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EMERGING THREATS AND CAPABILITIES SUBCOMMITTEE

SCIENCE AND TECHNOLOGY OVERVIEW

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Good morning, Mr. Chairman, members of the Subcommittee, and Staff,

We appreciate the opportunity to appear before you today to report on a wide range of science and technology issues. Before taking your questions, we'd like to spend a few minutes giving you our perspectives on where we are today in providing our forces with the best equipment and support possible, where we want to be -- both in the near future and within the next 10 or 20 years, and how science and technology plays a role in that future.

The Quadrennial Defense Review outlined the prospect of continued global dangers and established our strategic goals for meeting projected threats in the early 21st century. It will be our strategy to promote regional peacekeeping efforts; to prevent or reduce conflicts and threats; to deter aggression and coercion; and to respond to the full spectrum of potential crises. In order to carry out this strategy, the U.S. military must be prepared to conduct multiple, concurrent, contingency operations worldwide. It must be able to do so in any environment, including one in which an adversary uses asymmetric means, such as nuclear, biological, or chemical weapons. Our combat forces must be organized, trained, equipped, and managed with multiple missions in mind.

Our defense strategy is based on the reality that, while we no longer face the threat posed by a global peer competitor, we still live in a very dangerous, uncertain, and unpredictable world; a world where terrorists, transnational actors, and rogue nations can unleash firepower in many ways as terrifying as that of a major global power. We are not facing a few disorganized political zealots armed with pistols and hand grenades. Rather, we must defend against well-organized forces armed with sophisticated deadly weapons and access to advanced information and technology. They represent a different and difficult challenge to forces organized and equipped around traditional missions.

These hostile forces are unlikely to attempt to match overwhelming U.S. superiority on a plane-for-plane, ship-for-ship, or tank-for-tank basis, but are more likely to use asymmetrical strategies against us -- including weapons of mass destruction, "information warfare", large quantities of low-cost cruise and ballistic missiles, and the like. They can use commercial navigation, communications, and imagery satellites. They can project their forces anywhere and anytime using worldwide commercial transportation networks available to any and to all.

The Defense Science Board, in its 1998 Summer Study Task Force Report on our response to transnational threats, warned that, today, even an adversary with a relatively small defense budget can become a significant regional threat. It noted that this smaller adversary can present a non-traditional military force as deadly and destructive as large conventional forces. Military conflict is being dramatically transformed by the rapidly changing nature of modern technology.

Of course, this is nothing new. Throughout history, advances in technology have directly and indirectly transformed the course of warfare. From spear and longbow, to the invention of gunpowder and dynamite, to the use of aircraft and the machine gun, and on to chemical and nuclear weapons and biological agents, we have seen how revolutionary advances in weaponry have influenced the nature and extent of combat. In spite of such advances, however, for centuries, the use of technology has primarily been to provide advantage to one side's massed forces in its efforts to defeat the other side's massed forces.

How do we counter this threat and keep ahead of accelerated modernization by the new adversaries facing us in the early 21st century? Clearly, we must perform better than they do and retain our vast superiority in the quality of our personnel and in our force's

mobility, global projection, and equipment. These, combined with "information superiority", will assure our nation's future stability.

Our vision for the 21st century is a warfighter who is fast, lean, mobile, and prepared for battle with total battlespace situation awareness and information assurance. Our military strategy, as stated in the Joint Chiefs of Staff "Joint Vision 2010" posture statement, is to be based on Information Superiority -- real-time intelligence from "sensor to shooter". This is the backbone of the "Revolution In Military Affairs" that will allow us to achieve total battlefield dominance.

Secretary Cohen announced, in November of 1997, the Defense Reform Initiative. The DRI, as it is called, is a basic restructuring of the way the Department does business. It calls for a "Revolution In Business Affairs". Although our military is unquestionably the strongest in the world, our defense establishment has labored under outdated and outmoded policies, procedures, and infrastructure -- designed to deal with a Cold War threat -- all of which are at least a decade out of date and far behind the private sector which, restructured and revitalized, is now thriving in a dynamic global marketplace.

Our defense industrial base has undergone successful consolidation; and we, in turn, must capitalize on the lessons we have learned from this successful commercial restructuring -- how to adopt modern business and commercial practices; consolidate and streamline; embrace competitive market strategies; and eliminate or reduce excess support structures. Our future direction must include greater competition (both horizontal and vertical); greater civilian/military integration; and global links to achieve the full potential of our defense industrial base.

Unfortunately, potential adversaries are able to capitalize on our Nation's successes, for example: commercial communications/navigation/earth surveillance satellites, low-cost biological/chemical weapons, cruise and ballistic missiles, etc. -- if they can't develop them, they can purchase them -- and the skills to use them -- on the world arms market. Therefore, we must develop effective countermeasures to this technology; for example: information warfare defenses, vaccines and special medical agents to counter biological and chemical weapons, defenses against ballistic and cruise missiles, and the ability to destroy hard and deeply buried targets. In some respects, we have become the victims of our own technological advances. Our successes in using new technology to our advantage in operations such as Desert Storm and Bosnia have made those technologies an object for acquisition by all.

Yet we have no choice. We must develop the defenses and we must do so in a coalition context. For example, ballistic missile defense -- essentially hitting a bullet with a bullet -- poses a particularly difficult challenge; and deploying an integrated coalition theater missile defense system -- one that collectively hits all the incoming missiles instead of all of us going for the first one coming at us -- is an even more demanding technical and management problem. Unless all systems -- weapons and communications -- are fully interoperable, the complex job of theater missile defense cannot be done.

In addition to developing and deploying countermeasures to our adversaries' use of advanced technology (weapons of mass destruction, information warfare, etc.), perhaps the most important implication of the revolution in technology and its global spread is the need for the acceleration of advances in technology in order to maintain superiority on the battlefield.

From a science and technology perspective, to accomplish this, we must ensure that the warfighters today and tomorrow have superior and affordable technology to support their missions, and to give them revolutionary war-winning capabilities. Our number one priority is providing the weapons and equipment our combat forces and our allies will need to meet our strategic objectives in 2010 and beyond. One of the difficulties is that we must always be looking with one eye to the day ahead and another eye to the distant future -- ten or twenty years down the line. What do we need to serve the warfighter in 2010 and insure our national security well into the 21st century? There are five weapons-oriented goals we are working to address:

- **First, in the information area, to achieve an interoperable, integrated, secure, and "smart" command, control, communications, computer, intelligence, surveillance, and reconnaissance (C4ISR) infrastructure that encompasses both strategic and tactical needs.**
- **Second, in the "strike" area, to develop and deploy -- in sufficient quantities -- long-range, all-weather, low-cost, precise, and "brilliant" weapons for both offensive and defensive use.**
- **Third, to achieve rapid force projection, global reach, and greater mobility for our forces. With uncertainty over where they will be required, and the need for extremely rapid response to a crisis anywhere in the world, this capability -- when combined with the first two elements -- will provide us with overwhelming military superiority.**
- **Fourth, to develop and deploy credible deterrents and, if necessary, military defense against projected, less traditional early 21st century threats -- which include: biological, chemical, and nuclear weapons; urban combat; information warfare; and large**

numbers of low-cost ballistic and cruise missiles. These threats represent priority issues for our resources -- even if it means impacting some of our more traditional areas.

- **Fifth and finally, to achieve not only inter-service jointness, but also interoperability with our Allies. This is essential for coalition warfare and even more important given the realization that coalition-driven operations will become the norm, rather than the exception, in the future. We must insure that their technologies compliment those of our forces. To accomplish our goal of information superiority, we are taking steps to make certain that the C4ISR systems and advanced weapons -- such as theater missile defense systems -- are fully interoperable.**

These five working priorities form the platform of the Revolution in Military Affairs. To pay for these new systems, we are engaged in an equally important Revolution in Business Affairs. Our second priority goal is the vital challenge of acquisition reform -- in its broadest context -- for all the services, and for the Department of Defense, as a whole. There is no question that the DoD is a much different place today than it was five years ago and even one year ago. We still have a long way to go, but, on most fronts, we can report progress and substantial successes in transforming the way the Department does its business, in areas such as use of commercial practices and distribution systems to satisfy materiel acquisition and support requirements; more competitive sourcing of current in-house work; and greatly expanded purchase of common-use, commercially available, goods and services.

For instance, the Air Force's Evolved Expendable Launch Vehicle (EELV) program has used a creative business approach to reduce costs while modernizing the vehicles that launch satellites into space. Under the traditional approach, the Air force would have

funded the full development costs after downselecting to a single competitor. However, the EELV will be able to carry both military and commercial payloads, and the market for commercial launches is expected to outpace the military launch requirements. So the Air Force initiated a partnership with both Lockheed-Martin and Boeing to share the costs of the EELV development – each contractor will receive about $500 million in federal funding and each will invest over $1 billion in corporate funds in the program. In addition, instead of the traditional separate purchase of the launch vehicles and launch operations, the Air Force awarded "launch services" contracts to both Lockheed-Martin and Boeing. This approach allows the program to sustain competition for launch services through the life of the program, thereby bringing lower launch costs and maintaining producer expertise. The EELV will reduce launch costs by at least 25% over current Delta, Atlas, and Titan launch systems and is expected to save over $5 billion between 2002 and 2020.

Additionally, the Navy's DD21 program has not only showcased a new way of doing business for our surface ship acquisition community, but it has also put several key ideas for reforming acquisition to work in a "real world" laboratory. Significant DD21 program reform initiatives have included an acquisition approach that leverages industry competition and innovation. Breaking up the so-called "dream team" of Bath Iron Works, Ingalls, and Lockheed Martin and, instead, requiring competition, in the initial concept phase of the program, between teams of shipbuilders and system integrators, assures us the best of weapon system ideas at the lowest future production and support costs -- the award criteria. Allowing the teams to enjoy maximum design flexibility has allowed us to mitigate risks and future costs while optimizing system capabilities. Then, requiring shipyard competition on the winning design, between the two remaining yards, will provide us with

assured competitive production procurements. In this manor, the Department continues to pursue proactive research and engineering. Our science and technology investments of the past have made clear the fact that basic research fuels technological superiority; future research investment will assure this superiority.

As is apparent, warfighter systems and defense doctrines are constantly evolving to new dimensions. Many of the DoD science and technology achievements, designed to maintain a technologically superior military force, have progressed to the civilian economy and formed the basis of technological advancement in industry. Historically, there had been a distinct difference between the technologies of warfare (gunpowder, cannons, bombs) and those of the normal day-to-day commercial economy. As defense has moved increasingly toward information-based warfare, however, and as the information age has moved the civilian economy into the high-tech environment, there has been a growing merger of the technologies of the two arenas.

Common technologies, however, are not enough to yield dual-use operations; there are other areas of concern. The commercial sector frequently offers lower-cost, higher quality, faster new product realization times and state-of-the-art performance and equipment that meets environmental requirements that are at least as rigid as those of the military. The Department has three programs in particular, the Domestic Technology Transfer program, the Commercial Operations and Support Savings Initiative, and the Dual Use Science and Technology program, which foster this innovative environment.

Domestic Technology Transfer Program

The DoD Domestic Technology Transfer Program encompasses a wide range of activities involving spin-on, spin-off, and dual use. One technology transfer instrument

especially important is the Cooperative Research and Development Agreement (CRADA). The flexibility of this instrument is unparalleled -- we have 1364 active CRADAs. We are doing research in a wide range of technology areas, including vaccine technology, hazardous materials management systems, software development, acoustics and signal processing, imaging technology, and laser development. We appreciate the congressional interest in this area shown in passage of the National Technology Transfer and Advancement Act of 1995.

Commercial Operations and Support Savings Initiative

As equipment ages, operations and support (O&S) costs increase. Many DoD systems are being retained far beyond what was initially anticipated, so O&S costs have become an increasing concern. The Commercial Operations and Support Savings Initiative (COSSI) addresses this concern. The intent of COSSI is to insert commercial technologies into military systems in order to reduce O&S costs. Typically, system performance is enhanced as well. COSSI currently supports 25 projects that insert commercial technologies into legacy systems in areas like computers, electronics, and composite materials. These projects are expected to generate huge savings in O&S costs because the inserted technologies are more reliable, less expensive to buy, and easier to upgrade. The President's Budget requests $96.8 million for COSSI projects in FY 2000. This investment is essential if we are going to get O&S costs under control and keep legacy systems operating at required performance levels.

Dual Use Science & Technology Program

The Department's Dual Use Science & Technology (DU S&T) program allows the DoD and contractors to form partnerships for the purpose of developing technologies that can benefit both parties. One of the goals of DU S&T is to make technology development with industry routine, helping the Department comply with the Defense Authorization Act for Fiscal Year 1998 which requires 10 percent of the applied research budget to be spent on dual use projects in FY 2000. Since the program began in 1997, the Department has spent $298 million on dual use projects, with Industry contributions totaling $298 million. The President's Budget for FY 2000 requests $54.5 million. This funding is necessary to continue the partnering arrangements with industry and to meet the dual use technology goals established by the FY 1998 Authorization Act.

BUDGET OVERVIEW

The Department is requesting approximately $34B in Research and Development; of that amount, the science and technology request is $7.4B. The Defense Advanced Research Project Agency (DARPA) will receive approximately $2B, the Services will receive approximately $1B each, and the remainder will go to programs funded by Office of the Secretary of Defense and other agencies, including the Defense Threat Reduction Agency (DTRA) and the Ballistic Missile Defense Organization (BMDO).

The overall Defense budget can be viewed as a balance between funding for today's forces, funding to develop and acquire equipment for the next force, and funding to develop the technology for the force after next. The Services' request in FY 2000 for readiness (pay of personnel, training, maintenance of equipment, etc) represents 79% of the Army's budget, 64% of the Navy's budget, and 60% of the Air Force's budget. The

funding required for modernization for the next Army, the next Air Force, and the next Navy consists of both procurement and test and development dollars. It provides for the engineering development of systems, for system upgrades, and for procurement of follow-on systems. This modernization budget requires 19% of the Army's budget, 34% from the Navy's budget, and 39% from the Air Force budget. The science and technology investments are required to ensure that the "force after next" will have the technologies available to field systems with superior technology. The amount remaining in the budget, which is less than 2% for each of the Services, goes to the science and technology programs. This investment creates and develops the programs that develop the technology for our future—our Army After Next, Navy After Next, and Air Force After Next. The science and technology is a small part of our budget request, but it is very important that this investment in the future be protected. As Secretary Cohen said in late 1997, "We cannot afford to mortgage our future by making the S&T program a bill payer for near-term requirements. Technological superiority has been and continues to be one of the foundations of our national military strategy."

SCIENCE AND TECHNOLOGY PARTNERS

The Department's investment in Science and Technology is executed through a partnership among our Defense agencies, Service laboratories, universities, industry, and international partners. Each "member" of this partnership provides different capabilities and strengths.

Defense Advanced Research Projects Agency

As mentioned previously, DARPA has the single largest share of the Department's Science and Technology Program. In general, one can categorize the DARPA program as high-risk, with high-payoff potential. The DARPA investment strategy searches for technology areas where a focused effort over several years is expected to have large payoff. DARPA tends to be more "system" oriented as opposed to basic research oriented. This strategy has served the Department and the nation well in the past. Both the Internet and stealth technology can be traced back to initial investments made by DARPA. Today, the DARPA investment continues to pay dividends, through programs such as its biological agent detector program, which is designed to address national security concerns associated with biological weapon attack. DARPA also has a significant investment in information assurance, which will help defend our national information infrastructure. Other priority programs will provide operational dominance for our armed forces. These include dynamic battlefield preparation, advanced surveillance systems, affordable precision target engagement, and distributed command and control, as well as concept studies supporting unmanned warfare systems.

Defense Threat Reduction Agency and Ballistic Missile Defense Organization

Our other Defense agencies, in conjunction with DARPA and the Services, provide a focus on special emerging threats. Current technology and operations are threatened by the specter of emerging chemical, biological and radiation threats, as well as theater and intercontinental missile delivery systems. Future technology will have to provide a broad spectrum coverage to respond to these emerging threats. Chemical and biological detection technologies, physical protection systems (e.g., masks) and medical countermeasures will

exploit discoveries defining common chemical and biological principles in order to achieve a broad-spectrum coverage of threats. For example, DARPA's program to understand and use characteristics of the sensors in a dog's nose may make feasible a universal chemical detection system. The Defense Threat Reduction Agency's program to provide a multi-disease vaccine construct using an adapted, harmless virus as the carrier may provide a medical capability for immunizations that will revolutionize preventative medicine. Finally, some highlights of the BMDO program include developing the technology to more rapidly detect theater and intercontinental missiles against a cluttered background, as well as technology to improve the robustness and performance of the atmospheric interceptor missiles being developed throughout the Department.

Service Laboratories

The Service laboratories provide a stable, longer-term focus to the Defense science and technology program, as well as a focus on Service-specific needs. These laboratories perform approximately 36% of the total DoD applied research program, as well as 24% of the advanced development program. The Service laboratory element of the partnership has brought the Department such advances as night vision from the Army, underwater acoustics from the Navy, and much higher performance turbine engines, primarily from the Air Force. The Army is developing technologies necessary for both the Force XXI and Army After Next, and is focused on providing land warrior systems that will have increased lethality, survivability, tactical mobility, and energy efficiency. Examples of significant programs include the compact kinetic energy missile and the future Scout and Cavalry System light infantry vehicle. Within the Navy, the current focus is on reducing the logistics and manpower requirement of combatant ships and extending the littoral

battlespace. Examples of significant programs supporting these areas include the Next Generation Destroyer (DD 21) Program, and Organic Mine Countermeasures. Finally, the Air Force science and technology investment represents a shift toward space platforms and systems. Some specific programs within the Air Force include the Warfighter-I hyperspectral space sensor; this program is a cooperative development with industry. Finally, through the Reliance planning process, which we shall review later, the Services also conduct longer-term, cooperative programs in support of joint capabilities, such as the tri-Service program to mature automatic target recognition systems.

Universities and Department of Defense Basic Research Program

Basic research advances the scientific frontier and provides the foundation for future U.S. defense capabilities. In fact, approximately 70% of DoD basic research investment is executed by universities. The historical record and impact of the Defense basic research investment is well-documented. Department of Defense basic research has sponsored over 65 Nobel Prize winners, including Dr. Richard Smalley, from Rice University, for his work in nano-technology. This technology is likely to be the foundation for the next generation of computers, enabling us to develop systems which will be faster, smaller, and require less power. Other recent recipients include Dr. Walter Kohn of University of California who received the Nobel Prize for computational chemistry, and Dr. Daniel Tsui of Princeton for super magnetism physics. Another example of the value of basic research is the Global Positioning System (GPS), which is revolutionizing warfare, as well as and finding literally thousands of civilian uses. GPS is a system that evolved from Defense basic research investment in satellite navigation, atomic clocks, and communications.

The Department of Defense strives to focus its basic research efforts on those areas that have high military benefit. In 1997, which is the last year the National Science Foundation has analyzed, DoD funding comprised only seven percent of the total Federal government investment in basic research; however, our limited funding is highly focused. DoD basic research funding comprises over 70% of the total annual federal investment at our Universities in electrical engineering; over 65 percent of in mechanical engineering; over 20 percent in computer sciences, metallurgy and materials, and oceanography; and about 15 percent of the total annual federal investment in aeronautical and astronomical engineering, chemistry, and mathematics. So, while we target Defense basic research toward areas that can most significantly impact future warfighting capabilities, the Department's basic research is also important to the nation's scientific capability as a whole.

Industry

The benefits of the Department's partnership with industry include enhanced innovation and technology transfer. In fact, industry executes nearly 50% of the Department's applied research, and almost 65% of the advanced development. This investment's primary contribution comes in developing more mature technology transitioning to warfighting systems. The Office of the Secretary of Defense manages specific programs aimed at maturing Dual-Use technology, Manufacturing Technology, and the Commercial Operations and Support Savings Initiative (COSSI). For instance, the Department is involved in a 50/50 partnership with the automotive industry to develop an active braking system for medium weight trucks. When fielded in the Army's High Mobility Multipurpose Wheeled Vehicle, this technology will reduce life cycle costs, and

increase safety of current vehicles. A final element of industrial partnership is with small businesses, through the "Small Business Innovative Research" (SBIR) program. In FY 1998, over 120 contracts were issued to small business. Many of these addressed problems in emerging threat areas. For example, the accelerometer used to arm most DoD missile systems, including the Patriot Advanced Capability-3 comes from a SBIR set-aside development.

International Collaboration

Another partner for the DoD Science and Technology program is the international S&T community. Although we have individual bi-lateral and multilateral science and technology agreements with individual nations, the primary international collaboration comes through our involvement in the NATO Research and Technology Organization (RTO) and The Technical Cooperation Program (TTCP), a long-term alliance with Australia, Canada, New Zealand, and the United Kingdom. Through these bodies, the Department has engaged in international cooperative research for over forty years. For example, the Electronic Warfare Systems Group of TTCP cooperatively developed the Advanced Receiver and Processor Technology, Specific Emitter Identification capability. This technology allows for the classification of radar signals to identify between friend, neutral, and foe in a high air traffic environment. In fact, NATO forces in Kosovo are currently using this technology. The TTCP Materials Group have led development of a stress and corrosion resistant weldable aluminum alloy being used on F-18 forward surfaces that is has both significantly longer life and lower cost than conventional materials.

PLANNING AND ASSESMENT PROCESS

The S&T investment is planned and assessed through a cooperative initiative with the Services and Agencies in DoD called the Defense Reliance Process. The process enables us to integrate programs across the Services and Agencies to develop the capabilities needed to meet the goals of Joint Vision 2010. Through this process, we are able to avoid unwarranted duplication of efforts in the Services and Agencies, and to leverage the investments they make. The execution of our S&T program is based on four planning documents that we develop: The Defense S&T Strategy, the Joint Warfighting Science and Technology Plan (JWSTP), The Defense Technology Area Plan (DTAP), and the Basic Research Plan (BRP). The assessment of the quality of the research in the S&T plan includes reviews by teams of independent reviewers from academia and industry.

S&T FOCUS AREAS

In developing the Department's Science and Technology program, we recognized the need to provide an additional focus on the technologies to acquire and use information to our advantage. Consequently, we have three interdisciplinary science and technology focus areas that are intended to allow the Department to more fully benefit from emerging capabilities.

Information Technology Initiatives

Information technology has been a core research area for the Department since the beginning of computing. This research area remains vital, and may even be more significant to the Department as we move into the 21st Century. Our research programs include activities that will lead to the Next Generation Internet, "Smart" software,

advanced human-computer interactions, and the next generation of high-performance computing. Many of these activities would benefit from the funding increases proposed in the Administration's Information Technology for the 21st Century Initiative, which includes DoD as a major participant. Each of these areas, while having strong DoD applications will also have broad commercial application. For example, DARPA's work in Human-Computer Interaction, specifically in Multilingual Information Management, will help lead to a computer that can operate in any language, and "self-translate." Much like the work at DARPA that lead to the Internet, the DARPA effort in scalable networks should lead to a wireless network interface that operates faster than the wired Internet of today. In addition to DARPA's initiatives, we have made information technology a focus area for our FY 2000 multi-disciplinary university research initiatives, and expect to receive proposals for expanded university effort later this year.

Smart Sensor Webs

The near future will see a proliferation of sensors and associated processors available for battlefield use. Commercial and military space technology and systems will provide major leaps in coverage, timeliness, and resolution. As a result, the amount of raw information available to the battlefield commander and soldier, sailor, airman, and marine is increasing at an ever-expanding rate. In concept, smart sensor web integrates networks of sensors to provide near real time representations of complex battlefield information to the warfighters. Many efforts in these areas are ongoing in the Services and Agencies, and together could provide a tremendous new warfighting capability.

Cognitive Readiness

To achieve the capabilities outlined in Joint Vision 2010, our Armed Forces will rely on superior learning technologies that must be available on demand, anytime, anywhere. It is known that the complexity, tempo, and dispersion of current military operations stresses traditional training and education systems based in the classroom (synchronous learning). In addition, time spent in on-site education and training impacts operational readiness. The pace of technological change in weapons systems and complex cognitive demands of the variety of missions, including missions-other-than-war, further complicate this concern. Development of new learning technologies to address these concerns and provide cost-effective systems will provide high quality "learner-centric" systems for military training and education under the Department's overall Advanced Distributed Learning program.

Learner-centric systems require technologies for both synchronous and asynchronous learning, and requires that we undertake technology development through focused research investments in human factors, cognitive task assessment, learning object modules, adaptive learning, intelligent tutors, information network design, knowledge agent development, advanced distributed learning standards, embedded training, and modeling and simulation based collaborative tools.

In addition to the three focus areas, the Department's science and technology program is actively involved in several high-priority interagency efforts. First, in response to Presidential Decision Directive-62, <u>Protection Against Unconventional Threats to the Homeland and Americans Overseas</u>, we have established a subcommittee to focus DoD efforts to develop countermeasures to Weapons of Mass Destruction. The first action is to

assess all applicable S&T areas and determine what we can contribute to the federal effort of protection of the homeland. A related program responds to PDD-63, Critical Infrastructure Protection. In this area, we are identifying technologies that will address activities related to cyber terrorism, and better protect critical information systems within the Department, and throughout the nation. Finally, we have initiated a specific executive-level science and technology working group to coordinate ongoing efforts in detecting, characterizing, and neutralizing hard and deeply buried targets, in response to the emerging threat from other nations due to underground facilities.

In addition to these technical challenges, we also are examining ways to revitalize the Department of Defense laboratory and test center infrastructure. Specifically, we have initiated an experimental pilot program that allows a Defense laboratory and Test and Evaluation Center from each Service to relax some constraints pertaining to Federal workforce, infrastructure, and program execution; and to provide the laboratories a mechanism to cooperate more effectively with industry. Additionally, most laboratories are included in the existing personnel demonstrations, which provides flexibility in the pay and progression of DoD scientists and engineers.

CONCLUSION

Mr. Chairman, we wish to thank the Committee for this opportunity to give you a broad overview of our defense science and technology posture. The future of our modernization efforts will rely on the partnerships we form in the development and execution of our Science and Technology programs, which in turn will enable tomorrow's warfighting superiority. The Congress and the Department have worked hard - together - to achieve our global dominance and to maintain our strength. We urge your continued

support of our common, overriding interest in keeping our combat forces the best equipped, the best supplied, and the best sustained in the world. Thank you very much.