modifying SATCOM radios in country in support of OEF. This included the design and test of Army aviation Blue Force Tracking capabilities which supported the modification of 200 Army aviation assets in Southwest Asia and the current designing and testing of improvements for AH-64A/D instrument flight rules (IFR) capabilities which will provide significant operational improvements. AMRDEC's Prototype Integration Facility (PIF) is a Government Owned, Government Operated (GOGO) facility/concept concentrated on meeting the rapid response needs of Army, Department of Defense (DoD), and ultimately the warfighter. Customers buy solutions, not technology; therefore, the GOGO PIF concept focuses on assembling and integrating the necessary Government and Industry expertise to render a true rapid response.

The Army Research Laboratory (ARL) has been working with DARPA for over five years on the development of the PacBot robot. We have provided two PacBot platforms (Hermes and Professor) and an infrared imager to the forces in Afghanistan that was used in the caves and closed environment. An improved platform with a fully articulated sensor head under complete remote control of the operator is ready for troop evaluation and may be available for the deployed troops.

The US Army Tank Automotive Research Development and Engineering Center (TARDEC), in partnership with industry and ARL, is currently developing semi-autonomous and follower capability for unmanned ground vehicles under its' Crew-integration and Automation Testbed (CAT) and Robotic Follower programs. At the request of the FCS LSI, TARDEC adapted their program to form the basis of the FCS program's Unmanned Combat Demo (UCD). The CAT operates as a surrogate FCS Command and Control Vehicle and the Robotic Follower together with ARL's Experimental Unmanned Vehicle operates as two surrogate FCS Armed Reconnaissance Vehicles (ARV). The goals were to demonstrate one to one soldier to ARV robotic control, conduct a remote fire engagement, and to generate much needed experimental data in support of the FCS Milestone B decision. The UCD field experiments culminated with the first ever successful remote firing from a ground robot under semi-autonomous control. This effort went from first discussion to successful field experimentation in less than 18 months and involved multiple Army agencies and industry partners. We continue to do field experimentation at Ft Bliss to generate data in support of the FCS Milestone B decision.

The Medical Research and Materiel Command (MRMC) is playing a key role in inserting new medical technologies into both future acquisition programs such as the Objective Force Warrior, and directly into operational forces. Recent technology successes include:

Battlefield Medical Information System - Telemedicine (BMIS-T), which captures longitudinal patient information (predeployment, deployed, postdeployment) and epidemiological data. The system provides first-responder and forward deployed and home-station physician access to critical information, knowledge bases, and medical consultation that will

greatly improve the quality of medical data acquisition, processing, and storage, regardless of the point of care. BMIS-T is currently being deployed as part of the U.S. Special Operations Command (USSOCOM) Health Surveillance System and is a component of the DoD Theater Medical Information Program, as well as current Army medical surveillance architecture (BMIS-T/Composite Health Care System II - Theater).

Chitosan Dressing (CD) is expected to provide a marked improvement in the ability of front-line medics to control severe life-threatening external bleeding on the battlefield. Developed under Army contract, the Food and Drug Administration (FDA) approved the CD on 4 November 2002 for temporary control of severely bleeding wounds. Research has shown that the CD is also effective in reducing internal bleeding after severe liver injury, and work is continuing to allow FDA approval for internal use of the dressing. Through a combination of FY02 and FY03 funding ~~technology base funding and additional special interest funding in FY03~~, a total of 27,000 dressings are being procured. Delivery of these dressings is under way, and production will continue through the summer of 2003, with the initial dressings designated for delivery to the USSOCOM and the remaining dressings to be distributed in Army channels.

Combined Camouflage Face Paint is a U.S. Environmental Protection Agency-approved blend of face paint with DEET insect repellent to provide a minimum of eight hours of protection against biting insects. Inclusion of insect repellent protection will reduce nuisance factors by repelling insects near the face and help reduce diseases, such as malaria and dengue fever, transmitted by biting insects. DEET has been previously used as a separate product, but caused existing face paint formulations to run. Its integration into face paint is intended to

simultaneously improve ease of use and compliance, optimizing protection.

In keeping with the Army's Executive Agent responsibilities for the use of INDs (Investgational new drugs) for force health protection, USAMRMC has currently deployed two Special Medical Augmentation Response Teams to the Middle East to oversee the operational use of IND products. The IND products are not yet approved by the Food & Drug Administration for every day use. These products must be administered by a physician under an approved human use protocol and require consent forms. Regulatory requirements warrant maintenance of complete and accurate records by the principal investigator/s. IND products being used are a new hemostatic dressing for medic use in the control of severe external bleeding, and botulinum toxoid vaccine, human botulism immune globulin, and botulinum antitoxin to prevent and treat illness caused by use of botulinum toxin as a biological warfare agent. These teams will oversee the use of the products, and provide training to field medical personnel in their use, the collection of informed consent, and required record keeping. The team devoted to botulinum toxin prevention and treatment is also overseeing compliance with FDA requirements for storage and transfer of products to ensure their effectiveness.

These technologies as well as many others will provide capabilities which will be introduced into the Objective Force. This Force, with the FCS as its centerpiece, will be a leap ahead for the Army and its ability to defend the Nation.

Infrastructure

The FCS program has had a significant impact in revitalizing Army laboratories. Dr. Michael Andrews, the Assistant Secretary of the Army for Acquisition, Logistics and Technology – Research and Technology, initiated this effort. Beginning in 1999, Dr. Andrews refocused, reshaped and reinforced Army S&T efforts to speed the development of those critical technologies essential to transform the Army into the Objective Force. Continued revitalization of the Army laboratories is key to the success of this reshaping effort.

In-house laboratories provide the Army with a critical source of objective expertise, corporate memory, niche-area technologies of little interest outside the Army, an understanding of the user's problems, and innovative technology breakthroughs. The Army laboratory facilities are located throughout the world. Currently the Army has 7 major laboratories located within the United States. This represents almost 8 million square feet of laboratory space. We also maintain facilities in other parts of the world, such as Africa, to study disease where it occurs. These facilities represent our ability to develop technologies for tomorrow's weapons and our ability to develop defensive technologies for the future.

The Army laboratories provide Subject Matter Experts in support of the Army acquisition community throughout the entire system lifecycle from concept exploration to disposal. Army laboratories provide engineering support to the Program Executive Officers/ Program Managers, materiel managers, and other customers. Army laboratories played a vital role in the development of the FCS requirement documents, Request For Proposal to industry and are active participants in the source selection process.

Our Army laboratories have developed an in depth capability to conduct research in a variety of specialized areas. Many are world class.

Most Army laboratories have a very strong modeling and simulation capability within their facilities for virtual design, development and testing as part of our efforts to decrease the time between laboratory research and fielding. For example, the Tank-Automotive Research Development and Engineering Center (RDEC) operates a 360 degree immersive collaborative virtual environment (CAVE) for design, development and testing of automotive systems. In conjunction with the CAVE, the RDEC developed the Power Wall, a single screen 3-D, one to one scale analysis tool. Both tools can be linked across multiple sites and have generated interest from major contractors associated with FCS. The Army Research Laboratory has the Zahl Physical Sciences Laboratory. This laboratory contains a 6,400 square foot clean room used for chip development and small-scale manufacturing as well as facilities for nanotechnology, Infrared and Wide Bandgap Technology research. At the Engineering Research and Development Center (ERDC) in Vicksburg, MS, the Army Corps of Engineers operates the Survey and Global Positioning System Laboratory. This facility is used to develop and test survey techniques and equipment for use in positioning and navigation, and, in conjunction with other systems, for obtaining high-accuracy terrain and navigation channel elevation data. The Army also maintains one of its two DoD High Performance Computing Major Shared Resource Centers at ERDC. This 55,000 square foot facility includes multiple, state-of-the-art High Performance Computing Systems, which provide some of the most powerful scientific and engineering computing capability in DoD. The U.S. Army Medical Research Institute for Chemical Defense is the DoD lead laboratory for development of medical countermeasures against chemical warfare agents and for training personnel in the medical management of chemical casualties. The Institute's facilities support chemical casualty care training, physiology, drug assessment, pathophysiology, pharmacology, analytical chemistry, neurotoxicology, veterinary surgery, chemical safety/surety, medical maintenance, information and resource

management, logistics support and quality assurance. The Army Medical Research Institute of Infectious Diseases maintains containment laboratories that are a unique national and international resource for the safe study of high-hazard disease agents. This lab was instrumental in the recent anthrax investigation.

People and Organizations

Army laboratories are staffed with some of our country's most talented and dedicated civilian and military scientists and engineers. The Engineering and Scientist Career Program is extremely important for the Army because it establishes career development programs for its many scientists and engineers that maintain the highest levels of technical and managerial competency. The career development program reflects current and future needs for education, training and developmental assignments so that Army engineers and scientists bring state-of-the-art skills and knowledge to their jobs. In large part because of the Army's focus on FCS and the Objective Force, and the enabling laboratory personnel demonstration authority championed by this committee, we show an upward trend in the numbers of engineers and scientists. Between 1999 and 2002, AMC hired over 1100 engineers and scientists. The technical expertise of the workforce at ARL has shown significant improvement with an increase in the number of engineers and scientists holding doctoral degrees increasing from 22 percent in 1992 to 32 percent in 2002 and individuals with master's degrees rising from 34 to 47 percent. However, recruiting top talent in specific emerging technology areas remains a challenge. One way we are addressing this challenge is by Army laboratories maintaining an active recruiting presence on major university campuses to attract the best and brightest talent. Another way we are responding is through the unique hiring, compensation, and performance management authorities the Congress has provided the DoD

laboratories over the last eight years. The importance and excitement of the work within the Army labs is attractive to many college graduates. We are also aggressively pursuing opportunities to revitalize the S&T workforce through participation in the DoD Laboratory Quality Improvement Program which will shape the new National Security Personnel System development. We are working with the office of the Secretary of Defense through the Director, Defense Research and Engineering (DDR&E) to include critical flexibilities.

The Army has a number of initiatives to reach outside our laboratories to leverage talent, ideas and technologies. Typically our labs and RDECs attempt to achieve a ratio of 35 percent for in-house research to 65 for outsourcing research. These figures vary from lab to lab from a low of approximately 8 percent in-house to a maximum of approximately 72 percent in-house. The variance in these percentages results from specific missions of the organizations. The weapon system commodity based organizations typically have higher industry interest in solicitations due to quantity or profit potential. Some of our organizations deal with very specific low volume solutions that are service unique thereby necessitating an in-house capability to address Army or DoD unique problem.

The Army is committed to a significant outreach program toward institutions of higher learning and, in particular, to an outreach program towards Historically Black Colleges and Universities/Minority Institutions (HBCU/MI). These institutions of higher learning form the nucleus of the next generation of scientists and engineers for our country and for the Army. In FY 2002, the Army sent over $296 Million in funding to colleges and universities. Of the $296 Million, the Army awarded over $35 Million to HBCU/MI in FY02.

The Army is taking extensive advantage of the research capabilities associated with our universities. One of the ways we do this is through University Affiliated Research Centers (UARC). UARCs provide or maintain essential engineering, research, and/or development capabilities through DoD contracts awarded under the authority of 10 U.S.C. 2304(c)(3)(B). Currently, the Army maintains three UARCs. They are: the Institute for Advanced Technology at the University of Texas at Austin, the Institute for Creative Technology at the University of Southern California, and the Institute for Soldier Nanotechnology at the Massachusetts Institute of Technology. We are currently in the process of soliciting for a fourth UARC to be known as the Institute for Collaborative Biotechnology.

There are several notable examples of partnerships that the Army has with both institutions of higher education and HBCU/MIs, one of which is the Army High Performance Computing Research Center (AHPCRC) located at the University of Minnesota. University researchers use state-of-the-art computers to solve real world problems for the Army. Specific examples include work in computational solid mechanics to model ballistic armor perforation of a layered ceramic target and computational aerodynamics dealing with the airflow past advanced parachute designs. As part of its contract, the University of Minnesota partners with six HBCU/MIs to investigate phenomena of interest to the Army. Recently the AHPCRC concluded a computational fluid dynamics model of aerosol dispersion in downtown Atlanta. This model demonstrated the effective radius of a chemical or biological attack based on specific weather conditions and is relevant to Homeland Defense planning.

eCYBERMISSION is a national science competition for seventh and eighth grade students initiated by the Army. It is a web-based science, math and technology competition for teams at U.S. based public or private schools, Department of Defense schools abroad or U.S. based

home schools. Teams consist of three or four students in the same grade and region with a team advisor. Each team selects a challenge in any one of four areas: Sports and recreation, arts and entertainment, environment and health & safety. The Army hopes to stimulate interest in the sciences and technology through this program. This program represents one way in which the U.S. Army can demonstrate it's gratitude to the citizens of this Nation for giving their sons and daughters to military service in defense of freedom.

Uniformed Army Scientists and Engineers provide a vital link between the work in the laboratories and the operating forces. The expertise derived from military training and experience is a key success factor contributing to the design, conduct, and interpretation of operationally relevant studies of technologies in actual deployment or under field conditions.

The need for uniformed Army scientists and engineers is particularly great in the medical area, as the medical R&D laboratories provide the personnel necessary to perform significant operational support roles, in addition to and separate from their research mission. These roles include management and oversight of the use of Investigative New Drug products in theaters of operation, operational laboratory support for contingencies (e.g., anthrax attack response), and performance of specialized in-theater assessments and consultations to operational commanders on matters affecting health and performance. Medical R&D personnel also augment deployable Combat Health Support by providing professional fillers (PROFIS) to Table of Organization and Equipment medical units and by serving as members of deployable Special Medical Augmentation Response Teams.

Today, our needs are changing as we face new threats. We must get technology out of the lab and into the field faster. It is vital that we optimize the benefits of technology by sharing across the old commodity oriented stovepipes. We must organize to do so.

In October 2002, AMC established the Research, Development and Engineering Command (Provisional). It has three major objectives. The first is to integrate research, development and engineering across all areas of the Army, the other services, universities and all other sources. The second is to get emerging technology to the soldier faster. The third is to demonstrate the agility to rapidly take advantage of opportunities no matter where they may arise. To achieve these objectives requires new and innovative approaches to all aspects of the development of technology for the soldier.

The first organizations assigned to the new command were the Army Research Laboratory, the Army Materiel Systems Analysis Activity, the International Cooperative Programs Activity, the International Research and Development Standardization Groups and the Field Assistance in Science and Technology Activity, the S&T portion of HQ AMC and the S&T portion of the former Simulation Training and Instrumentation Command. We intend to formally stand up the full organization, including the RDECs, October 2003.

The Command is establishing a formal relationship with the Army Training and Doctrine Command (TRADOC) and the Army Test and Evaluation Command (ATEC). The relationship with TRADOC will include the full integration of Doctrine, Training, Leadership, Organization and Soldier considerations into the technology development and transition process. Similarly, with ATEC the relationship will include the comprehensive testing considerations into the integration of technology

and technology programs to facilitate the rapid and effective development and transition of technology to the soldier and maximum verification with modeling and simulation. No longer will technology be developed or acquired without a very close link to these two Commands.

The RDE Command will look at the capabilities the Army needs from a Systems of Systems perspective. For example we will focus on supportability and lethality capabilities instead of commodities such as helicopters or missiles, which will enable the scientists and engineers to integrate those technologies across multiple disciplines. We will use modeling and simulation (M&S) to reach across all the labs so that they can operate in a virtual environment from any location.

The M&S that the RDE Command is developing and integrating will feed into the Advanced Collaborative Environment. This virtual, distributed environment will tie together M&S, life cycle cost, requirements, testing, and training. We are using it now in the Future Combat System acquisition process. It will continue to grow and become the means by which all of the Army shares concepts and breaks down organizational walls. The days of single, independent platforms are coming to a close. The future will require each platform to be linked to all the others. The only way we can learn to operate that way is to first build the modeling and simulation capabilities. We will start at the beginning with the simulation and carry that all the way through in a way that ensures the training devices and the systems are fielded together.

I see the RDE Command as a key part of the process the Army is using to transform itself. We are breaking down our old barriers. Transforming the way we acquire and develop technology for our soldiers is a step further down that road.

Conclusion

We have only touched the surface of some of the facets of Army Transformation, but it is apparent that the science and technology facets are essential to success. The Army has embarked on an ambitious transformation journey. We must provide technology solutions essential to current and future warfighter needs across the full spectrum of Army operations. A diverse S&T portfolio will enable Army to support evolving and emerging capabilities. Innovative initiatives will revitalize our workforce and laboratories and ensure our world-class labs continue to be equipped with modernized equipment and staffed with a dedicated and highly skilled workforce. Effective partnerships and collaborations will speed the transition of technology solutions to the soldier. The Army S&T community remains committed and focused to support Army Transformation and provide the warfighter with "Technology to Win". Our Army and a team of people from industry, academia, and other nations are committed and focused on enabling a faster transformation. At the end of the day, our soldiers, our civilians, our contractors and our allies – our world benefits from the power of science and technology applied across a remarkable spectrum~~, from the World Trade Center to the mountains of Afghanistan~~. [how does the WTC benefit, when it no longer exists?]