

**DEPARTMENT OF DEFENSE AUTHORIZATION FOR
APPROPRIATIONS FOR FISCAL YEAR 2005**

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES

UNITED STATES SENATE

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

ON

S. 2400

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2005 FOR MILITARY
ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CON-
STRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF
ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL
YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 5

EMERGING THREATS AND CAPABILITIES

MARCH 3, 10; APRIL 2, 2004



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AND CAPABILITIES**

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**DEPARTMENT OF DEFENSE AUTHORIZATION
FOR APPROPRIATIONS FOR FISCAL YEAR
2005**

WEDNESDAY, MARCH 3, 2004

U.S. SENATE,
SUBCOMMITTEE ON EMERGING THREATS
AND CAPABILITIES,
COMMITTEE ON ARMED SERVICES
Washington, DC.

**THE ROLE OF DEFENSE SCIENCE AND TECHNOLOGY IN
THE GLOBAL WAR ON TERRORISM AND IN PREPAR-
ING FOR EMERGING THREATS**

The subcommittee met, pursuant to notice, at 9:31 a.m. in room SR-325, Russell Senate Office Building, Senator Pat Roberts (chairman of the subcommittee) presiding.

Committee members present: Senators Roberts, Allard, Collins, Reed, and Clinton.

Committee staff member present: Leah C. Brewer, nominations and hearings clerk.

Majority staff members present: Elaine A. McCusker, professional staff member; and Lynn F. Rusten, professional staff member.

Minority staff members present: Evelyn N. Farkas, professional staff member; Richard W. Fieldhouse, professional staff member; and Arun A. Seraphin, professional staff member.

Staff assistants present: Michael N. Berger, Andrew W. Florell, and Nicholas W. West.

Committee members' assistants present: Darren M. Dick, assistant to Senator Roberts; Derek J. Maurer, assistant to Senator Collins; Clyde A. Taylor IV, assistant to Senator Graham; Mieke Y. Eoyang, assistant to Senator Kennedy; Elizabeth King, assistant to Senator Reed; Richard Kossler, assistant to Senator Akaka; William K. Sutey, assistant to Senator Bill Nelson; and Andrew Shapiro, assistant to Senator Clinton.

OPENING STATEMENT OF SENATOR PAT ROBERTS, CHAIRMAN

Senator ROBERTS. The subcommittee will come to order. Good morning, and thank you all for joining us today. This morning, the Subcommittee on Emerging Threats and Capabilities meets to receive testimony from representatives of the Department of Defense (DOD) on science and technology (S&T) programs and their role in

the global war on terrorism and also in confronting emerging threats.

I'd like to thank the witnesses and I would really like to thank those who have provided the demonstrations in the back of the room for their participation.

I would urge all members, and when they come in, I will urge them again, and I would urge all those in the audience to take a look at the demonstrations that we have in the back of the hearing room.

These displays, I think, have helped us all better—I know they have helped me—appreciate and understand the role that S&T plays in equipping, training, and also protecting America's fighting force, i.e., the warfighter.

Let me say from the outset that as I went around the back of the room, and I apologize for missing some of the demonstration projects, but it indicates to me how important it is that we somehow meet the goal of 3 percent of defense spending for S&T and maintain the technological lead that is absolutely essential if we're going to continue to be successful in the global war on terrorism.

We have some stand-off equipment in regards to check points. We have Mr. Omni-Directional Inspection System (ODIS) over here on the floor, whom we could use by the Hart Building and probably speed the—I know speed doesn't work very well in the Senate, but at least to get Senators and also our visitors and other important people into the buildings. Why, ODIS could certainly do that job.

We have some unmanned aerial vehicles (UAVs) that can do the same thing in regards to check points. In the back, we have the Omni directional system. Actually, that's displayed and that's ODIS. We have 20 of the ODIS in operation as of right now—no. We have 20 and 10 are in operation.

Mr. Ranking Member and Senator Collins, I don't know why I got into all this, but at least give me a little slack here and I'll be all right.

We have a new bandage back there, and I can't read my writing, but basically it's made up of shrimp cells and vinegar. We have 3,000 of these. We need probably 303,000. It could be applied to a shrapnel wound or any other wound that is experienced in combat and save lives immediately.

We have another testing device over there right next to this bandage. It's C-H-I-T-O-S-A-N. I don't know how you pronounce that. We'll have to get a better acronym if we're going to work that out.

Then we have the taser and the shock demonstration. I urge everybody to go back there with the little black box. Put your finger on the little projectile and see how that feels. I did that three times and my finger is numb. You can see what would happen if that were used on an individual in terms of crowd control. If you had that kind of capability set back from what was happening in Iraq last night and the crowd control in the future, or something that would happen here in the Capitol area or, for that matter, anywhere. You can see where we're headed.

I was impressed with the Phraselator that deals in 53 languages. I spoke English and it came back to me in Iraqi. Then we have a whole series of other demonstrations back there. Part of the big challenge with those projects is to have interchange and interoper-

ability and a funding source that is constant so we can not only get these things out and have them tested in theater, but to have the funding so that we can proceed and then usually have a second development, a third development, so on and so forth.

There's an outfit back there called Portable Iris Enrollment and Recognition (PIER) 2.3. I just read in the paper today, Senator Reed, that the Federal Bureau of Investigations (FBI) and the Border Patrol say it's going to take 4 years to somehow get the data on fingerprinting to match up in terms of the database that the Border Patrol has and the FBI has.

Yet, we have an outfit back here that's about this big and this high in regards to focusing on the iris fingerprinting and facial recognition.

Basically that goes into a database. Why on Earth we could not get some kind of a—I don't know what to call it—you have to get that kind of unit in the hands of the FBI and the Border Patrol rather than spend 4 years trying to work on the fingerprinting. But you can see some of the options here.

We have Tactical Aircraft Directable Infrared Countermeasures (TADIRCM). We need to have an agency in charge of better acronyms. That's all there is to it.

We worry about surface-to-air missiles from terrorists attacking commercial and military aircraft. This is something that could provide us not guaranteed protection, but basically in flying the no-fly zones that we used to fly, much improved safety for our pilots.

With all the concern about commercial aircraft, I think that's the kind of thing that we're talking about. I told one of the reporters here this has application not only for the warfighter but also for homeland security.

All right. Enough of my editorials about the fine demonstrations. I want all of you after this is over—they're going to stay 15 minutes—to get in line and quick step right around there so you can see what these companies and contractors are doing.

Our first panel today represents technology operators and the warfighter and will inform us about the value of S&T programs from the perspective of those who receive new capabilities and put them to use.

Our second panel represents the S&T executives and will also address the design and the mission of technology and transition as well as priorities and budget for the S&T portfolio.

As demonstrated here today, decades of investments in basic and applied research have led to a force that is better equipped and protected. Many times you have a hard time explaining to our colleagues the value of basic research, but that is one area that we must certainly protect.

Our military possesses new standoff detection, surveillance, and, when needed, lethal capabilities.

What we don't have on display, but that represents another key return on our investment, is people. That's the chemist or the material scientist or the physicist or the computer whiz or the graduate student who will craft innovations for our future fighting force.

So today's agile and adaptive fighter will continue to face new battlefield challenges. We learn, they learn, and then we learn again.

We require an educated, well-trained resource pipeline from the researcher to the trigger puller to the operator to the field commander and on up. A vital question we plan to explore today involves whether we have enough of the right people trained, at least in part through funding and programs that are provided here.

We have seen this morning examples of the transition of technology from the vision stages to the lab to the prototype to the demonstration to testing and fielding, which really forms the key component of our military might and capability. We must continue in our determination and our ability to adapt to emerging challenges and improvise existing capabilities in new ways.

This involves, as I said before, basic research, including the creation of new tools and devices even before we fully realize what their use might be. It is a hard sell, but it is very important.

This subcommittee oversees a set of bridge programs that are designed to ensure that we cross the technology so-called "valley of death" in both directions, avoiding the disappearance of research results onto the shelf, where they never see any transition or use, and allowing for operators' feedback into the research pipeline.

Our investment in these transition programs has increased 32 percent over the last 3 years, and we look forward to your comments on the effectiveness of this investment in meeting our Nation's needs.

I have questions on the long-term viability of our current investment strategy and concern about the Department's apparent deviation from its projected 3 percent goal for S&T.

I know Senator Reed and Senator Collins share my view that this is a goal we should meet. We have not met it, and we have not met that goal in this year's budget. But in terms of increased funding from year to year, we are headed in the right direction.

Now, in thinking about any future threat and asking ourselves from a national security perspective what really keeps us up at night, we are always led to the next question, what have we done and what more can we do. S&T is a very key part of that answer.

We look forward to hearing from each of the witnesses. Please know that your full written testimony will be included in the record. Most senators can read, all staff can read, and so you can summarize your comments if you so choose to allow time for questions and answers for both of our panels today. I would ask that you very briefly summarize your remarks—something I am not doing, and I apologize.

Again, I thank you for being with us this morning. I now recognize our distinguished ranking member, Senator Reed, for any comments he wants to make.

STATEMENT OF SENATOR JACK REED

Senator REED. Thank you very much, Mr. Chairman. Let me thank the witnesses and also thank all the individuals that made these very interesting and informative displays possible this morning.

This hearing gives us an excellent opportunity to see how investments in S&T can save lives and increase the effectiveness of our forces all over the globe. From armor protecting soldiers from rocket propelled grenades (RPGs) to UAVs, to new precision munitions, we have seen how advanced technologies have enabled the success of our forces in the global war on terrorism and in operations in Iraq. We are all very grateful that the organizations that are represented here have been so responsive to the needs of our combatant commanders and their specific emerging technology requirements. I hope that in this hearing we can examine all the important pieces that must be in place to ensure that the rapid deployment and development of technology is possible.

For example, I hope the witnesses can describe how they work with their contractors, defense labs, and the industrial base to ensure that we can rapidly manufacture these innovative technologies on demand and in sufficient quantities.

In particular, it would be interesting to learn how our investments in manufacturing technologies and in our technical workforce contribute to this capability to surge production.

I also hope that we can examine the funding mechanisms that are used to support the rapid transition of these technologies. Most government funding processes are extremely rigid and slow. So it is remarkable in many cases that money can be moved fast enough to address any emerging requirement in a timely fashion.

I hope the witnesses can make clear whether funding has been included in special technology transition accounts or supplemental appropriations, whether it required reprogramming funds from other critical needs or whether new funding mechanisms need to be devised. That's something that we can work on in this subcommittee.

Finally, I hope we can discuss the S&T programs that develop these technologies in the first place and provided us the possibility of meeting some real needs in Iraq and Afghanistan.

As I visited Iraq last July, the first thing that my National Guard military police (MP) men and women told me was they needed armored High Mobility Multipurpose Wheeled Vehicles (HMMWVs). The Army has been responding and the kit that's being developed by the depots is one response to that.

So I commend all of you for your response to these individual needs of the soldiers and marines in the field.

We should always remember that the technological advantage that we currently enjoy should not be taken for granted. It has been earned through years of stable investment in S&T and the hard work of scientists, engineers, universities, small businesses, governmental labs, and the defense industry.

It was the research investments of the 1980s and the 1990s that have led to the Global Positioning System (GPS)-guided munitions, unmanned vehicles, and instantaneous communications that are making the difference for countless young people serving today. We must ensure that these investments are continued for the sake of those who will serve tomorrow.

This hearing brings into sharp focus the role that S&T plays in the current operations of our military. That is why it is so dis-

appointing that the President's 2005 budget request cuts S&T by \$1.5 billion as compared to last year's appropriated levels.

The request also does not meet the goal of investing 3 percent of the DOD's budget in these innovative S&T programs. A concern I share with the chairman.

The reductions in these programs may severely impact the work that is done by our Nation's high-tech small businesses as well as the university research programs that are training the technical workforce of the future.

I look forward to learning how these budget decisions were made and how they will impact our ability to continue to produce the critical lifesaving technologies that we are highlighting today.

Once again, welcome to our distinguished witnesses and I look forward to their comments. Thank you.

Senator ROBERTS. I thank my colleague and friend.

Senator Collins, would you have any opening comment?

Senator COLLINS. Mr. Chairman, in the interest of time, I will just submit my statement for the record and look forward to hearing from our witnesses.

Senator ROBERTS. I truly appreciate that.

[The prepared statement of Senator Collins follows:]

PREPARED STATEMENT BY SENATOR SUSAN M. COLLINS

The past 2 turbulent years have demonstrated that an investment in innovative research and development (R&D) will help to ensure that our Nation's military accomplishes its vital missions.

The continuing source of ingenuity provided by our R&D community has demonstrated that it is instrumental in the war on terrorism. Defense R&D runs across a broad spectrum of projects from widely known programs to those which receive scant attention. But each program is necessary to our continuing efforts to provide for national defense and engage the enemy abroad. Our soldiers should have the best tools possible for their missions. Mr. Chairman, members of the subcommittee, and members of today's panels, our soldiers deserve nothing less.

Our science and technology (S&T) community has produced or is continuing to develop technologies that only a few decades ago were unknown or deemed impossible to achieve in our own lifetime. From directed energy weapons to advanced bandages to language converters to microsatellite technologies, the United States is continuing to make investments in its own security and, consequently, our long-term freedom from terrorists and future adversaries.

In my home State of Maine, several companies are rising to the challenge of providing effective, high-tech answers to current and future needs. Applied Thermal Sciences (ATS) in Sanford, for example, is developing technologies in advanced composites, laser welding, and propulsion systems. Technology Systems, Inc., in Wiscasset, is producing the first commercial solar-rechargeable autonomous underwater vehicle. The Sensor Research and Development Corporation (SRD) is developing novel chemical and biological sensor technologies.

I look forward to hearing the testimony of our distinguished witnesses and the effort the Department of Defense (DOD) is making in providing critical technologies to the war on terrorism.

Senator ROBERTS. Senator Allard.

Senator ALLARD. Mr. Chairman, I have just a very brief comment. First of all, I want to thank you for holding this hearing and then just review briefly a couple of points.

The Secretary of Defense told Congress that the U.S. Special Operations Forces (SOF) will have an expanded role leading the global war on terror.

I'm pleased to hear in this morning's testimony that the DOD has made great strides in advancing not only the state-of-the-art technology leading to new technical capabilities, but also the bu-

reaucratic transformations necessary to speed these new capabilities into the field with the warfighters.

I'm hopeful that Congress can help this year by getting the S&T program budget closer to the Secretary's goal of 3 percent of the total defense budget and providing additional authorities or resources through the technology transition initiative for rapid prototyping and fielding of emerging technologies that will sustain our battlefield superiority for decades to come.

I'd just like to thank you, Mr. Chairman, again for this hearing. Senator ROBERTS. I thank my colleague and friend.

On our first panel, we have Dr. Dale Uhler, who is the acquisition executive and senior procurement executive at the Special Operations Acquisition and Logistics Center of the United States Special Operations Command (SOCOM).

We are also pleased to have General Thomas D. Waldhauser of the United States Marine Corps. He's the commanding general of the Marine Corps Warfighting Lab, something I visited what, 7, 8 years ago, which is about half the size of this room, and you've done a splendid job of expanding that whole operation. He is also the vice chief of the Office of Naval Research.

We are also pleased to have General Charles A. Cartwright of the U.S. Army. He is the deputy commanding general for systems of systems integration from the United States Army Research, Development and Engineering Command.

Dr. Uhler.

STATEMENT OF DR. DALE G. UHLER, ACQUISITION EXECUTIVE AND SENIOR PROCUREMENT EXECUTIVE, SPECIAL OPERATIONS ACQUISITIONS AND LOGISTICS CENTER, UNITED STATES SPECIAL OPERATIONS COMMAND

Dr. UHLER. Mr. Chairman, distinguished members of the subcommittee, it is truly an honor and a privilege to report to you.

Senator ROBERTS. Could you pull that microphone right up close to you? This room is famous for its echoing effect. So speak loudly and have at it.

Dr. UHLER. Mr. Chairman, distinguished members of the subcommittee, it's truly an honor and a privilege to report to you this morning on the topic of special operations technology. I'll keep the opening remarks short as you requested, but would like to enter written testimony in the record.

Congress, through title 10, U.S. Code, chapter 6, section 167, empowered the commander of SOCOM to develop and acquire special operations' peculiar equipment, material, and services. This is equivalent to what the military departments do for their respective programs. So we consider ourselves extremely fortunate to have that authority and capability.

We've implemented and streamlined cost-effective processes to provide the SOF soldiers, sailors, and airmen with the technology they need. Our fundamental acquisition philosophy in SOCOM is to field in an expedited manner the 80 percent solution while working with our actual warfighters and industry to address the remaining 20 percent of the requirement.

In essence, we've really bought into the concept of spiral development and evolutionary acquisition.

One of the things that really helps us is our ability to leverage very heavily the research and development programs that are occurring in the military departments, the Defense Advanced Research Projects Agency (DARPA), Department of Energy (DOE) labs, and other Government agencies.

We also survey industry on a continuing basis and use a buy-and-try approach for Government and commercial off-the-shelf items. When we get our hands on these, we have our warfighters perform user evaluations of these potential systems and then we make appropriate modifications, retest, and field the acceptable products.

We have an especially close relationship with our SOF operational users, which really facilitates our ability to make all this happen.

We also have the advantage of having our acquisition organization collocated with headquarters SOCOM and, thus, we have daily contact with our SOF warfighters.

We have small, short decision cycles and the support we receive again from the Services, DOD, and Congress have been major contributors to our effectiveness.

With our expanded role in the global war on terrorism, we've gotten increased resources from Congress and also from the DOD which has helped us to even more expeditiously field solutions that our warfighters need on a daily basis.

People are our most important asset. That said, we have a parallel situation that says maintaining and improving the material capabilities for our people is also our most difficult challenge because these people are on the tip of the spear. They need new capabilities as quickly as we can get them and they need the best ones that we can field and provide.

In conjunction with the war on terrorism and the fruition of some of our flagship research and development (R&D) programs as they move into procurement we are changing our focus in the S&T arena and we're focusing now on three major initiatives.

One is the individualized platform. We firmly believe that the individual is the indispensable element of our SOF and we need to develop enhanced protection, armor, lightweight sustainment systems, night vision devices, and better weaponry.

We also need to manage the SOF personnel signature in all environments so that he remains invisible to the enemy, yet the enemy becomes visible to him regardless of concealment.

At the same time, we need to do this without increasing weight and complexity. Speaking of weight, power and power sources have been and continue to be both a major problem and a critical need for our SOF forces.

At this point in time, approximately one-third of the weight carried into combat by our individual SOF soldier comes from batteries. We urgently need power sources that are small, lightweight, and inexpensive, while at the same time providing high power, long endurance, interchangeability, and multiple recharging features.

These batteries and our fuel cells must give off little or no signature and offer our SOF users an extended operating capability without suffering degradation or requiring resupply.

We also need to know what the battlefield around the individual SOF operator or team is comprised of. Consequently, we are pursuing a family of unmanned and semi-autonomous or autonomous systems, for air, land, sea, and possibly space sensors in the future which will range in size from tactical to micro and nano.

This will give us the persistent intelligence and denied area access to meet the needs of our SOF operators as they determine the landscape around them and go into harm's way.

Systems must also possess a reduced logistical footprint and withstand the rigors of the various climates and operating environments in which we work.

In conclusion, we've worked hard to wisely use our resources to sustain systems when it makes sense, to integrate new technologies into legacy systems, and to acquire new technically-advanced systems. We intend to continue this focus in our concept of rapid prototyping and fielding and we also want to aggressively leverage the S&T and R&D investments of our military departments as well as the other Government agencies and industry.

Thank you very much for the opportunity to appear before you this morning.

[The prepared statement of Dr. Uhler follows:]

PREPARED STATEMENT BY DR. DALE G. UHLER

Mr. Chairman and distinguished members of this subcommittee, I am Dale Uhler, Acquisition Executive for the United States Special Operations Command (SOCOM). Thank you for the honor and privilege of providing you with a perspective on SOCOM's science and technology (S&T) strategy.

INTRODUCTION

A real strength of SOCOM is the commander's acquisition authority, which is similar to that of the military departments (MILDEPs). Among the responsibilities assigned to the Commander, SOCOM, under title 10, section 167, is that of developing and acquiring "special operations-peculiar" equipment. Special operations-peculiar equipment is based on technologies that enable our operators to become faster, stealthier, more precise, lethal, survivable, and sustainable. With exceptional support from Congress, the Secretary of Defense, MILDEPs, defense agencies, other government agencies (OGAs), and our industry partners, these authorities have been instrumental in equipping today's world-class Special Operations Forces (SOF) team to perform a broad range of SOF missions.

We enhance those authorities through aggressive application of acquisition policy and guidance, organizational flexibility, and streamlined procedures that facilitate rapid response to the needs of our warfighters. SOCOM is accustomed to and comfortable with change and has a tradition of "out of the box" transformational thinking.

A guiding principal of our acquisition policy has been to embrace and respond to change. Our system has been built to recognize not only the critical need to respond quickly, but also to adequately sustain the combat forces that protect us and our interests throughout the world. Our dialogue with and planned leveraging of other DOD developers' efforts to integrate SOF requirements into new equipment, coupled with our willingness to take calculated fielding risks when necessary to improve our capabilities on the battlefield will continue to play a major role in our success. SOCOM's aim in pursuing technological transformation is to guarantee our forces remain relevant in any fight, and ensure we minimize risk to our Nation's vital interests while providing reliable support to the overall Defense Strategy.

GLOBAL WAR ON TERRORISM/THE IMPACT OF TECHNOLOGY

As we develop the tools to conduct our expanded mission in the fight against terrorism, SOCOM has transformed from the traditional train, organize, and equip mission to a capability to plan and execute the global war on terrorism. Our near term objective is to continue to realign our requirements and programs to better address the war on terrorism mission. As such, we will be eliminating those legacy

systems that do not support the global war on terrorism and using the saved resources to invest in future capabilities. Our programs must be transformational, not merely a re-invention of what we are doing today, and SOCOM must continue to invest in making our SOF more capable in all tactical environments. To this end, our research and development (R&D) activities are being refocused to exploit technologies in the following areas:

Individual As A Platform

The individual is the indispensable element of our force. We need to develop enhanced protection, armor, lightweight sustainment systems, night vision devices and better weaponry. The SOF warrior must be able to manage his signature in all environments, and see the enemy regardless of concealment. We need to do this without increasing weight and complexity.

Power

Power sources have been, and continue to be, both a major problem and a critical need for SOF. One-third of the weight carried into combat is from batteries. SOF urgently needs power sources that are small, lightweight, and inexpensive while providing high power, long endurance, interchangeability, and multiple recharging features. These batteries/fuel cells must give off little or no signature and offer the SOF user an extended operating capability (months) without suffering degradation or requiring re-supply.

Sensors

We are pursuing a family of unmanned, semi-autonomous and/or autonomous systems (air, sea, land, and, in the future, space) ranging in size from tactical to micro and nano, which will use persistent intelligence and denied area access technologies to meet the needs of SOF operators. These systems must be simple to operate, possess a small manning and logistical footprint, and withstand the rigors of various climates and operating environments.

SOCOM ACQUISITION

The nature of the global war on terrorism forces a technology developer to move quickly to understand the operator's needs and to satisfy them with state of the art technology. To facilitate this process, our professional staff maintains constant liaison with our component commands and visits deployed forces to ensure that we understand the need in the context of the mission. Often, prototype equipment is made available for user evaluation before designs are finalized. The use of concept-based experimentation and demonstrations to ensure that the product we are providing is, in fact, the best solution to an identified deficiency is an integral part of our approach to S&T development. This includes early hands-on prototype assessments conducted by uniformed SOF operators. These assessments typically provide invaluable feedback concerning factors such as weight, ergonomic design considerations, military utility, and the ease with which the system can be employed, learned, and sustained. Such feedback saves considerable expenditure of scarce resources by identifying problem areas at the prototype stage rather than during production. To accomplish this, the Command has a Special Operations R&D Support Element (SORSE) to assist in the development of new equipment. SORSE includes operators who are fully qualified in a wide variety of combat skills. As noted above, it is their early and expert involvement that allows us to streamline development and to produce fieldable equipment in minimum time.

We are often told that SOF items of personal equipment (helmets, boots, etc.) are in high demand by the other Services. In fact, we use Service equipment to the maximum extent possible. When mission requirements dictate special gear, we first seek to modify the standard item and, if that is not possible, we turn to commercial vendors to meet the requirement. In all cases, we work closely with the MILDEPs to ensure that whatever we field is sustainable.

Special operations elements are deployed throughout the world as our first line of defense against the global war on terrorism. Much of the legacy equipment we use to ensure a redundant mission capability is wearing out and we are now faced with the choice of modernizing or simply sustaining the current capability. To help us with the decision process, we are continually seeking transformational options, those new equipment or equipment concepts that will truly enhance our capabilities and allow us to address new missions and execute existing tasks better.

SOCOM is a highly professional organization in which training is a way of life. Maintaining the capabilities of deployed forces provides unique challenges, so we pursue technology to assist us with training sustainment. Recent advances in

ruggedized language systems and computer-based training are being effectively used by our deployed forces, but more needs to be done in this area.

The core capabilities of SOF typically require leading-edge technologies to meet the requirements for rapid deployment, precise and decisive employment, and sustainment while operating far forward of conventional support structures.

The focus for SOCOM's S&T investment strategy, therefore, is how to effectively apply and invest available resources to achieve those SOF-peculiar capabilities. Much of the basic and advanced research efforts behind our S&T program requirements are similar to those of the MILDEPs or OGAs. Therefore, cooperation and coordination with ongoing MILDEP, Defense Agency, and OGA technology development programs plays an important role in SOCOM's technology development strategy. We aggressively interact and coordinate with other S&T organizations. This includes participation in reviews, cooperative developments, collocated liaison personnel, Service advisors, and information sharing. We are putting in place new Memoranda of Agreement (MOAs) with the MILDEPs to further enable a mutual focus on key cooperative efforts and transitions. We are proud of the progress we have been able to make delivering advanced technology into the hands of the SOF operator, but we can and will do better. We could not have been, and will not be, successful without the continued support of the larger R&D community.

As the opportunity presents itself, we suggest modifications to those R&D community projects of interest to encourage them to move in a direction that could also satisfy a SOF need. R&D efforts that are kept in-house are those that contribute most directly and specifically to SOF core tasks and that are least likely to be realized or supported by the MILDEPs, Defense Agencies, or OGAs. We highly value the close partnerships we currently enjoy with the MILDEP laboratories, Defense Advanced Research Project Agency (DARPA), Defense Agencies and other national laboratories, as well as academia and industry.

SOCOM also strives to ensure that our materiel capability solutions are based on requirements identified by our SOF warfighters in the field. Concurrent with the development and fielding of new equipment will be the development of changes in SOF doctrine based on that equipment, the development of training programs to ensure that our operators know how to use and maintain their equipment, and the initiation of sustainment programs to keep their equipment operational.

EXAMPLES/SUCCESSSES

The SOCOM Acquisition and Logistics Center (SOAL) exhibited exceptional adaptability in response to the demands of sustaining forces during Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). The SOAL has been responding to combat mission needs and urgent deployment acquisition requests from deployed and deploying units. Our efforts have resulted in the rapid fielding of numerous equipment items and systems to satisfy the requirements of SOF elements. The support of the Office of the Secretary of Defense (OSD) and Congress, who provided supplemental resources, was the key to our ability to rapidly field those requirements without having to break other programs that are also important to SOCOM mission accomplishment.

The Military Operations in Urban Terrain (MOUT) Advanced Concept Technology Demonstration (ACTD), a joint U.S. Army/Marine Corps/SOCOM program, identified the Pointer unmanned aerial vehicle (UAV) system to satisfy a multi-Service requirement. Operator evaluations fed into an R&D cycle, and the developer made significant improvements to the Pointer system. The Pointer system continued to grow through the MOUT ACTD and a number of upgrades were made to the system to meet SOF requirements. A Combat Mission Needs Statement (CMNS) was received in December 2001 and initial deliveries began in March 2002. A second CMNS delivered 20 more systems into the hands of SOF operators in October 2002. The ACTD program office formed a cadre to train SOF operators in the tactical employment of the system concurrent with operational testing. The training cadre deployed to Afghanistan in November 2002 to conduct additional training, perform intermediate level repairs, and implement a software upgrade to the system. SOF user feedback on the Pointer system was used to refine later iterations of the Pointer system and assist the contractor in developing its successor, the Raven UAV. The Raven UAV leveraged all of the lessons learned through developing and fielding Pointer and packaged it in a system less than half the size of Pointer. The first Raven was delivered in May of 2003. In December 2003, a third CMNS was issued by SOCOM, this time for the procurement of Raven systems. These systems are successful because of the constant user feedback that fed our R&D process over the last 3 years. The success of these systems also illustrates the inherent utility of the spiral development and evolutionary acquisition processes available for our use.

People are SOF's greatest asset. Rapidly applying medical technology to save lives is a top priority. An excellent example is our one-handed tourniquet. This tourniquet provides SOF with a vastly improved capability to self-provide immediate trauma care for combat-induced wounds. The requirement for such a device was forwarded by SOF operators to SOCOM's Biomedical Initiative Steering Committee (BISC) which supports the Special Operations Medical Technology (MEDTECH) program. The BISC focused on accelerating fielding of the tourniquet. SOCOM, through the BISC, worked closely with the U.S. Army Institute for Surgical Research and SOF operators, to develop and evaluate multiple prototypes. We were able to field prototype tourniquets to deployed SOF operators in 2002.

TECHNOLOGY TRANSITION PROCESS

We have learned from both the experiences of the MILDEPs and our own early experiences that transitioning new technologies into fieldable equipment is a difficult challenge that, if not solved, denies needed capabilities to our SOF users. Within our structure, we are addressing this challenge by transforming our technology transition process to function like "an interstate instead of a traffic jam." In SOCOM, as throughout DOD, technology development is an integral part of the acquisition process. Our Advanced Technology Directorate is collocated with our program executive officers (PEOs) and other acquisition professionals. This collocation enables continuous collaboration, as well as the early agreements and necessary planning for successful technology transition. This process, coupled with our close cooperation with the user, enables us to adequately plan for the resources required to support the new capability.

As we look to the future, we will continue to rely heavily on the MILDEPs, defense agencies, OGAs, academia, and industry partners to leverage their intellectual and development capabilities. We will use technology roadmaps built upon SOCOM's Technology Thrust Areas (TTAs) drawn from Special Operations Technology Objectives (SOTOs) reflecting the commander's refocus on the global war on terrorism to guide our research, development, test and evaluation (RDT&E) efforts. In addition, we will continue the judicious use of ACTDs to focus on system of systems approaches to reduce sensor to shooter lag time. We will strengthen our collaboration with the MILDEPs through efforts such as the Army's Future Force Warrior (FFW) program to develop and demonstrate revolutionary capabilities for the individual soldier and small team using a holistic and synergistic approach.; Navy projects to improve intelligence, surveillance, and reconnaissance (ISR) in denied littoral areas; and Air Force programs such as the Air Force Research Laboratory's Battlefield Air Operations kit to develop technologies to better locate, identify, designate, and transmit target information.

CONCLUSION

In closing, S&T programs are crucial to Secretary of Defense Rumsfeld's goal to provide transformational capabilities to the DOD. I believe the successes the DOD has enjoyed in science and technology are significant.

Now, and in the future, SOCOM will continue to pursue technologies that improve its ability to execute the global war on terrorism, while remaining ready to deal equally with the demands of both our warfighting and peacetime roles, missions, and responsibilities.

It has truly been an honor for me to come before you today to tell you about our successes and the future S&T focus at SOCOM in support of the "quiet professionals." Most of all, thank you for your continuing support of our SOF warfighters.

Senator ROBERTS. We thank you very much, Dr. Uhler.
We now have General Thomas D. Waldhauser.

STATEMENT OF BRIG. GEN. THOMAS D. WALDHAUSER, USMC, COMMANDING GENERAL, MARINE CORPS WARFIGHTING LABORATORY; VICE CHIEF, OFFICE OF NAVAL RESEARCH

General WALDHAUSER. Thank you, Senator Roberts.

Chairman Roberts, Senator Reed, distinguished members of the subcommittee, it is my privilege as the Commanding General of the Marine Corps Warfighting Laboratory and as Vice Chief of Naval Research to address you today.

Prior to September 11 and the global war on terror, naval S&T worked diligently and productively on delivering technologies to the operating forces through the well-constructed R&D process.

This approach certainly has merit for supporting the deliberate development and fielding of future warfighting capabilities. As we noted, however, this approach was not always responsive to some of the emergent needs of those tasked to fight in the harsh and challenging environments of locations such as Afghanistan and Iraq.

Nevertheless, the “business as usual” mindset has changed. To adapt, the S&T community has had to take its traditional approach to technology push and requirements pull and make them equally capable of timely and responsive support. This also gave the S&T community the opportunity to be even more relevant.

My experience during the early days of Operation Enduring Freedom (OEF) in Afghanistan clearly laid out to the S&T community critical needs such as updated aircraft, electronic countermeasures, dust palliatives that mitigate unsafe dust levels in austere environments, persistent intelligence, as well as reliable over-the-horizon and on-the-move communications.

For the S&T community, OEF served as a real-world laboratory for what it takes to fight on an extended battlefield with dispersed locations in support of the global war on terrorism.

During Operation Iraqi Freedom (OIF), it was my experience that the S&T support was making an incredible shift from the traditional approach of delivering capabilities to the warfighter through expectations and formal programs of record to one that also accommodates a more proactive and responsive methodology.

My formal statement gives several examples of this process.

As marines head back to Iraq, the level and commitment and desire from the S&T community to support those going back into theater remains unchanged. Moreover, standing working groups and cells within the Office of Naval Research and the Marine Corps Warfighting Laboratory now work in tandem with operational forces, the Marine Corps Systems Command, and the Marine Corps Expeditionary Force Development Center in Quantico under the leadership of the deputy commandant for combat development in defining requirements, identifying capability gaps, and determining potential technology solutions and finally delivering necessary capabilities to the warfighter.

In summary, the more traditional approach to S&T support to the warfighter has been energized and has become somewhat more responsive. At this time, however, we must ensure we continue not only to satisfy emergent needs in the global war on terror, but also to continue to judiciously invest in higher-risk, long-term discovery and invention.

Thank you for this opportunity this morning and I look forward to your questions.

[The prepared statement of General Waldhauser follows:]

PREPARED STATEMENT BY BRIG. GEN. THOMAS WALDHAUSER, USMC

INTRODUCTION

Chairman Roberts, Senator Reed, distinguished members of the subcommittee; it is my privilege to serve as the Commanding General of the Marine Corps

Warfighting Laboratory at the Marine Corps Combat Development Center and as the Vice Chief of Naval Research at the Office of Naval Research. Thank you for the opportunity to share my views on the important issues associated with naval science and technology (S&T) as they impact the global war on terrorism and the Marine Corps' operational abilities to successfully wage that war. I would like to address the contribution of naval S&T based upon my experience as an operational commander and from what I have observed and learned since recently assuming a leadership role in naval S&T. To put my thoughts in context, I would like to lay out how S&T supported the warfighter prior to the global war on terrorism, and then discuss how I saw this support adapt from the period of Operation Enduring Freedom (OEF) in Afghanistan to Operations Iraqi Freedom (OIF), and since that period how I see naval S&T supporting the warfighter today and into the future.

PRE-GLOBAL WAR ON TERRORISM

Prior to the global war on terror, naval S&T worked diligently and productively on delivering technologies to the operational forces through the well constructed research and development (R&D) process, gleaning technology opportunities through basic research, discovery and innovation, and exploitation and deployment into formal programs of record within the systems commands. The requirements process was generated through universal needs statements articulated periodically by the operational forces and vetted through a concept based requirements system. Both the Navy and Marine Corps conducted aggressive concept based experimentation in partnership with the operational forces. The identification of operational requirements and the servicing of these through the combat development process worked well, but were often protracted. The tendency was to respond to requirements of the operational forces using a requirements pull methodology. This approach was probably appropriate for supporting the deliberate development and fielding of future warfighting capabilities. As was soon seen, however, this approach was not particularly responsive to the emergent needs of the men and women who would be asked to fight the global war on terrorism.

POST-GLOBAL WAR ON TERRORISM

Business as usual changed rapidly and permanently as a result of September 11 and the initiation of the global war on terrorism. While S&T clearly still needed to conduct basic research, which could identify cutting edge technologies for the future warfighter, it was also recognized that S&T needed to focus attention on today's warfighters engaged in current operations. To adapt, the S&T community has had to take its traditional approach to technology push and requirements pull and make them equally capable of timely and responsive support as well as deliberate support.

The global war on terrorism presented the S&T community with new challenges; but more importantly the global war on terrorism has given the naval S&T community the opportunity to be even more relevant to the warfighter. I think it would be useful for us to briefly look at S&T involvement in our two most recent operations: OEF and OIF.

OPERATION ENDURING FREEDOM

From my perspective, OEF was a "come as you are" operation. I was the Commanding Officer of the 15th Marine Expeditionary Unit (MEU), forward deployed to the Northern Arabian Sea after the attack of September 11. This Marine unit was the initial conventional force on the ground in Afghanistan. As such, there was little opportunity for us to identify S&T needs or for emerging S&T to be pushed. What OEF did provide was a tremendous number of needs that could be supported by emerging S&T. OEF clearly laid out to the S&T community critical needs such as aircraft electronic countermeasures, effective dust palliatives to mitigate unsafe dust levels in austere operating environments, more pervasive intelligence, surveillance, and reconnaissance (ISR) at the tactical level, as well as reliable over-the-horizon and on-the-move communications. For the S&T community, OEF served as a real world laboratory for what it takes to fight on extended and dispersed locations in support of the global war on terrorism and battlefields of the future. Additionally, OEF underscored the need for a streamlined processes for the S&T provider as well as the combat developer to fast track the needed capabilities to the warfighter.

OPERATION IRAQI FREEDOM

Based upon my experiences in OIF working with the British Royal Marines, and as part of I Marine Expeditionary Force (I MEF), again as the commander of the 15th MEU, I believe there was a real sea change in the manner in which naval S&T

was approached. What I observed in OIF, and what I have learned since assuming my current position, validates that S&T support is making a credible shift from the traditional approach of delivering capability to the warfighter through experimentation and formal programs of record to one that also accommodates a more proactive and responsive methodology. Operators, combat developers, and technologists are now working more closely in S&T working groups, focusing on the delivery of viable cutting edge technologies to the warfighter.

To illustrate how the S&T community has responded to the challenges of the global war on terrorism, I have selected a few examples of successful efforts resulting in the rapid fielding of advanced capabilities provided to the operating forces as a result of warfighting requirements that leveraged technology.

The Marine Corps' Dragon Eye unmanned aerial vehicle (UAV) is a great example of how "technology push" can work. Originally conceived of as part of an effort by Office of Naval Research and Marine Corps Warfighting Lab to enhance small unit organic surveillance, the Dragon Eye combines advanced technologies in hand held computer devices, batteries, electric motors, wireless data communications, and optics. This combination has yielded a man-portable, easy to use UAV that can move with combat forces and provide overhead imagery directly to a battalion or smaller sized unit. The success of this UAV, and the initial response from the operating forces lead to a plan to build and field these systems. The subsequent onset of OIF, caused us to re-prioritize available funds and complete the initial fielding in time to support our marines during combat operations in Iraq. Twenty Dragon Eye aircraft deployed with elements of the 1st Marine Division during OIF. After action feedback from the war confirmed the value of a man-portable small unit level UAV and the Dragon Eye UAV is now a program of record with initial full fielding starting in May 2004. Moreover, marines presently returning to Iraq are relying on this capability to provide them with intelligence gathering observation.

As part of naval S&T's long-term investment in urban combat innovations, the critical need for squad level communications became apparent to enable small units to rapidly coordinate the complex tactics of building-to-building and room-to-room combat. Our British partners in this effort suggested we try a commercial off-the-shelf radio called the Personal Role Radio (PRR). Low-cost development of this commercial off-the-shelf (COTS) item enabled this to be interoperable with our newest small unit tactical radios and we now have communications systems that support units down to the lowest tactical level. Responding to a request by 1st Marine Division, who participated in the PRR experiments, radios were purchased for the deploying infantry units. The PRR will now be part of a Marine Corps wide fielding program. As I can personally attest, this simple and highly effective addition to the equipment of the marines in Iraq was an extremely relevant and timely addition.

A third example of successful transition of an experimental system to combat forces in Iraq focuses on the individual rifleman. The Advanced Combat Optic Gun (ACOG) sight exploits what hunters and competitive marksmen have known for years. A quality optic on a quality rifle will enable an average shooter to regularly hit a target at greater distances. After conducting experiments with the ACOG, which confirmed the advantages of this sight, the S&T community provided the test sights along with additional sights purchased to support marines deploying to Iraq. The response from marines in combat confirmed that plans for full fielding this device are right on target.

Another great example of how the development of experimental prototypes can be rapidly transitioned to operating forces to meet contingency requirements is seen with the Pre-First In Command and Control (Pre-FICCS) project. The Office of Naval Research and the Marine Corps Warfighting Lab had previously conducted tactical experiments with this system. Pre-FICCS offers the commander a highly mobile and fully operational level command and control suite. The configuration can be as small as two Highly Mobile Multipurpose Wheeled Vehicles (HMMWVs). Comparable conventional command and control suites are many times larger and considerably cumbersome to move. When faced with the deployment to Iraq, the S&T community made this system available to I MEF. This turned out to be a crucial technology that enabled the MEF commander to rapidly establish forward command and control that could keep pace with the rapid advance during OIF.

Although the normal interest in what the S&T community provides the warfighter deals with advanced equipment, the same organizations are also involved with non-material solutions that in some cases provide even broader and more significant changes to the way we fight. The Marine Corps Warfighting Lab has dedicated an effort to develop advanced tactics, techniques and procedures aimed specifically at the challenges of urban combat. After a strenuous series of experiments conducted during the late 1990s, the Marine Corps Warfighting Lab developed a comprehensive revision of our tactical urban doctrine as well as a supporting training program

to compliment this effort. Initial units that participated in these experiments and conducted these revised urban tactics, used the skills extensively in the villages and cities of Iraq. To ensure our marines now returning to Iraq have the absolute best training available, the Marine Corps Warfighting Lab is sponsoring an intense training effort for all of the units returning to Iraq that will better enable them to conduct stability and support operations in urban terrain.

Most recently, the Marine Corps Warfighting Lab has re-oriented our main experimentation program titled Sea Viking to support marines deploying for OIF-II. In its original form, Sea Viking aimed at the transformational capabilities the Marine Corps will need to operate on the dynamic battlefields of the future.

Although the re-deployment to Iraq of Marine forces scheduled to conduct the Sea Viking experiments changed the immediate Sea Viking goals, this presented another opportunity for the S&T community to provide direct support to deploying forces while still maintaining the transformational momentum of the Sea Viking program. One of the central technology areas being pursued by Sea Viking involves on-the-move command and control of dispersed forces operating on an extended battlefield. Sea Viking experiments planned to use a surrogate command and control system called the Experimental Tactical Communications System (ETCS). ETCS is based on the commercial IRIDIUM satellite telephone network. S&T development has modified this commercial system to achieve a tactical networked architecture that supports voice and data communications extending to any user, worldwide. A portion of this architecture will provide portable unit, individual vehicle, or individual marine position location information that is interoperable with current command and control systems.

By revising the Sea Viking program, the Marine Corps now plans to deploy ETCS with elements of the I MEF returning to Iraq, while still maintaining the integrity of the Sea Viking long-range experiment goals.

The S&T efforts I have addressed are only a small representation of the tremendous work that a number of people and organizations successfully undertook to support the warfighter in OIF.

While the context of OIF has changed, (some refer to it as OIF-II,) the level of commitment and desire of the S&T community to support those going in harms way remains unchanged. For example, standing working groups and cells within the Office of Naval Research and at the Marine Corps Warfighting Laboratory work in tandem with the operational forces, the Expeditionary Force Development Center and the Marine Corps Systems Command, under the leadership of the Deputy Commandant for Combat Development in defining requirements, identifying capability gaps, determining potential technology solutions and finally delivering sorely needed capabilities to the warfighter. Examples of these range from counter improvised explosives devices (IEDs) technology to explosive resistant coatings. These types of efforts are outlined in weekly S&T support to OIF-II situation reports that are disseminated widely within the Department of the Navy. Additionally, the Iraqi Freedom Combat Assessment Team the Marine Corps deployed to Iraq to leverage and act upon lessons learned includes S&T personnel. This team is only one way the Naval Services are insuring that there is an open line of communications between deployed warfighters and the S&T community.

In summary, as an operator I see this as a good news story. The more traditional approach to S&T supporting the warfighter has evolved into a more proactive, responsive and supportive process, which will pay great dividends to today's warfighter as well as tomorrow's warfighter. While my comments today have principally focused on how the S&T community has become more responsive to the warfighter, I think it is important to note that these efforts would not have been possible had it not been for the long-term vision and commitment of those professionals involved in planning and executing S&T programs. We leverage today their past work and while we have focused on their many successes it must also be noted that S&T development is inherently risky. Every fielded success probably has a matching effort that ended up in the dustbin. Consequently, we must ensure that especially today we not only satisfy the emergent needs of the global war on terror, but also continue to judiciously invest in higher risk, long-term discovery and invention.

Senator ROBERTS. We thank you, General.

We turn now to General Charles A. Cartwright. General, you are recognized.

**STATEMENT OF BRIG. GEN. CHARLES A. CARTWRIGHT, USA,
DEPUTY COMMANDING GENERAL FOR SYSTEMS OF SYS-
TEMS INTEGRATION, UNITED STATES ARMY RESEARCH, DE-
VELOPMENT, AND ENGINEERING COMMAND**

General CARTWRIGHT. Thank you, sir.

Mr. Chairman and distinguished members of the subcommittee, on behalf of the soldiers and civilians of all the Army labs, thank you for this opportunity to appear here today. I would like to thank each of you for the tremendous support you continue to provide for our men and women in uniform wherever they serve.

Scientists and engineers from all our labs are deployed around the world to provide the combatant commanders and their soldiers, sailors, airmen, and marines immediate access to labs and centers to rapidly bring technology solutions and equipment improvements to the warfighters.

Providing the right technology to the warfighter faster is our primary focus in supporting operations in Iraq and Afghanistan and around the world.

Our laboratories and R&D centers have rapidly responded to immediate warfighters' requirements. You only saw two here this morning.

Other innovations include speech and language translation with DARPA, a ground standoff mine detection system, electronic countermeasure systems that provide protection for convoys and fixed sites, M1A1 grill rear doors, and Stryker slat armors.

This has all been made possible by teams from our laboratories, centers, depots, arsenals, and industries in fabrication testing and installation rapidly to the field. We provided these and many more items that are required to fill the critical capability gaps for the warfighter.

The command has increased on-the-ground visibility throughout the deployment of civilian and military S&T assistance teams to Iraq and Afghanistan to assist our S&T teams already assigned to the combatant commands.

These technologists on the point for the soldier have the flexibility to quickly reach back to the command's laboratories and centers to solve requirements in nearer time.

In supporting the development of the Future Combat System (FCS), we have changed how we have done business in the past to move quickly, spiraling new and emerging technologies into systems being developed and fielded to our current operating forces. This is having a direct impact on the current as well as the future force.

Capabilities at the 50 to 70 percent level, versus the 90 percent level, are now considered acceptable to provide an immediate solution to our forces. A sample of some of these technologies is the suite of sense-through-the-wall systems, a lightweight counter-mortar radar system, change-detection using high resolution and overhead imaging, and close-in active protection systems, just to mention a few.

While this new command is changing how the Army accomplishes its research, development, and engineering activities, we have also taken significant steps in making sure we work in partnership with the combatant commanders, the combatant devel-

opers, and the testing community to determine, provide, and test solutions to warfighters' needs.

We have developed ties with other Service laboratories, DARPA, DOE laboratories, and universities to leverage their resources. This joint approach is helping us ensure a clear path to the success in our future warfighting missions.

Today the Army is both at war and continuing development along the Army's campaign plan. As we move from our current force to the future force that is strategically responsive and dominant at every point on the operational spectrum, the Nation's S&T assets are essential to that success.

We must provide the technology solutions essential to the current and future warfighting needs across that spectrum for both joint and Army operations.

Thank you, Mr. Chairman, for the opportunity to testify before this subcommittee. I'll be happy to answer any questions from you or the members of the subcommittee.

[The prepared statement of General Cartwright follows:]

PREPARED STATEMENT BY BRIG. GEN. CHARLES A. CARTWRIGHT, USA

Mr. Chairman and members of the committee, on behalf of the soldiers and civilians of U.S. Army Research, Development, and Engineering Command (RDECOM), thank you for this opportunity to appear today. The men and women of RDECOM are deployed around the world to provide the combatant commanders, and their soldiers, sailors, airmen, and marines immediate access to labs and centers within RDECOM to rapidly bring technology solutions and equipment improvements to the warfighter.

To see our activities in context, it is important to understand the operational environment we face now and in the future. The nature of future warfare is expected to look less like Operation Desert Storm and more like what has been played out in Chechnya, Afghanistan, Iraq, and more importantly, the attack on the United States on September 11, 2001. In the old paradigm, we balanced the Soviet Union's superiority in quantity with our superiority in quality. In the new paradigm, we must have superiority in both quantity and quality. We can expect symmetry at the strategic and operational levels of warfare but asymmetry at the tactical level, as our enemies cannot win conventionally. As we are seeing currently, there will likely be a blurring among the strategic, operational and tactical levels. We can also expect increasingly sophisticated opponents exploiting all types of weather conditions and terrain (with urban increasingly likely) and employing both military and paramilitary conventional and unconventional forces. In both current and future warfare, we face the leveraging by adversaries of the global proliferation of weapons technology.

To meet the technological challenges of the current and future operational environment, the RDECOM was established in October 2003 as a Major Subordinate Command of the Army Materiel Command (AMC). RDECOM includes the Army Research Laboratory (ARL), Army Research Office (ARO), Army Materiel Systems Analysis Activity (AMSAA) and seven Research, Development and Engineering Centers (RDECs). They are the Aviation and Missile RDEC (AMRDEC), Natick Soldier Center (NSC), Armament RDEC (ARDEC), Communications and Electronics RDEC (CERDEC), Tank Automotive RDEC (TARDEC), Edgewood Chemical Biological Center (ECBC) and Simulation Training and Technology Center (STTC). A major part of the RDECOM's mission is to plan and execute the majority of the Army's science and technology (S&T) programs. The RDECOM is structured to enhance synergy across technology organizations, eliminate redundancy, improve the capability to do program and system integration, and improve the prioritization of programs. The RDECOM has three major objectives: (1) get emerging technology to the warfighter faster; (2) integrate research, development, and engineering across all areas of the Army, other Services, universities, and all other sources; and (3) demonstrate the agility to rapidly take advantage of technological 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 warfighters.

RDECOM is decisively and aggressively engaged in supporting current operations. The command created the Agile Integration Demonstration and Experimentation

(AIDE) organization, which functions not as a brick and mortar institution, but as a vital collaboration center to accelerate the delivery of technological solutions for warfighter requirements. The AIDE organization succeeds by helping the individual labs and centers, as well as the Program Managers (PMs), Program Executive Officers (PEOs), and the Rapid Equipping Force (REF).

RDECOM's AIDE deploys Science and Technology Assistance Teams (STATs) into theaters of operations and charges them with the role of liaison between the warfighters and the labs and development centers across the Army. Their role is to not only keep RDECOM informed of warfighter emerging requirements, but to also be our forward eyes and ears for scientists and technologists in our working centers. Additionally, the AIDE's Field Assistance in Science and Technology (FAST) teams, which are assigned to combatant commands, keep the scientists and engineers in RDECOM informed and orchestrate quick responses to the warfighters' needs. RDECOM also has numerous scientists, engineers and contractor personnel deployed in the theater of operations who are working side by side with soldiers to maintain and operate equipment employing new technologies that are being used in support of Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF).

Some examples of how the command is supporting current operations today are: ARL/TARDEC has implemented an expedient solution in which Army scientists and engineers designed a novel configuration of steel bars and steel armor that can be added to the doors of the High Mobility Multipurpose Wheeled Vehicles (HMMWVs) to protect crews from rocket-propelled grenades (RPG) attacks as well as small arms fire; 4,800 HMMWV application armor kits are in production by the Army's depots and arsenals and being deployed in theater, along with M1A1 rear grill door armor and Stryker "bar armor." The Defense Advanced Research Projects Agency (DARPA) and ARL developed the Pacbots (portable backpack robots) deployed to Afghanistan to clear caves and buildings. TARDEC, with cooperation from Utah State University, developed omni-directional under vehicle inspection systems to foreign devices and contraband; and CERDEC developed and fielded an electronic countermeasure (ECM) system that provides force protection in convoy, fixed site and check point missions against booby traps and remotely detonated weapons. By modifying an electronic warfare (EW) technology that has been fielded to defeat certain weapons, the research and development (R&D) community has created a number of systems that can be used by our soldiers to prevent the enemy from being able to use their improvised explosive devices (IEDs) in the vicinity of our operations. We are getting these new devices to the field as quickly as possible and will continue to do so while continuing to employ advances in electronic technology that will allow us to defeat the changing threat as our adversaries rapidly adapt. NSC developed Phraselator for fixed phrase speech translation from English to Dari, Pashto, or Arabic for use by special operations, civil affairs, military police (MPs), and medical personnel. ECBC developed chemical detection lab in Baghdad. AMRDEC integrated the Hellfire missile on a Predator Unmanned Aerial Vehicle (UAV). CERDEC developed a Well Camera System that is an alternative to lowering a soldier into a well to identify hidden caches of weapons and munitions; CERDEC developed and fielded two prototypes of the Ground Standoff Mine Detection System (GSTAMIDS), which is a remotely controlled vehicle-mounted mine detection system using a commercial off-the-shelf (COTS) vehicle (Meerkat) controlled by a follow-on vehicle (Buffalo). ARL developed a new sniper detection system for use in Iraq.

In addition to supporting current operations, RDECOM is heavily involved in moving future technologies into the current force. The RDECOM supports PM Future Combat Systems (FCS)/Lead Systems Integrator (LSI) by inserting advanced technology as it becomes available to increase FCS capabilities, using a spiral development acquisition approach. However, it is transitioning a number of technologies that are in development for PM FCS LSI, for use in current operations. Also, RDECOM supports the Army Chief of Staff's Focus Area effort through interaction with the Future to Current Task Force. The Task Force is working to provide future capabilities to an army that is in combat today: providing some of the FCS-like technologies that have been in development for the last 4 years. It is vital that we focus a portion of our S&T on deliverable, affordable products within shorter timeframes while the remainder continues to develop our "next generation" capabilities. The key enabler for this is to take shorter technology jumps and transition incremental improvements to the soldier rather than wait decades for revolutionary materiel and doctrinal changes. Sometimes a 70-percent solution that is available now can be better than a 99-percent solution that will be ready for fielding 3 years from now. For example, the First Strike Ration prototypes out of NSC were demonstrated under a previously completed Science Technology Objective (STO), but deployed to OEF and consumed by elements of the 75th Ranger Regiment. After receiving constructive comments from the deployed soldiers, the NSC team improved the nutrient-

laden ration, deployed the rations again, and now receives continuous requests for them.

Another example of moving technology forward is the Suite of Sense Through the Wall (STTW) system, which will provide mounted/dismounted soldiers with the capability to detect, locate and "see" personnel with concealed weapons and explosives who are hidden behind walls, doors and other visible obstructions. This capability has direct application to the operating forces requirements for military operations in urban terrain (MOUT), prisoner/checkpoint screening or hostage recovery operations.

An additional example where RDECOM is inserting advanced technological equipment for the warfighter is with the Lightweight Counter Mortar Radar (LCMR), which provides the capability of 360 degree detection of mortar fire out to ranges which are beyond the effective range of most mortar weapons and locating the firing weapon with accuracy sufficient to engage with combat air support. The radar weighs approximately 120 lbs and disassembles for transport. The radar reports target locations to a Personal Data Assistant (PDA) that can communicate with the radar wirelessly so that the radar operator need not remain with the radar. The PDA also provides radar control and receives and displays system status and fault messages.

IED Change Detection is being developed by CERDEC to detect IEDs along travel routes using high resolution aerial/overhead imagery. It uses day and night sights and is currently mounted on manned and unmanned aviation systems. The data is sent to a Change Detection Work Station, where a warfighter views day-to-day thermal or TV imagery that is collected by the airborne asset. This system helps an operator to identify and locate "new" environmental changes on a route which could indicate the presence of IEDs or landmines.

The Active Protective System (APS) is the hit avoidance portion of the manned FCS platform against anti-tank threat munitions prior to the threat munitions making physical contact with the platform. The Integrated Army Active Protective System (IAAPS) is an integrated FCS system that uses soft kill electronic sensors and countermeasures (jammers and decoys) and a hard kill active protection system (physical interruption) to protect a vehicle from direct fire and top attack threats with growth potential for kinetic energy (KE) threat defeat. RDECOM is developing the following two APS programs for integration into the current force in order to increase survivability of our warfighters.

The Full Spectrum Active Protection (FSAP) Close-In Layered Shield (FCLAS) is a cross-technology solution integrating radar, digital signal processing and explosives in a small, self-contained interceptor ready for loading into a smoke tube or an upgraded FCLAS tube. It detects, tracks, and defeats RPGs.

The Close-In Active Protection System (CIAPS) consists of a radar staring in all directions that can detect an incoming threat at very short range and launch one of an array of pre-positioned interceptors to intercept and destroy the threat shaped charge warhead before it hits the protected vehicle. It is effective against anti-tank guided missiles (ATGMs) as well as RPGs and can defeat threats launched from very short range.

The command not only collects lessons learned from the FAST and STAT Teams, but each RDEC also has teams that deploy with the soldiers to gather on-site operational lessons learned. For example: One of the NSC's programs is called the Operational Force Interface Group (OFIG), which is in place to gather soldier feedback on equipment. The OFIG conducts numerous visits to operational units, after redeployment, where they survey hundreds of soldiers about their equipment. The OFIG also has teams that deploy to the area of operations to gather soldier feedback on problems with equipment. The NSC also has a "Greening Program," which allows engineers, project officers and scientists the opportunity to participate in a field training exercise with a unit for a 4- to 5-day period.

In order to ensure that the RDECOM has knowledge of and access to the best technologies in the world, the command has established International Technology Centers (ITCs) throughout the world. As regional representatives, the Command's ITCs understand and anticipate U.S. technology requirements and initiate proactive, innovative approaches to expanding contacts with foreign military R&D organizations, foreign commercial industry and foreign universities involved in S&T. Based on their discoveries, to include non-developmental items (NDI), they recommend to the laboratories, RDECOM-AIDE, PEOs, PMs and the REF, potential opportunities for cooperative projects, commercial contracts, university studies, etc., that will leverage international S&T in support of Army Campaign Plan.

RDECOM has established a formal relationship with the TRADOC Futures Center (FC). This relationship insures the integration of technology into holistic Doctrine, Organization, Training, Material, Leader Development, and Personnel

(DOTMLPF) solutions for the warfighter. The RDECOM becomes the entry point for the FC for all AMC S&T products through multiple channels that includes resident liaison officers assuring that the FC is cognizant of emerging technology enablers and the potential to deliver capabilities to the warfighter. The FC/RDECOM team provides a decisionmaking framework for Army leadership by analyzing S&T developments linked to operational capability to validate the S&T investment. The command plays an integral role with the FC in addressing shortfalls in future operating capabilities (FOCs) and providing the technologies to assure that warfighter capability goals are met. The command's technology integrated product teams (IPTs), including strong FC participation, insure that all pursued efforts will result in operationally relevant solutions to warfighter requirements and that the warfighter requirements are met. The focus for this new command has been in the power and energy, lethality, robotics, modeling and simulation, countermeasure, supportability, survivability, networking, nanotechnology, and biotechnology areas.

The role of RDECOM is to provide a single integrated strategy toward the research, development and engineering of materiel solutions addressing user requirements. One major player in the strategy is that of experimentation. The linking of experimentation insures that RDECOM technology demonstrations are operationally relevant, while providing a venue to develop operational concepts for new technologies in FC experiments. By adhering to a Code of Best Practices for Experimentation, and institutionalizing the system engineering processes and disciplines throughout the RDECs, RDECOM provides a broad base of consistent and innovative approaches to developing the DOTMLPF solutions for the warfighter today and tomorrow. Using a variety of tools, ranging from hardware platforms, through virtual simulations, in either stand-alone or integrated mode, the centers perform a variety of experiments, from discovery, through hypothesis testing, and demonstration, leading to a developed and refined military capability. One of the tools that the command will use is the Modeling Architecture for Technology, Research, and Experimentation (MATREX) STO, that is developing a persistent, secure, distributed, and reusable environment where models can be "plugged" into an established architecture as needed and then "played" for engineering analysis, evaluations, supportability, and technology trade-offs in support of Army transformation. The MATREX will be a key enabler of Simulation and Modeling for Acquisition, Requirements, and Technology (SMART) initiatives throughout the command and the Army that will enable the Army to field equipment to the warfighters more speedily. Together with the Army Training and Doctrine Command (TRADOC) and the Army Test and Evaluation Command (ATEC), RDECOM plays a vital role in experimentation and development, from concept to fielding.

But most importantly, we have worked closely with the Air Force and Navy R&D community and the national labs to ensure we are on a clear path to success in our warfighting missions in the 21st century.

Today the Army is both at war and continuing its efforts towards transformation. As we move from our current force to the future force that is strategically responsive and dominant at every point on the operational spectrum, the Nation's S&T assets are essential to success. We must provide technology solutions essential to current and future warfighter needs across the full spectrum of Army operations. Our diverse S&T programs will enable the Army to support evolving and emerging capabilities.

The RDECOM fields the technologies which sustain America's Army as the premier land force in the world.

Thank you, Mr. Chairman for the opportunity to testify before the subcommittee. I would be happy to answer any questions you or the members of the subcommittee may have.

Senator ROBERTS. Senator Reed.

Senator REED. Thank you very much, Mr. Chairman. Thank you gentlemen for your testimony this morning and for your presence here.

A key aspect of success and rapidly transitioning these technologies through the current operation has been the ability to find the money to develop and produce the needed systems.

I wonder if each of you might share the various mechanisms that you're using to find the money to move things out of R&D and into the field.

Dr. Uhler.

Dr. UHLER. Yes, sir. As I mentioned, what we tend to do is pay a lot of attention to what's occurring in the other military departments and the laboratories within government, as well as where industry is. We aggressively participate in their planning processes and we also try to look and see what's occurring in industry and academia.

When we see a good idea—and this isn't just from our technologists that are doing this, this is also from our operators who are constantly exposed to interaction with their counterpart forces around the world—we take a quick look at that. We go out and buy it. We bring it in. As I mentioned, we test it quickly and then we get it in the hands of our operators for further evaluation.

The advantage we have is that our operators are highly trained, mature, and skilled compared to the normal types of folks that are in the other Services because they spend more time training and they have a limited focus in their objective.

Consequently, we can take some calculated risk in fielding this to them sooner than going through the full-blown development, testing, and evaluation process. That's where we tend to collapse the time needed to field capabilities.

We can take a relatively commercial item and bring it in. If it looks really useful, we can field it very quickly by using our own in-house testing and give it to the field operators. We make modifications as they demand from there.

Senator REED. What funding sources do you use to under—

Dr. UHLER. We use our existing R&D and S&T funding that we have. We've been fortunate to be well-supported in our budget requests by the committee. So it's done well for us.

Senator REED. General Waldhauser, do you have any comments?

General WALDHAUSER. Sir, at the warfighting lab, one of our main functions is to go ahead and test and evaluate these new technologies for the operator. So once we determine perhaps that there is something there that could work and may be of use we coordinate with the operating forces, we also coordinate with those who would be involved in a transition later on, if required, and work through the Office of Naval Research and with our own program and resources in the Marine Corps to move money around, if necessary, to do that.

So far in the time I've been in the job, my experience has been that this has gone fairly well. We have not had any major problems in doing that.

Senator REED. General Cartwright.

General CARTWRIGHT. Sir, in the Army, there are a couple of means to look at answering your question. First, a combatant commander comes in with what's called an operational needs statement. He goes into our G3, who runs what in the Army we call the Army Strategic Programming Board.

Those funds there, sir, are operational global war on terrorism funds and it looks at how to fill an immediate need and whether it can be applied to our rapid equipping force, i.e., I can turn a solution around in 90 days, or do I reach inside one of the labs for this 50 to 70 percent solution and deploy those in small numbers.

The second thing is, through Dr. Sega's help in the Office of the Secretary of Defense (OSD), working with the combatant command-

ers helping us identify both money and critical capabilities—particularly I'll use the improvised explosive device (IED) change detection, which they're funding right now, to be able to field those needs. The testing is actually done by those combatant commanders, in conjunction with those combatant commanders, to field those things.

The third way to look at it, sir, is the Army has put a huge investment into FCS. When we say "system," it's really a unit. It's called a unit of action. That unit of action—one of the chief's goals for task forces when he came in, was task force modularity. That was to look at how to move the current Army more to the future Army as it stands now.

That investment in FCS—we're seeing some of the systems I mentioned this morning—and the light-weight armor that you see to my right over there, we're pulling those technologies out of the FCS and applying those to current needs today. So I use those funds that we're doing with FCS or, as we say, you pull them off the bench and apply those to warfighting needs at this time.

The third thing is we're learning from our brothers in SOCOM how to really get at how to do agile development and fielding with the combatant commander and turn solutions around.

As I mentioned, we have S&T advisors on the combatant command staff. We actually have today 31 scientists—both military and civilian—deployed at the division, at corps levels in the area of responsibility (AOR) who are providing us both a capability and a need of how to turn those solutions around.

Those solutions, sir, we either take out of the work we're doing for FCS or the doors and the kit that we did on HMMWVs, we take that out of the S&T dollars and then are repaid back through the global war on terrorism as that becomes available through the Army Strategic Programming Board that's run by our G3 in the Army.

Senator REED. Thank you very much.

General Cartwright, one of the most obvious needs has been armoring of these HMMWVs both with the kits and with acquiring more armored HMMWVs.

Do we yet have enough of the kits to provide for all of our requirements?

General CARTWRIGHT. Sir, as the chief said before the full committee last week, the requirements have grown to about 11,000. This kit to your right is only one of the solutions. We're pulling up-armored HMMWVs from all over the world and shipping them to the AOR.

We're also using industry kits that were all tested to the same requirements to meet both small arms, RPG, and IED threats.

The kit that you see to your right, sir, by the end of May, we will produce about 6,300 of these. In fact, today there are a little over 1,300 of these kits. It was started in December and we are already installed in-theater with these kits to move to the requirement to do that, sir.

Senator REED. Just focusing for a moment on this, and there's probably a hundred other items that we could focus on, what lessons have you learned from this experience about the industrial base, about our ability to surge the production, about the manufac-

turing technologies program and making sure that we can produce these things? Are there any initial lessons?

General CARTWRIGHT. Sir, as you well know, starting up an industry is tough. The RHA that's used on this, they run the mills twice a year. If you don't have your orders in, you don't get it. They're actually running 24/7 on special runs to be able to do that.

On the electronics industry, sir, as long as we can pull, and we're pulling a lot of commercial technologies right now, particularly in the surveillance arena from the commercial industry, I have a fairly strong industrial base out there.

The piece we've learned is how to be agile in all of our processes, whether it be funding, authorities, or how do I meet the requirement or that capability that's coming into me today that says I need this now. It may be more than a couple hundred thousand dollars.

The Department is learning from SOCOM, and with help from Congress, how to become the agile, expeditionary force that will go into any part of the world at any point in time and be able to meet that threat that we are going to meet.

An industrial-based issue, particularly in electronics, is that what we use today may be a threat tomorrow. So what I'm using today, I now have to defeat tomorrow. In the electronics, it's fairly good. It's when I particularly want to get into the heavy industries is where they start up mills, just from the sheer start-up costs, sir.

Senator REED. Well, thank you very much indeed. I'm sure this subcommittee would like to hear more about the lessons and also anything we can do to facilitate your flexibility and your ability to be rapid in your response.

Thank you, gentlemen. Thank you, Mr. Chairman.

Senator ROBERTS. Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman. Again, welcome.

Dr. Uhler, I am directing these questions primarily to you, but I would hope that General Waldhauser and maybe General Cartwright would also chime in and talk about this a little bit.

I'm comfortable with the concept of spiral development with missile defense and whatnot. I appreciate General Cartwright's response to some questions I had that he responded to already with Senator Reed.

I guess the follow-up question is, and you've talked a little bit about lessons learned, but are you sharing your successes and failures with other people in acquisition activities and acquisition officials throughout the DOD, including the space acquisition community? Are you communicating back and forth on your lessons, both the difficulties that you run into as well as successes?

Dr. UHLER. Yes, sir. In fact, one of the first meetings I had when I was appointed to this position was with Mr. Wynne. One of the things we talked about was the fact that he encouraged us to keep taking advantage of the capabilities we have with this new look at spiral development and evolutionary acquisition and to continue to bring to him and the rest of the community the methodologies that we've used.

One of the things he also said that he was interested in us doing was attending the semiannual conferences that he convenes to exchange those types of lessons. It's where he gets the whole acquisi-

tion community together down at the Defense Systems Management College at Fort Belvoir and we talk through these. He invites the acquisition executives from the three military departments and also from SOCOM, and that is a good exchange.

I also have done speaking engagements and am committed to do more at the Defense Systems Management College for their new students in their program management course, explaining to them how we do these types of capabilities and changes within SOCOM.

At the same time, I have a good relationship with my counterparts in both the S&T community and the acquisition community and other military departments. So we do, in fact, share our lessons learned and our experiences.

One of the things that's so nice about the collaboration that we enjoy with them is that the authorities that you all gave us to function like a military department were for SOF-peculiar equipment.

What we tend to do is again look at what the Services have developed for their own common items of equipment in terms of helicopters, for example, and then we add to their basic air frame and capability those things that we need for our special operations mission.

As a result of that, we're continually talking about what modifications we're making based on their common production line and depot facilities. That gives us another interchange mechanism that is very effective on showing how we can help each other do business.

Senator ALLARD. In your statement, Dr. Uhler, you mentioned your command's updated acquisition priorities included the divestment of legacy systems that are not desired for the global war on terror.

My question is, does the 2005 budget describe the legacy systems being terminated or are we to expect additional program budget information or reprogramming requests to terminate additional systems?

Dr. UHLER. Actually, I'll put a slightly different twist on that. What we really have done is, as we laid out the fiscal year 2005 budget, we said certain systems are going to finish their development, move into production, and at the end of production, they will go into sustainment.

So, as those systems which are currently being used in the field reach the point where we can say we now have a better product and no longer need to continue to field those systems, we will do so.

In fact, that's what's reflected in the fiscal year 2005 budget, and you'll see more of that in the out years as we bring those systems to fruition, have replacements for them, and use that money that's freed up to reinvest in the new systems.

Senator ALLARD. Thank you, Mr. Chairman.

Senator ROBERTS. Senator Clinton.

Senator CLINTON. Thank you very much, Mr. Chairman.

This question is for all three of you, and it's a problem that we have been struggling with. This issue concerns the Reserve and National Guard units' training and equipment and access to technologies, because with this higher operations tempo (OPTEMPO), we have seen and heard disturbing reports about reservists and

Guard members not receiving adequate equipment, or at least not the equivalent of Active-Duty Forces.

What I'm wondering is, have there been any lessons learned about how we can better equip and train on the newest technologies the Guard and Reserve units that are called into active duty, General Cartwright?

General CARTWRIGHT. Yes, ma'am. The Army is using a couple of initiatives. One is called the Rapid Fielding Initiative, which started about a year ago. Under the chief's direction, it will equip every unit with the exact same equipment, whether it be active or Reserve. Those units deploying on OEF-II now, whether they be from the Guard, Reserve, or active component, will have the exact same equipment, whether it be knee pads or rifles.

As far as training goes, one of the lessons we have learned, ma'am, is we have what we call, in conjunction with the combatant commander, an IED task force. That IED task force has actually gone to every Guard brigade and done training on IEDs.

Both here and before the unit crosses into Iraq, they'll get training on what the tactics, techniques, and procedures should be. They train on how to be able to do that before they go into theater. Those are two of the initiatives in the lessons learned that we're doing.

Senator CLINTON. Thank you.

General Waldhauser.

General WALDHAUSER. Ma'am, I can't speak directly on the equipment side of the house, but I can talk about the training to a certain degree.

The Warfighting Lab, in conjunction with coalition partners and other agencies within the Marine Corps, has put on a training evolution in southern California for all battalions going back to Iraq. This has to do with cultural sensitivity, IED awareness, and how to work in the environment that the marines will find themselves in very shortly.

I would say that the Reserve units, the battalions that are going back with the marines, have participated in that training. They've essentially received the same training that the active-duty units have.

Senator CLINTON. General, would you mind submitting to the subcommittee an answer with respect to equipment?

General WALDHAUSER. It's now taken for the record, and I'll do that.

[The information referred to follows:]

General Waldhauser did not respond in time for printing. When received, answer will be retained in committee files.

Senator CLINTON. Thank you.

General Cartwright, I know that General Kern has visited Watervliet Arsenal. Since the War of 1812, Watervliet Arsenal has played a vital role in arming our military. It is our Nation's only manufacturing facility for large-caliber cannons in volume.

At that same facility, Benet Labs performs scientific and engineering activities that range from basic research through design for production and engineering support for the production of its design team.

This collocation of the arsenal and Benet Labs allows for complete life-cycle management from idea through research, engineering, prototype testing, and finally full-scale production. There isn't, so far as I know, any other collocated facility, and certainly no other arsenal, that has this kind of resource.

When I visited Watervliet and Benet Labs, obviously there were a lot of questions about their future. I was impressed by what I saw there and I certainly have been impressed by the role that they've played in the last 2 years. I think that having that facility available and open and operating, no matter what conditions we confront, is essential to meeting our security needs.

Are you familiar with Benet Labs and Watervliet Arsenal, General?

General CARTWRIGHT. Yes, ma'am, I am.

Senator CLINTON. What are your thoughts on their future role?

General CARTWRIGHT. Ma'am, I'll speak only to Benet since they are one of my labs that's actually owned up there. I'll give you a couple examples of the work Benet is doing right now.

One of the things they're doing is looking at tank tubes, particularly the Abrams tank tube. Over a life cycle, the tube will actually bend. One of the technologies they're looking at is going to actually use a process to re-straighten the barrels, which would be applicable for anything from large caliber to small arms, to be able to re-straighten barrels.

The second technology they're looking at in cooperation with Lawrence Livermore is a process called laser peening. It actually allows the metal to be harder. You shoot the laser at the metal and it allows it to be harder than it actually is and it lasts a lot longer. Those are two of the pieces that Benet Lab is doing.

So it's not only supporting the arsenal, but it's looking at using them across a lot of the products—particularly laser peening. I can use it for tank tubes or tori tubes, but could I use it for fan blades on jet engines.

Senator CLINTON. So that could be part of a transformational recapitalization strategy with respect to a number of items?

General CARTWRIGHT. Yes, ma'am. We're looking at that across all the labs, and it goes back to the chief's direction as to how do I take future technologies and put them to current use today, because we can't wait until 2010 to bring the technologies in. I need the technologies now.

We're looking at that across all our labs, the industries, and the arsenals to say, how do I bring those in today? Because the old 90-percent solution is a day gone by when I can give the soldier a capability they need.

Senator CLINTON. Thank you.

Senator ROBERTS. The thought occurred to me that at Fort Riley, Kansas, we have the best tank firing range in America. I guess maybe relocating all that to Kansas wouldn't be what the answer is then.

Senator CLINTON. I think a memorandum of understanding and partnership would be the—jointness is what I think it would represent.

Senator ROBERTS. Well, everything has to be joint today, so I would certainly take that under consideration.

I have two quick questions. Well, they're not quick, but let me make the observation that our ability to maintain what's called battlefield superiority obviously requires control of the information systems against increasingly sophisticated adversaries employing computer network attacks.

You go to almost every one of these demonstrations back here and they're all highly computerized, and we just talked about a computer database with a problem at the FBI and the Border Patrol.

Would any of you like to talk a little more about efforts underway to combat this potential weakness?

The exercises that I've attended, some with Senator Reed, are very impressive. This new technology is very impressive.

Usually one of my first questions is, what if the satellite goes down? What if you have an adversary who is very skilled in regards to combating our information technology?

Where are we in terms of efforts underway? We are so reliant on these kinds of systems. If that is taken away by somebody wearing jeans, a Madonna T-shirt, whatever the latest brand of tennis shoes would be, and maybe a ball cap, where we're all outfitted in a high-tech way to combat that and they take it down, what do we do? What are we doing S&T-wise to offset that? Anybody?

General CARTWRIGHT. Sir, you're correct. About the only thing that doesn't have software in it now is a bayonet.

Senator ROBERTS. I'm sorry. I didn't hear that.

General CARTWRIGHT. About the only thing that doesn't have software in it is a bayonet. If you look at the next generation of weapons, particularly rifles, they will have software in them.

So information assurance is key, whether it be the computer on your desk today that you get your e-mail on in a classified or an unclassified method, or whether it's the soldier on the battlefield using reach-back systems to order those spare parts or to be able to destroy or neutralize an enemy's system.

There are several ways we're doing that. There are S&T objectives that we're doing. There are actually 6.3-Advanced Technology programs in our labs now to combat that, and as you well know, a lot of the information assurance.

I tell people that engineers recreated a wheel thousands of years ago in the engineering world. In the software world, we're about 50 years old in the art of learning this. I say learning it because every day it changes. A lot of it has to do with the ability I call, "the attack and defend." To be able to defend yourself, you have to know how the attacker will attack you.

Now, there are both classified and unclassified programs that we'll work on to take care of that, but the issue becomes how smart I am in protecting my own systems. That knowledge, a lot of times, comes from learning the attackers and the methods they're going to use.

A lot of the systems we use today use commercial software in the reuse business because that's how you cut down the time needed for developing the new software. There are programs to ensure that the commercial software you get and that source code will do exactly what you want them to do, when you want them to do it.

It is an area that is going to get more complex, because the other thing I would tell you is we've seen policies grow in the last couple of years in the areas of information security, information operations, and data fusion.

That's my real worry. Do policies affect how we protect the battlefield? As I said, the only thing that's not going to have software in it is going to be a bayonet.

What I may use on the tactical battlefield is also applicable in the civilian world, and we have to be very careful that we don't cross that boundary in protecting our own soldiers. A soldier on a battlefield now can reach back and touch your computer with the reach-back capabilities, particularly in the logistics world of being able to order that spare part in real time.

Senator ROBERTS. Any other comments by any other of the witnesses?

General WALDHAUSER. Sir, I have nothing significant to add to that, but I'd like to take that one for the record.

General Waldhauser did not respond in time for printing. When received, answer will be retained in committee files.

Senator ROBERTS. All right. Dr. Uhler.

Dr. UHLER. From our perspective, our situation is a bit less complicated than that of our sister Services. We focus on smaller unit operations.

We tend to rely to a large extent on the best practices and the technology that's coming out of the military departments and also the DOD agencies.

We spend a lot of time also worrying about low probability of intercept, low probability of detection for communications capabilities. We have a lot of alternate means to circumvent those types of situations if we do discover a vulnerability or suspect that there are problems with our situation.

So we think we're in fairly good shape just following that practice right now.

Senator ROBERTS. Well, some of those answers could be answered in a classified presentation, which we hope to have if we can fit it in with a very busy schedule.

The year was 1999. I was privileged to chair the Emerging Threats Subcommittee when it was first formed by Senator Warner, Senator Lieberman, and Senator Coats. I think I made a statement—well, I know I made a statement that given the attack on the World Trade Center, that if the attacker had known or the terrorist had known where the grid was or had a copy of the grid of the towers there, that 6,000 people wouldn't come out suffering from smoke inhalation. They wouldn't have come out.

Now, at that particular time when I said that and quoted Osama bin Laden and then asked people what really kept them up at night, that was the lead question and that's what I'm going to ask you.

I had no idea that somebody would be using—I don't think any of us did—aircraft as missiles. I'm not saying that we were that prescient, except that virtually every panel we had before us kept warning over and over again that something like this could happen.

So my question to you today is, when you look out 10 to 20 years in the future, what is the technological challenge and future threat that concerns you the most? In other words, what keeps you up at night?

As you look down the road, not only at what we're going through now, but also the rapid change and the revolutionary change that we have in technology and the change in threat now with the global war on terrorism, what's the one thing that really is of concern to you in this field?

We'll start in reverse order with General Cartwright.

General CARTWRIGHT. Sir, it's the ability to be able to defeat a technology that we may use in our everyday lives. It deals with your question of information security. We may have the greatest technology in the world that we use every day in our lives, but the next day the bad guy has figured out how to use that against me.

To take that technology down, I might take that technology away from every one of us. How we work through that ability to be able to take that down may also affect how we do our everyday lives.

Technology is turning so fast. You have nano and you have biotechnology coming on faster. In fact, I looked at a uniform yesterday that was built out of nano materials. I got in it. A guy put a hose against me. I was perfectly dry.

Do we understand what those technologies are going to be, and then if we start using them and the bad guy uses it against us, how do I take that down and not affect our everyday lives that we all take for granted that we grew up with and that we live with?

That's probably my greatest fear, sir. I have civilian scientists and military scientists and engineers that are coming in now that are just doing absolutely great things. They love it. They love it because of the support from this subcommittee and OSD and everybody because we're actually giving them real projects. The advance of this technology coming so fast really has them excited.

But we're going to use that in our everyday lives and the bad guy is going to use it too. I don't want to take that technology away from anybody when he starts using it against me.

Senator ROBERTS. Sobering thoughts.

General, any comments?

General WALDHAUSER. Sir, I would answer the question this way. I think presently the people we work with, the S&T community, the universities, the laboratories, everyone is extremely excited to make a contribution.

My concern is, over the long-term, the ability to maintain the level of support we have right now in the community, to maintain the contributions that are being made, and to be able to harness what exactly is out there. What is the art of the possible? I think we have to be able to do that for the long-term. There has to be some type of incentive to keep the ground swell of support that we see right now. We have to maintain that for the long term, 10 to 15 years from now, because the technologies change so rapidly, the threats change so rapidly.

We have to have the momentum on our side so that next time around, wherever or whenever that may be, whatever threat emerges or whatever technology solution is there, we have to be

able to rapidly harness that effort and then move forward to find the solution.

Senator ROBERTS. So basically you're telling us that the goal of providing at least 3 percent of the DOD budget to S&T should be attained, and then you wouldn't have to worry so much about a particular surge requirement where you'd probably have to rely on a supplemental or whatever it is?

In other words, you want a consistent and constant funding commitment not only during times when we are obviously involved in personnel tempo, OPTEMPO, and the global war on terrorism, and we're stretched all over the world, but also during other times as well?

Am I sort of paraphrasing what you're saying?

General WALDHAUSER. Yes, sir. If we have a relatively level commitment when something arises, the ability to find a quick solution would be that much easier as opposed to having to ramp up if we did not have a constant effort over time.

Senator ROBERTS. So we'd have 11,000 of these units in theater right now. That's probably not the best example in the world, but at least it's the one I remember.

Dr. Uhler, do you have any comment?

Dr. UHLER. Yes, sir. When you think about the kinds of missions our SOF can be called upon to do, they can be sent anywhere in the world on an instant notice and encounter the full range of sensors and threat weapons that exist. So my biggest concern is how do we make those individuals not only invisible, but also invulnerable to those various types of environments in which they must operate?

They don't have the support structure associated with them that the larger units do and so, again, these individuals are our most important asset. How do we protect them and how do we keep them from being seen and injured?

Senator ROBERTS. Okay. We thank you for being here and we thank you for your contributions and your perseverance. We will go to the next panel.

I would like to welcome our second panel. We have with us Dr. Ron Sega, who is the Director of Defense Research and Engineering; Dr. Thomas Killion, who's the acting Deputy Assistant Secretary of the Army for Research and Technology and the Chief Scientist; Rear Admiral Jay Cohen of the United States Navy, the Chief of Naval Research; and James B. Engle, the Deputy Assistant Secretary of the Air Force for Science, Technology, and Engineering.

Gentlemen, if you can summarize your comments, we would appreciate it, and we'll begin with Dr. Sega.

STATEMENT OF DR. RONALD M. SEGA, DIRECTOR, DEFENSE RESEARCH AND ENGINEERING

Dr. SEGA. Mr. Chairman, Senator Reed, Senator Allard, thank you for the opportunity to appear before you today to talk about the S&T program for the DOD. Thank you for allowing my written testimony to be submitted for the record.

S&T remains postured to support both the near-term global war on terrorism and the transformation of the DOD. We're excited

about the capabilities and possibilities that continue to be opened by S&T throughout the Department.

Secretary Rumsfeld stated in last month's fiscal year 2005 budget testimony that the Department and Congress have a common challenge, to support the troops and to make sure they have what they will need to defend the Nation in the years ahead.

The Department's S&T program is vital to support our troops and is simultaneously developing the capabilities for our future forces. While there are still many challenges, I believe the S&T program has been productive over the last year and the increasing emphasis on accelerating transition of technology is showing positive results.

The president's budget request for fiscal year 2005 is up approximately 1.5 percent in real growth from the President's budget request in fiscal year 2004.

As the Director of Defense Research and Engineering, I serve in the role of the Department's chief technology officer and have established five priorities. In the written testimony, there are many examples and I will forego some of those.

Number one, to integrate the DOD S&T and focus on transformation, and to establish three cross-cutting initiatives for the Department. There are many initiatives within each of the Services as well.

The National Aerospace Initiative will help us enable high-speed and hypersonic flights and have access to space, space technology, and the Energy and Power Technologies Initiative will enable a more electrical force by creating new ways of power generation, energy storage and conversion and management of electrical power.

The Surveillance and Knowledge Systems Initiative is enabling command, control, communications, computers, intelligence, surveillance, and reconnaissance (C⁴ISR). Senator Roberts, it gets to the question you have on information assurance. This is very important. For a network-enabled, network-centric approach to the future, the network has to be there.

We are also working on sensing knowledge management and communications in that initiative. You'll hear from the components, the Services, and some of their transformational activities in their work in the global war on terrorism.

Number two, address the national security science and engineering workforce. We've begun addressing this need. It establishes things such as increasing the number and stipend in national defense graduate fellowships and also working with freshman initiatives and K-12 programs.

It's just a start. We are currently examining future workforce needs to ensure that we have the best technical talent available for national security R&D.

Number three, expand the outreach to the combatant commands and Intelligence Community. We've strengthened our ties with the combatant commands. In fact, we have a liaison officer from my office currently at Central Command (CENTCOM) forward in Doha, Qatar as we speak to continue that linkage.

We've redone the joint warfighting S&T plan. This year for the first time, we've aligned with the joint functional concepts. The chapters are cosponsored by the joint staff or combatant commands

and it is tying and aligning our program with the needs of the warfighter.

We're testing more technical capabilities through a variety of mechanisms. The one you're probably most familiar with is the advance concept technology demonstration (ACTD).

We're also increasing our collaboration in S&T planning with the Intelligence Community. I think that has been a positive initiative.

Number four, to enhance technology transition. The relevance of research and engineering efforts hinges on the rapid and effective transition of technology to fielded military forces.

The Department partnered with Congress to establish a quick reaction special projects program. It is critical that this program continue and expand. It allows the execution year flexibility to meet new needs and new technical opportunities. It's important for the value and as an effective mechanism in this near-term technology transition.

The three components include the Quick Reaction Fund, the Technology Transition Initiative, and the Defense Acquisition Challenge Program. All, I believe, are working well and we appreciate your support.

Other mechanisms, and we have a whole host to address different situations, include the ACTDs and Title III as two other examples.

Number five is to accelerate the technical support for the war on terrorism. As General Cartwright had just alluded to, there is an integrating function that we established on September 19, 2001, called the DOD Combating Terrorism Technology Task Force.

The leadership, technical leadership of the Services, agencies, and subject-matter experts, and then shortly after that, folks outside of the DOD, have come together to look at technologies, move forward quickly, and match those with the needs of the combatant commanders.

We had three phases, one to address issues in Afghanistan, the next for preparing combat operations and potential needs in Iraq, and the third phase is concentrated primarily on force protection.

Some of the areas included in that you see in this room. Others include other aspects of intelligence, surveillance, and reconnaissance (ISR), electronic countermeasures, language translation aids, and automated biometrics.

In conclusion, the technology development results are largely achieved through long-term stable investments in S&T. Although the fiscal year 2005 President's budget request does focus on transformational technologies, it also maintains the flexibility to respond to near-term operational requirements and technology opportunities. The balance has been and remains important.

I believe the DOD's successes in technology and transformation are significant, and I appreciate the opportunity to come before you today and tell you about them. We appreciate the support the Senate Armed Services Committee has provided the Department.

[The prepared statement of Dr. Sega follows.]

PREPARED STATEMENT BY DR. RONALD M. SEGA

INTRODUCTION

Mr. Chairman, members of the subcommittee, thank you for the opportunity to appear before you today to talk about the science and technology (S&T) program of the Department of Defense (DOD). S&T remains postured to support both the near term global war on terrorism and the transformation of DOD. We are excited about the capabilities and possibilities that continue to be opened by S&T throughout the Department. Secretary Rumsfeld stated in last month's fiscal year 2005 budget testimony that the Department and Congress have a common challenge: "to support the troops and to make sure they have what they will need to defend the Nation in the years ahead." The Department's S&T program is vital to the support of our troops and is simultaneously developing the capabilities for our future forces. While there are still many challenges, I believe the S&T program has been productive over the past year, and the increasing emphasis on accelerating the transition of technology is showing positive results.

As the Director of Defense Research and Engineering, serving in the role of the Department's Chief Technology Officer, I have established five priorities. These priorities facilitate the Secretary of Defense's goals. Our research and engineering goals are to:

- Integrate DOD S&T and focus on transformation
- Enhance technology transition
- Address the national security science and engineering workforce
- Expand outreach to the combatant commands and Intelligence Community
- Accelerate technical support to the war on terrorism

Taken together, these priorities provide a sound strategic roadmap to support the transformation of the DOD, and where technology can help, address the immediate challenges of the global war on terrorism. We have strengthened the programmatic oversight processes over the past year to better ensure that the goals and objectives of the Department are met. We have revised the Joint Warfighting Science and Technology Plan (JWSTP) to better integrate and align our S&T program with the needs of combatant commands and the joint functional concepts. We have instituted focused reviews of the Defense Advanced Research Projects Agency (DARPA) activities to ensure the best integration of the DARPA research and results into the Department's coordinated research and engineering program. We have expanded reviews with the components to assess technology maturity and enhance technology insertion in support of defense acquisition programs.

INTEGRATE DOD S&T AND FOCUS ON TRANSFORMATION

This goal strives for an integrated program across the DOD Services and agencies that is aligned with transformational goals of the Department. Two enabling elements for this goal—how much the DOD invests in S&T, and into what technologies the Department invests its S&T dollars.

The fiscal year 2005 President's budget request is a solid budget proposal for S&T programs. The DOD request for S&T in fiscal year 2005 is \$10.553 billion, or 2.62 percent of the overall DOD request. The budget request achieves about 1.5 percent real growth in S&T, when compared to the fiscal year 2004 President's budget request. The Department's S&T investment has increased from \$7.8 billion to \$10.5 billion in the last 3 years of the President's budget requests.

We are mindful however, that additional funding, without focus, will not ensure transformation. We have focused the budget request on several important technology areas that should enhance transformation and deliver critical military capabilities, and in addition, provide technology solutions to support the global war on terrorism. The fiscal year 2005 President's budget request continues the direction of aligning S&T dollars to support the Department's six critical operational capabilities as outlined in the Quadrennial Defense Review. These capabilities are: protect bases of operations, deny enemy sanctuary, project and sustain US forces, enhance space operations, assure information operations, and leverage information technologies. Additionally, we continued with three broad, cross-cutting initiatives that address the development of DOD critical transformational technologies. These three initiatives have matured over the past year. They are the National Aerospace Initiative (NAI); Energy and Power Technologies, and Surveillance and Knowledge System (SKS). Finally, we continued to identify potential technologies for acceleration in support of initiatives for force protection of our remarkable men and women deployed in Afghanistan and Iraq.

An important point to emphasize is the continuing importance of basic research to enable the development of future military capabilities. In the past 20–30 years, basic research has spawned such advances as the Global Positioning System (GPS), Stealth, and Night Vision devices. The pace of technology development is increasing so the generation of new ideas through basic research remains a high-payoff component of the S&T program. The fiscal year 2005 President’s budget request for basic research is \$1.3 billion. Although the investment level for basic research remains constant, the payoff continues to produce significant discoveries, sometimes on a critically shortened time-scale. For example, the success of the thermobaric weapon is directly linked to the basic research in DOD. The thermobaric weapon went from basic research through operational testing in 90 days. Basic research also closely links the DOD with universities that provide a great breadth of leading edge research, some that can be applied in the very near-term. For instance, the technology used to decontaminate the Senate offices and Federal facilities in the aftermath of the anthrax attack come from an ongoing university-based basic research project. The university linkage is also key in the education of the future defense workforce.

COMPONENT INITIATIVES

The Army’s Future Combat Systems (FCS) is a complex transformational initiative that networks combat and support vehicles, unmanned air and ground systems, and soldiers together as an integrated system. As this system matures, it will provide a revolutionary capability to move, shoot, communicate, and defend. A technology solution called “ZEUS” is a good example of enhanced technology transition in support of the global war on terrorism. ZEUS involves a high mobility multipurpose wheeled vehicle (HMMWV) mounted laser neutralization system for unexploded ordnance. ZEUS is currently fielded in Afghanistan. This technology has neutralized 10 different types of ordnance totaling 210 targets. The improved stand-off range for ordnance neutralization enhances the safety of our troops.

The Air Force’s major transformational projects derive from the envisioned joint battlespace infosphere capabilities. Those would provide technology for applications ranging from decision quality information to demonstrations of small and micro satellites that could dramatically enhance our ability to conduct enduring space operations. This movement to the transformational aspects of space and information is central to the Air Force’s investment profile, and will support the entire Department.

The Navy’s transformational programs include the electric ship which is an “umbrella” program to integrate an array of technologies that could provide an integrated propulsion, support, and weapons suite to maximize the capability of future naval operations. For the global war on terrorism, the Naval Research Labs developed and prototyped Dragon Eye, a successful project currently deployed in Iraq. Dragon Eye is a lightweight, person portable unmanned aerial vehicle (UAV) with a changeable sensor package. One such package allows for the collection and detection of chemical, biological, and radiological agents and provides a stand-off surveillance capability.

Our investment in DARPA continues to emphasize high-risk, high payoff research and development in a number of strategic thrust areas, as outlined in the DARPA Strategic Plan. I would like to highlight a DARPA-Service collaborative project that is supporting transformation in the Department and should ultimately provide a unique surveillance capability. The Organic Air Vehicle (OAV) is a small, man-portable UAV that can fly and hover using a large horizontal fan. The UAV has been tested in 9-, 15-, and 29-inch diameter versions—and each can carry different payloads. This vehicle is being developed as a component of the Army’s FCS. DARPA’s programmatic agility, when linked with Service programs, accelerates technology development and transformation.

CROSS-CUTTING INITIATIVES

One of the joint transformational technology initiatives is the NAI, which consists of research and development (R&D) in hypersonic flight technology, affordable and responsive space access, and an increased focus on space science and technology enablers.

NAI provides an integrated technology roadmap for the DOD to increase our capability in several mission areas such as high speed/hypersonic flight, access to space, and space technologies. For example, hypersonic capability could provide an air breathing option to conduct strikes from strategic distance in a short amount of time, reducing vulnerability of future systems, and help to deny enemy sanctuary. In the fiscal year 2005 budget, the Department increased hypersonics funding primarily in support of the Air Force-DARPA Single Engine Demonstrator (SED). The

objective of the SED program is to flight test the Air Force Hypersonic Technology (HyTech) scramjet engine using endothermic hydrocarbon fuel accelerating a vehicle from boost (approximately Mach 4.5) to approximately Mach 7. The NAI also has the potential to capture American interest in aerospace technology, while providing needed technical capability for the warfighter.

A second transformational technology thrust is Energy and Power Technologies. This thrust involves a coordinated investment across the DOD to improve power from systems such as microbatteries for soldiers to massive generators for ships. This initiative is investing in technology that could develop batteries with over five times the energy density, fuel cells that are reliable and safe to use in the battlefield, and capacitors that will decrease size needed to store electricity on ships by a factor of 5–10. The initiative is also focusing on “electric” weapon systems such as high power microwaves, lasers, and electromagnetic guns that will provide greater options for our forces.

The third cross cutting initiative is SKS. SKS is a broad-umbrella program to develop capabilities to achieve information and decision dominance through integrated communications, command, control, and computers and intelligence, surveillance, and reconnaissance systems (C⁴ISR). This initiative seeks to bring about major improvement in sensing, communications and networks, knowledge management, and information security to provide superior decisions on shorter time scales than can be made by potential adversaries. Instead of treating each component separately, SKS has the goals of detecting objects in the area of interest (battlespace) through enriching sensors (optical, radar, acoustic, etc); moving the sensed information to present a coordinated picture of the area of interest; using advanced software to make sense of the information; and presenting this knowledge-based result to assist decisions. By using such an integrated approach, the goal is to allow our forces to react faster and smarter than potential adversaries. The initiative should continue to make the vision of network centric warfare a reality.

ENHANCE TECHNOLOGY TRANSITION

The relevance of research and engineering efforts hinges on the rapid and effective transition of technology to fielded military forces. In partnership with Congress, we established the Quick Reaction Special Projects (QRSP) program, a flexible continuum of technology transition projects that moves products from the DOD to the warfighter quickly. The QRSP includes three technology transition projects: the Quick Reaction Fund (QRF); the Technology Transition Initiative (TTI); and the Defense Acquisition Challenge Program (DACP). We leverage the Foreign Comparative Test (FCT) and the advanced concept technology demonstration (ACTD) programs to get the best technologies to the joint warfighters in the shortest time possible.

The QRF meets critical warfighter technology requirements that cannot wait for the traditional 2 year budget cycle. In fiscal year 2003 we started six projects, three of which have already deployed to support the war on terrorism in Iraq. We have continued rapid technology insertion from the QRF in fiscal year 2004. This year, funds were provided for the development of a HMMWV mounted wideband microwave based integration system, called PING, to identify concealed weapons. PING has seen positive results in testing. We also used the funds to demonstrate and test ordnance disposal robots, a capability that has saved lives in Iraq.

Last year we initiated the congressionally-directed TTI. TTI provides bridge funding for critical technologies that have recently been evaluated for procurement and enables the Services to speed transition to acquisition programs of record. For example, the water purification pen provides warfighters the ability to purify water in unsanitary conditions. It is now available via the General Services Administration (GSA) catalog for purchase from all government agencies. This technology transition was accomplished 18–24 months earlier than the normal acquisition process due to our ability to use TTI, and is being used today by warfighters in Iraq and Afghanistan.

Under the direction of our new Comparative Test Office, the DACP and the FCT program inject the very best domestic and foreign technologies into existing capabilities, supporting the Department’s spiral development strategy. Through the FCT program, we significantly enhanced the Army’s Automatic Chemical Agent Detector Alarm (ACADA). The advanced power supply for this sensitive Chem/Bio detector was obtained from the United Kingdom. The power supply improved unit reliability and significantly reduced equipment weight. Over 22,000 of these detectors are deployed worldwide, protecting forces in Afghanistan, Iraq, and even those of us sitting here in the Capitol region.

In the DAC program, we selected 23 proposals from nearly 300 submittals. One example is an especially promising technology which provides hemoglobin substitute

for blood transfusions project known as the Restore Effective Survival in Shock (RESUS). We believe RESUS has the potential to dramatically increase the survivability of our troops. This remarkable polymerized hemoglobin is compatible with all blood types, can be stored for 3 years without refrigeration, and is pathogen free. The support Congress has provided to the QRSP program has enabled execution year flexibility to support new needs of the operational force and new technology opportunities.

The ACTD program is our flagship technology transition process for matching innovativeng technologies with joint and coalition operational concepts. This program earned a reputation for anticipating emergent threats and fielding transformational capabilities for combatant commands. Sometimes referred to as our “try before you buy” approach, ACTDs look for the 80-percent solution to jump start the acquisition process through fielded, hands-on demonstrations. For example, we successfully demonstrated the high-speed lift capability of the Theater Support Vessel ACTD in real-world operations during Operation Iraqi Freedom (OIF). Our Language and Speech Translator ACTD enabled us to quickly decipher confiscated documents which led to the location of several high profile Iraqi leaders. These and many other successful ACTDs draw the thanks of warriors engaged in Operation Enduring Freedom (OEF) and OIF.

ADDRESS THE NATIONAL SECURITY SCIENCE AND ENGINEERING WORKFORCE

The third goal is a broad national strategic issue involving the availability of scientists and engineers who are American citizens. Warfighting capabilities demonstrated on the battlefield since Operation Desert Storm are derived from the Department’s technological capabilities developed within DOD R&D laboratories, industry, and universities. These capabilities were built on the intellectual capital and competitiveness of the scientists and engineers, educated years earlier, who conceived the scientific ideas and engineering applications that became our present warfighting capabilities. We produced stealth technology, the global positioning system, night vision devices, precision weapons and pioneered the development of the internet through the “ARPANET” with the U.S. technical talent educated primarily in the 1960s and 1970s.

We now see warnings that America’s advantage in defense-related scientific and engineering intellectual capital is eroding. The significance of this problem is outlined in the Report of the U.S. Commission on National Security in the 21st century (Hart-Rudman Report) which stated: “Second only to a weapon of mass destruction (WMD) detonating in an American city, we can think of nothing more dangerous than a failure to manage properly science, technology, and education for the common good over the next quarter of a century”. The decreasing numbers of experienced scientists and engineers in the DOD draws from the available pool of high quality scientists and engineers who are U.S. citizens. The numbers of U.S. citizens in graduate schools studying defense related disciplines has decreased in the last decade according to National Science Foundation, National Science Board and National Academy of Sciences reports.

We are responding to this issue. A science and engineering workforce initiative is needed to reinvigorate our national security R&D capability to ensure that we have the best qualified and motivated scientists and engineers engaged in national security R&D. To begin to address these issues, over the past year the Department has increased the individual stipend and total number of National Defense Graduate Fellowships. In addition, we are continuing to examine our future workforce needs to ensure that we will have the best technical talent available for national security R&D.

Expand Outreach to the Combatant Commands and Intelligence Community

We are enhancing the connectivity between the combatant commands and the Intelligence Community and the DOD technology community. Over the past year, we have revised our S&T strategic planning approach, leading to a wholly revised “Joint Warfighting Science and Technology Plan” that was cooperatively developed by the combatant commands, Joint Staff, and S&T executives. We have also initiated several technology net assessments in partnership with the Intelligence Community to reduce the possibility of technology surprise in the future and better inform our S&T investment plans.

ACCELERATE SUPPORT TO THE WAR ON TERRORISM

Maturing and fielding technology continues to be our most important near term goal. Within a week of the attacks of September 11, 2001, the Department established the DOD Combating Terrorism Technology Task Force (CTTTF). This Task

Force is still ongoing, and is in its third major phase. The first phase accelerated technologies for homeland defense and the initial war in Afghanistan; the second phase delivered technology in support of the war in Afghanistan and Iraq. The current third phase is identifying and accelerating technology for deployed force protection. The Task Force is comprised of S&T senior leaders from all DOD components, flag-level officers from the Joint Staff and selected combatant commands, the Central Intelligence Agency (CIA), the Department of Energy (DOE), and now the Department of Homeland Security (DHS). The CTTTF continues to provide a valuable forum to examine the technology alternatives to address immediate operational needs to support the global war on terrorism.

Phase I, in the fall of 2001, resulted in such capabilities as the BLU-118B (thermobaric weapon) with applications to caves and tunnels, a backscatter gamma ray system to inspect cargo in closed containers, and a nuclear quadrupole resonance system that can detect small quantities of explosives. We also sponsored a rapid study to determine radiation levels needed to kill anthrax spores—knowledge that supported the detailed response to the anthrax attacks of 2001.

In Phase II, the CTTTF reacted to a broad set of operational issues that emerged leading up to and including support for OIF. Technologies were accelerated to fielding for several specialized, unique weapons which focused on specific, anticipated threats. Notable among these was the AGM-114N Thermobaric Hellfire which built upon previous efforts supported by the CTTTF in development of thermobaric weapons which were employed in Afghanistan in OEF. The CTTTF sponsored the Passive Attack Weapon to rapidly transition an Advanced Technology Development prototype program to production, fielding 230 weapons in 160 days. This effort included weapons production, development of operational tactics, delivery aircraft certification, field testing, certification, and deployment.

In the current Phase III, the Task Force's focus has been directed at OIF force protection capabilities. While specific details on programs are classified, actions are underway to mitigate effects stemming from terrorist use of weapons such as Improvised Explosive Devices (IEDs), mortars, and rocket propelled grenades. Key focus is on detection and defeat of IEDs and on predictive analysis capabilities.

The CTTTF will continue to serve as a conduit for matching the identification of new challenges in the global war on terrorism with available technologies developed both by the DOD, through commercial sources, and with other departments of the Federal Government. A key element of this effort is the need to have in place a process and funding to quickly identify, and then field, in militarily significant numbers, a series of new capabilities. The nature of the current operations indicates that the opponents, while often using low technology weapons, are very adaptive. We need the processes and flexibilities to anticipate, respond to, predict, and mitigate their adaptation cycles if we are to be successful in this long-term struggle.

CONCLUSION

The sustained investment in S&T over the past decades has enabled the Department's development of needed new capabilities. To enable transformation, this investment should continue. Technology development results are largely achieved through long-term, stable investment in R&D. Not every technology needs to be transitioned immediately, but a strong R&D base is critical. Although the fiscal year 2005 President's budget request does focus on transformation technologies, it also maintains the flexibility to respond to near term operational requirements and technology opportunities. The balance has been, and remains important.

In closing, the S&T program and the objective of Secretary Rumsfeld to provide transformational capabilities to the DOD are absolutely intertwined. I have mentioned only a few examples within the DOD S&T program. I believe the DOD successes in technology and transformation are significant, and I appreciate the opportunity to come before you today to tell you about them. We appreciate the support the Senate Armed Services Committee has provided for the Department's S&T program. Thank you.

Senator ROBERTS. We thank you, Dr. Segal.
Dr. Killion, please proceed.

STATEMENT OF DR. THOMAS H. KILLION, ACTING DEPUTY ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH AND TECHNOLOGY, CHIEF SCIENTIST

Dr. KILLION. Thank you Mr. Chairman and members of the subcommittee. I appreciate this opportunity to discuss the fiscal year

2005 Army S&T program and the significant role of S&T in supporting the warfighter today and achieving the Army's transformation. I previously submitted a written statement and request it be accepted for the record.

I want to thank the members of the subcommittee for your important role in supporting our soldiers who are now at war and for your support of the Army's S&T investments that will sustain the preeminence of our future forces. Your continued support is vital to our success.

We are a Nation at war. Army S&T is charged to provide America's Army with sustained over-match in land combat. To do so, the Army S&T program retains a dynamic portfolio of technology investments that is responsive to the warfighters' needs both today and for the future. The Army's S&T program is balanced to provide high payoff capabilities for the future force while seeking rapid transition of critical capabilities into the current force. In my remarks, I will focus on four themes briefly. We're supporting our soldiers today. We are delivering on the technologies we promised for our FCS and the future force. We've maintained our commitment to a robust basic research program for our future transformational capabilities, and our success depends upon a workforce that has the necessary expertise and understanding to support the Army's needs.

Army S&T is fully committed to providing our soldiers with the tools they need to survive and prevail in current operations. I wish to recognize the support that the Army is receiving from our sister Services and from OSD in rapidly transitioning technology to help our soldiers. I can personally testify to the offers the Army has received from my counterparts, Admiral Cohen and Mr. Engle, and to the leadership and resources provided by Dr. Sega. Everyone is committed to protecting our soldiers' lives with whatever technology we can bring to the fight.

As you heard from General Cartwright in the previous session, there are numerous examples of technologies we have introduced into the global war on terror, including Interceptor Body Armor, the HMMWVs' Expedient Armor Kits and the Stryker "Bar Armor." Others include the Chitosan bandage, as demonstrated earlier from Medical Readiness and Materiel Command (MRMC), to rapidly staunch arterial bleeding. The Zeus laser system for neutralizing mines and unexploded ordnance and the Forward Area Language Converter (FALCon) system for automatically scanning and translating foreign documents for intelligence exploitation.

We continue to explore gaps in current capabilities for which we can provide technological solutions. With regard to the FCS, it remains the highest priority for Army S&T. We have about one-third of our budget invested in technologies to make FCS a reality.

In May 2003, the FCS program passed acquisition milestone B, transitioning from S&T into a System Development and Demonstration (SDD) program.

S&T continues to play an important role in the FCS program by providing specific critical technology solutions for Increment I and beyond.

As part of the Milestone B decision, the Program Manager (PM) identified 31 critical technology areas that needed to be addressed.

The technologies that address most of these areas come from the Army S&T community and through our collaboration with DARPA. We are committed to the continued maturation and demonstration of these technologies for delivery to the Lead System Integrator (LSI) prior to the FCS preliminary design review in 2005. Some examples include the 120 millimeter lightweight cannon, Robotic Follower and Semi-Autonomous Robotics for the soldier "mule," Active Protection Systems against chemical energy weapons and tactical wireless network assurance use algorithms.

Instead of simply "hurling technologies over the transom" to the PM for additional development, we have entered into detailed Technology Transition Agreements (TTAs) with the PM and the LSI to ensure that S&T will deliver the products in the timeframe they are needed for integration into this system of systems. I believe that the implementation of this TTA approach will be a very valuable by-product of the FCS experience; it's a management tool that helps us bridge the gap that will often exist between the end of an S&T program and the actual transition of the technology into an acquisition program.

The bottom line is that we are delivering on the technologies we promised for FCS, helping to make it a reality by the end of this decade.

We've also maintained our commitment to basic research, which produces new knowledge to fuel revolutionary advances and leap-ahead technology for the future.

Technologies in the field today, such as night vision devices, advanced munitions, various types of armor, and medical vaccines and treatments, owe their existence to fundamental research we conducted in the past. Research that we are conducting today in areas such as nanoscience, biotechnology, quantum computing, and immersive environments will enable unique and, in some cases, unforeseeable capabilities for the future Army. Few people would have anticipated that the basic research investment in atomic clocks in the 1950s would result in the GPS on which we all rely so heavily today.

Finally, I mentioned earlier the support we are providing to current operations. That support certainly depends on the technological innovations that we are able to provide to the warfighter. More importantly, however, I believe it depends on the expertise and commitment of our scientists and engineers. Their understanding of the Army's needs, knowledge of the threat, and recognition of technological opportunities makes them uniquely qualified to bring relevant technical solutions to the battlefield. Perhaps the most important contribution the S&T community continues to make is sending its scientists and engineers into theater to see the real-life conditions, assess the problems, and develop rapidly deployable solutions for the warfighter.

In General Cartwright's testimony, he described the design of Expedient Armor and Bar Armor for HMMWVs, Strykers, and the Abrams tanks. These innovations were developed and tested very rapidly due to close collaboration between the scientists and engineers in our Army Research Lab. They take it to the R&D Engineering Center, the Army Test and Evaluation Command and the PMs office and our industry partners. Individuals such as these,

working with our soldiers, are what truly enables us to maintain and enhance our land combat advantage for today and tomorrow.

The Army must maintain a diverse S&T portfolio to be responsive to the current and future warfighter needs. The S&T community seeks technological solutions that can be demonstrated in the near term, investigates the feasibility of new concepts for the mid-term, and explores the imaginable for the uncertain, far-term future. In closing, I would like to thank you, Mr. Chairman, for the opportunity to testify before the subcommittee. I will be happy to answer any questions you and the members may have.

[The prepared statement of Dr. Killion follows:]

PREPARED STATEMENT BY DR. THOMAS H. KILLION

INTRODUCTION

Mr. Chairman and members of the subcommittee, thank you for the opportunity to describe the fiscal year 2005 Army science and technology (S&T) program and the significant role S&T is playing in support of the warfighter in our current force and in achieving the Army's transformation to our future force capabilities.

We want to thank the members of this subcommittee for your important role in supporting our soldiers who are now at war and for your support of today's S&T investments that will sustain the preeminence of our future soldiers. Your continued support is vital to our success.

ARMY SCIENCE AND TECHNOLOGY

We are a Nation at war. Challenged to maintain the technological and tactical advantage over our enemies by developing and exploiting both lethal, and when possible, non-lethal means. This creates a serious challenge for the Army. Army S&T is charged to provide America's Army with sustained overmatch in land combat. To do so, the Army S&T program retains a dynamic portfolio of technology investments that is responsive to the warfighters' needs of today and the future. The Army S&T mission is to conceptualize and develop future leap-ahead technologies that are necessary to maintain a superior land combat capability unmatched anywhere in the world while exploiting opportunities to accelerate the transition of proven innovative technologies to enhance the capabilities of the current force. The Army's S&T program is well balanced to provide high payoff needs of the future force while seeking rapid transitions for critical capabilities into the current force.

The Army continues in its commitment to transform into a lighter, more lethal force. However, we are an Army at war and are continually challenged to achieve this transformation as quickly and as efficiently as possible. As General Schoomaker so eloquently states, transformation is an ongoing process that we must work at each and every day. The S&T investments in the fiscal year 2005 President's budget pursue technologies that can be matured and rapidly transitioned to system development and procurement to enable future force capabilities as soon as possible. We also fund an agile basic research program focused on enduring Army needs as well as opportunities to further transform the Army.

We are not an Army alone; we are an integral member of the joint warfighting team. The S&T program is focused on developing technology relevant to the needs of the Army and the joint forces. It remains synchronized with operational concepts development and acquisition programs to ensure rapid transition into the field. The Army S&T program continues to exploit technology developments from the other Services, defense agencies, and commercial industry as well as international communities to assure that our soldiers get the very best technology as soon as possible. The future force Army will provide the Joint Force Commander with a versatile, full spectrum decisive land combat power while requiring significantly reduced logistics support.

S&T CONTRIBUTIONS TO THE GLOBAL WAR ON TERRORISM

Army S&T has supported the development of technology that has produced several benefits for the soldier in Iraq and Afghanistan. Perhaps the most important contribution that the S&T community continues to make is sending in-house scientists and engineers with the expertise and experience in critical technologies into the theater to see the real-life conditions, assess the problems, and develop rapidly deployable solutions for the warfighter. This community is committed to getting ef-

fective and usable technology into the hands of the warfighter—saving lives and enabling successful missions. While you have heard many examples of technology that has come out of S&T in support of the current operations, such as the Interceptor Body Armor, the High Mobility Multipurpose Wheeled Vehicle (HMMWV) Expedient Armor kits, and the Stryker “Bar Armor” in previous testimony, I want to take the time to highlight a few contributions that often aren’t reported but are clearly contributing to our continued success. These are examples of technologies that play an important role in getting the job done. One example is the Chitosin bandage. It is a Food and Drug Administration (FDA)-approved bandage designed by the Medical Research and Materiel Command (MRMC) to stop severe arterial bleeding within 2–4 minutes of application. This bandage’s adhesive nature and enhanced clotting capability provide wound pressure and bleeding control to external hemorrhages. This bandage has been deployed to both Special Operations Forces (SOF) and conventional forces in theater and has been utilized successfully on a variety of injuries ranging from gunshot wounds to landmine injuries. Bottom-line . . . it saves lives.

Another example is the Forward Area Language Converter (FALCon), an optical character recognition and machine translation system on a portable computer for foreign languages in theater. It was designed and developed by the Army Research Laboratory and provided to the Intelligence Community as a quick and reliable way to translate and analyze captured documents. FALCon can translate up to 47 languages, including Arabic and Asian languages, and is being used in both Iraq and South West Asia.

Finally, the Army deployed a prototype directed energy system to Afghanistan consisting of a commercial kilowatt class laser mounted on a HMMWV developed by the Space and Missile Defense Command. This system was successfully used in neutralizing surface mines and unexploded ordnance.

FUTURE COMBAT SYSTEMS (FCS)

Supporting the FCS remains the highest priority for Army S&T. We have about one-third of our budget (\$600 million) invested in technologies that will provide our ground combat forces of this decade and the next with the dominant, full-spectrum combat power they will need to carry out their missions swiftly, efficiently, decisively and as safely as possible, no matter where they are asked to fight. FCS will be a multi-functional, multi-mission, reconfigurable system of systems designed to maximize joint interoperability, strategic and tactical transportability, and commonality of mission roles, including direct and indirect fire, reconnaissance, troop transport, countermobility, non-lethal effects and secure, reliable communications. In May 2003, the FCS program passed Acquisition Milestone B, transitioning from S&T into System Development and Demonstration (SDD). The Project Manager (PM) for FCS continues to use the Boeing-led Lead Systems Integrator (LSI) team to identify and integrate technologies from the Army, the Defense Advanced Research Projects Agency (DARPA), and other Service and industry programs to develop an FCS that will satisfy the capabilities described in the approved Operational Requirements Document.

FCS has adopted an Evolutionary Acquisition Strategy, which will allow the Army to increase the capabilities of the system of systems over time through spiral and incremental development processes. The initial instantiation of FCS (Increment 1) will be designed to provide certain “threshold” capabilities. The subsequent versions will deliver increased functionality to achieve “objective” capabilities as quickly as possible. Army S&T continues to play an important role in the FCS program by providing specific critical technology solutions for Increment 1. As part of the Milestone B decision, the FCS PM identified 31 critical technology (CT) areas that needed to be addressed. The technology solutions to address most of these areas come from the Army S&T community in collaboration with DARPA. Eighteen S&T programs that were not quite as mature as desired by the May 2003 decision to enter SDD were identified in the PM FCS risk mitigation plans as being essential for Increment 1. Army S&T is committed to the continued maturation and demonstration of these technologies for delivery to the LSI prior to the FCS Preliminary Design Review in 2005. Some examples are: 120mm Line of Sight/Beyond Line of Sight Cannon, Mid-Range Munition, Robotic Follower and Semi-Autonomous Robotics for the Soldier “Mule,” Active Protection against Kinetic Energy weapons, and Tactical Wireless Network Assurance algorithms.

We continue to mature and demonstrate these critical enabling technologies, providing the promised products on schedule for integration into FCS. Instead of “throwing technologies over the transom” to the PM for extensive additional development, we are entering into Technology Transition Agreements (TTAs) with the PM and LSI to ensure that S&T will deliver these products within the timeframe

they need for integration into the system of systems. I believe that the implementation of the TTA approach will be a very valuable by-product of the FCS experience—a management tool that will help us bridge the gap that often exists between the end of an S&T program and the actual transition of the technology to an acquisition program.

In addition to the efforts supporting Increment 1, S&T now has moved our main emphasis to developing capability-enhancing technologies for the Increment 1 spirals and for Increment 2. Dr Tether and I have agreed to continue the Army/DARPA FCS partnership for fiscal years 2004 through 2007. We have identified a set of focus areas that represent some of the greatest challenges for the FCS and future ground combat, namely: Networked Battle Command On The Move, Autonomy With Intent, Find the Enemy, and Affordable Combat ID. We have agreed to co-fund about 15 high risk-high payoff programs at DARPA to find technology solutions that, when spiraled into FCS, will provide the next leap ahead in capabilities.

FUTURE FORCE WARRIOR

Another major S&T investment is the Future Force Warrior (FFW). FFW will provide capabilities to the individual soldier that are achievable only at the platform-level today. Through networked connectivity to the FCS-equipped maneuver unit of action (UOA), FFW will enable revolutionary lethality, mobility, survivability, and sustainability for the individual soldier while reducing logistics demands. By the end of 2007, the FFW program will demonstrate increased individual soldier lethality and survivability through netted communications and fires while reducing the soldier's physical, fighting load from over 90 lbs to less than 50 lbs. The program develops a lightweight, low-observable, enhanced-armor protective fighting ensemble that includes lightweight, high-efficiency power sources; embedded physiological monitoring and limited medical treatments; embedded training; and networked sensors to enable unparalleled situational understanding.

BASIC RESEARCH

The Army's basic research program produces new knowledge to fuel revolutionary advances and leap-ahead technology that enable Army transformation. The program invests in world-class expertise (government, academic and industry) and state-of-the-art equipment. It balances its investment between in-house Army specific research and leveraging external scientific research that can be used for military applications. For example, few people would have anticipated that the basic research investment in atomic clocks in the late 50s would have resulted in the Global Positioning System (GPS) that is so prevalent today.

Army in-house basic research focuses on military-unique problems, providing the underlying understanding that will enable technology development for the current force and future force technologies such as novel penetrators, lightweight durable armor, and energetic materials. In-house exploration research helps maintain "smart buyer" capabilities essential to the Army; utilizes Army unique facilities; and supports researchers in areas critical to the Army.

The Army maintains an extramural basic research program that is balanced between its two major components: (1) the single investigator program that invests in the brightest minds at our leading universities and is a key source of next-generation of scientists and engineers with an understanding of military problems; and (2) larger scale partnerships with universities and industry to take advantage of commercial investments and the cutting edge research at outstanding universities in areas critical to the future force. The external basic research program gives leverage to the power of academia and industry; focuses world-class research on Army challenges; allows flexibility to capture new discoveries; and, complements internal efforts. The Army continues to exploit the opportunities created by these organizations to accelerate development of transformational capabilities to a lighter, smarter, faster force.

The Institute for Creative Technologies (ICT) at the University of Southern California continues to be an excellent example of how these centers attack Army problems with new and different views. ICT leverages academic and Hollywood expertise to perform fundamental research in simulation environments and virtual human depiction for training, mission planning and rehearsal. It has worked with the Training and Doctrine Command's (TRADOC), Infantry School at Fort Benning to develop cognitive leadership training aids that leverage both Microsoft's X-Box game console (Full Spectrum Warrior) and "gamer" PCs (Full Spectrum Commander). In fact, Full Spectrum Commander is currently being adapted for Afghan National Army training in Operation Enduring Freedom (OEF).

The Institute for Soldier Nanotechnologies (ISN) at the Massachusetts Institute of Technology focuses and adapts nanotechnology research to significantly enhance soldier survivability. Investment areas are nanofibers for lighter materials, active/reactive ballistic protection (to solve the energy dissipation problem), micro-climate/microclimate conditioning, signature management, biomonitoring/ triage and active control components.

Last month we opened the Institute for Collaborative Biotechnologies (ICB) at the University of California, Santa Barbara. The ICB integrates biosciences with the physical and engineering sciences to provide an understanding of the biological construction of novel materials such as biologically-derived, functional electronic, magnetic and optical materials; integrated multi-modality sensing; biologically-derived network concepts; and, sense and respond actuation capabilities. This will influence the development of technology that improves military capabilities in the areas of precision strike, signature management, network design and implementation and "identification of friend or foe."

Collaborative technology alliances are industry-led partnerships between industry, major universities, historically black colleges and universities/minority institutions (HBCU/MI), and government. The strategy takes advantage of the large industry investments in areas of high importance to the Army such as communications and networks; robotics; advanced sensors and decisions architectures; and power and energy. This collaboration combines the practicality of industry with the creative research capabilities of universities and the operational knowledge and warfighter expertise of Army laboratories to leverage state of the art technology for the soldier.

Centers of Excellence support the advancement of technologies directly related to the enduring needs of the Army by funding universities where state-of-the-art research programs are coupled with broad-based graduate education programs to increase the supply of scientists and engineers in the areas of interest. This strategy focuses critical mass of effort on enduring challenges.

MANUFACTURING TECHNOLOGY (MANTECH)

The Army MANTECH Program is designed to improve readiness and reduce total ownership cost of Army systems through the implementation of new and enhanced manufacturing technologies. In 2002, the Army focused its MANTECH efforts to address high priority projects that will enable affordable production and sustainment of the FCS and future force in four major investment areas: armor; electronics/power systems; munitions; and sensors. The Army MANTECH Program places a strong emphasis on transitioning technology, directly involving the technology developers, acquisition program managers and industry.

The Army's newest Center of Excellence, the Flexible Display Center (FDC), was established on February 10 at Arizona State University at Tempe (ASU). ASU will partner with industry, other universities, and the government to advance flexible display technology and manufacturing. The Army's goal is to have rugged, low-power flexible displays provide enhanced information and situational awareness for the soldier and vehicle platforms. The FDC will provide the innovative R&D for materials, devices, and manufacturing processes to solve critical challenges in the performance and fabrication of flexible displays. The payoff to the Army is a transformational capability for a lighter, smarter, faster future force.

A good example of the return on investment that the Army MANTECH program has achieved is the Enhanced Manufacturing Processes for Body Armor Materials project that ended in May 2001. This effort helped reduce the cost of the composite plates that go into the Interceptor Body Armor vest from \$850/plate to \$500/plate. Through December 2003, 500,000 plates have been produced for the Army and the Marine Corps. For a total shared investment in the MANTECH program of \$1.5 million, we have realized a total of \$175 million in cost avoidance. With the Army's plan to field Interceptor Body Armor to all of its deployed forces, we expect this cost savings to significantly multiply.

CONCLUSION

The Army must maintain a diverse S&T portfolio to be responsive to current and future warfighter needs. The S&T community seeks technological solutions that can be demonstrated in the near-term, investigates the feasibility of new concepts for the mid-term, and explores the imaginable for the uncertain, far-term future. In closing I would like to thank you, Mr. Chairman, for the opportunity to testify before the subcommittee. I would be happy to answer any questions you or the members of the subcommittee may have.

Senator ROBERTS. We thank you for your testimony.

Admiral Cohen, please proceed.

**STATEMENT OF REAR ADM. JAY M. COHEN, USN, CHIEF OF
NAVAL RESEARCH**

Admiral COHEN. Good morning, Chairman Roberts, Senator Reed, Senator Allard, it's a great honor and privilege for me to appear before you this morning.

I will keep my comments very short because your questions are far more important than anything I might have to say.

Senator ROBERTS. You're not going to show us what's behind that—

Admiral COHEN. We're going to keep that the mystery of S&T.

Senator ROBERTS. Is that classified or is that—

Admiral COHEN. It is not classified.

Senator ROBERTS. Not classified. All right.

Admiral COHEN. It's just self-serving.

Senator ROBERTS. What about what's sitting on that chair with the hole in it?

Admiral COHEN. What's sitting in that chair, sir, is the result—you've already heard in the testimony this morning of the cooperation that is going on led in large measure by Dr. Sega amongst the Navy, the Marine Corps, the Army, and the Air Force, but also the other DOD agencies.

After the tragedy of Khobar Towers, the Defense Threat Reduction Agency (DTRA) came up with a coating that they were able to apply to the inside of masonry structures. I know you've seen pictures of that being tested. That is the coating that you see right there. It can be applied in different thicknesses. It's called explosive-resistant coating.

After the attack on the U.S.S. *Cole*, where 17 of our sailors were so tragically killed, we looked with DTRA at applying that to the inside of the hulls of our ships, not on the outside, but on the inside. We determined that if we had that, we could prevent penetration of the hull material that we currently use by an explosion about the size that occurred on the U.S.S. *Cole*. We might have grotesque deformation, but we would not have penetration.

Senator ROBERTS. Now, does the U.S.S. *Cole* have that on it now?

Admiral COHEN. It does not. We are looking very hard at using this under the existing insulation and Navy leadership, Naval Sea Systems Command (NAVSEA), et cetera, and the ship builders are looking at this.

Senator ROBERTS. Have you outfitted any ship with this yet?

Admiral COHEN. We have not outfitted any ship with it yet. We're looking to put it on X-Craft, which is the congressional experimental high-speed vessel, which is aluminum. As we're moving to aluminum, this technology becomes even more attractive. But what we have done—and I don't know if you had a chance to see the video. I know Senator Dole had a chance to see it.

Senator ROBERTS. Right.

Admiral COHEN. But what we have done, working with the Army at Aberdeen, in addition to their kits that they're using for the vertical protection from the IEDs and the shards, is we've looked to apply this underneath, just like undercoat, on the HMMWVs. I'm going to keep this unclassified so that against mines and other

threats, we would protect the soldiers and the marines who are on convoy duty. As you saw from that video, the results are the HMMWV is destroyed. But with this on the bottom, the passenger compartment is maintained intact.

Now, this also had 50 caliber bullets shot at it and you can see the effect it had. Those bullets are retained. Now, this is heavy. It's expensive. But this is the value of S&T being rapidly deployed.

Senator ROBERTS. I apologize to my colleagues and I apologize to you for interrupting your prepared remarks.

But how on earth are you going to keep that HMMWV traveling at 50 miles per hour through a hot zone with that kind of weight?

Admiral COHEN. Well, you're looking at a complex structure there. I will tell you that the Army is very focused on this—and Dr. Killion will correct me if I'm wrong here—and they will not go below a thousand pound load carrying capability in their HMMWVs.

The kit that you see, the four doors and the side protection, adds between 600 and 800 pounds. We're looking to limit this to under 200 pounds, which would still fit in the window, and I'm focused more on our deploying marines right now who may have slightly different standards on this in the field than the Army does. But we are already seeing the ball joints and the springs failing much earlier than we had ever anticipated.

So you push the balloon here, because you don't know the logistics problem it's going to create. But I will tell you as an aside, I am prepared to go to Chrysler, Ford, General Motors, Dean Kamon, and others and have them look at everything we know about nano, everything we know about structural integrity, all of the modeling simulation we've done, the appliques and the sandwich approach, and let's see if we can design a HMMWV-like vehicle knowing what the future holds for us in the global war on terrorism with suicide bombers, et cetera, so that we can better in the future deploy our sailors and marines in that environment trading the platform for the person.

The South Africans have a large vehicle that's called the Water Buffalo, I believe. It's way too big for a HMMWV kind of vehicle, but it shows promise in the intelligent design against these asymmetric threats.

Senator ROBERTS. Again, I'm sorry I interrupted, but I think it's very valuable that you point out the hands-on or the actual event occurrence and what you face with technology. As you improve one particular area, you have to, as you pointed out, fill out that other balloon.

Please proceed with your comments.

Admiral COHEN. Yes, sir. I was going to say that I'm just an old naval line officer and, in fact, I'm getting older. But 4 years ago when I was ordered—and they were called naval orders—to be the Chief of Naval Research, I did not have, although I have a post-graduate degree, an S&T background. I'm just an old submariner.

But I can tell you, Senators, that in the time I have been privileged to be the Chief of Naval Research, and it is unique in all of our Services, I have learned the value of sustained investment in basic research at a critical level.

I have learned that it is only the Federal Government, with its great resources and the staying power year to year, that enables the discovery and invention that generates the innovation that powers our economy and empowers our fighting men and women in the defense of our freedoms. I thank you and the American taxpayer for that investment. It is absolutely critical.

Now, the question is always asked, what do those science projects do for me today? We've talked about atomic clocks. The previous speakers had an opportunity. You asked very insightful questions.

In late November, the Secretary of the Navy, Gordon England, came to me and said, "we're going to deploy more than 40,000 marines in March and April to Iraq." He said, "Admiral, I want you to put out a very broad net, not just Naval Research, not just Naval Research Lab, not just the other Services, I want you to go to academia. I want you to go to industry. I want you to go to other departments of the government. I want you to go international."

I provided what's now called "the Sears catalogue" by your staff, and they have it, and I will just hold it up. We have many of the logos—you're nothing without a logo—that show literally the hundreds of groups that we went to.

On December 12, my birthday, we set up at the Naval Research Lab right here on the Potomac, the quadrangle there. We made it like Tikrit. It was 35 degrees. Secretary England came. He brought Navy and Marine Corps leadership.

Instead of giving a quad chart and viewing graph briefs, we demonstrated the cutting edge S&T from industry, from other Services, international, et cetera. Some of it worked. Some of it didn't work. That's S&T. I get paid to take risk. I have the privilege of failing occasionally in my job.

Based on that meeting, Secretary England has been holding bi-weekly meetings with Navy and Marine Corps leadership to ensure, number one, that our marines have the capability to provide their mission as they go to Iraq, but also to ensure that they have the maximum protection that our technologies can provide to the marines.

You saw some of that in the demonstration at the back of the room. I'm so proud to be part of the Navy, Marine Corps, civilian, and uniform leadership that values our fighting men. Thank you, sir.

[The prepared statement of Admiral Cohen follows:]

PREPARED STATEMENT BY RADM JAY M. COHEN, USN

Mr. Chairman, distinguished members of the subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's fiscal year 2005 naval science and technology (S&T) budget request.

The last year has demonstrated how new technology and new operations have transformed the nature of the battlefield and the speed of operations. I want to highlight some of the contributions from the naval S&T portfolio that have delivered new capabilities to our fleet and force. These are examples of how Congress' sustained and stable investment in science and technology in the past delivers the technological superiority for our sailors and marines today.

Let me tell you about some of the S&T success stories from Operation Iraqi Freedom (OIF). You will remember that I came before this subcommittee a few years ago and brought a prototype for demonstration of the Dragon Eye, a small unmanned aerial vehicle (UAV), for small unit tactical reconnaissance. The Dragon Eye is small, light, easy to transport, and easy to fly. This UAV has transitioned

into the Marine Corps Force and will accompany the First Marine Expeditionary Force (I MEF) when it deploys to Iraq later this year.

We have long supported the development of unmanned underwater vehicles. The Remote Environmental Monitoring Unit (REMUS) is a low-cost autonomous underwater vehicle. Originally designed to conduct coastal surveys in support of science, it was adapted for military use with support from the Office of Naval Research and the U.S. Special Operations Command (SOCOM). Capable of performing rapid environmental surveys, REMUS also functions as an underwater mine reconnaissance device for the Navy's Mine Countermeasure Program. A half dozen of the REMUS autonomous underwater vehicles went with the Navy Special Clearance team to the Arabian Gulf to help clear the ports of Umm Qasr and Az Zubayr. Equipped with side scan sonar, REMUS was used to systematically survey 2.5 million square meters of waterways. This was the first time that an unmanned underwater vehicle was used in conjunction with other mine countermeasure units in a wartime situation. The team had the first REMUS in the water within several hours of arriving in Umm Qasr.

Another UAV used in OIF is the Silver Fox. Built as a small tactical UAV, Silver Fox uses off-the-shelf avionics and can fly autonomously using differential Global Positioning System (GPS). Weighing only 22 pounds, it can be launched by hand or catapult from various platforms. Once airborne, Silver Fox uses an infrared and high-resolution color zoom camera to relay reconnaissance information instantaneously to a remote laptop computer. Powered by a 0.91 cubic inch engine, this fixed-winged aircraft can reach speeds close to 65 miles per hour and operate at an altitude of 1,000 feet with a range of up to 150 miles. We are working to increase the flight endurance beyond the current 10 hours. We are using the 4 pound payload capacity for small state-of-the-art detection systems. Silver Fox's 5-foot fuselage, detachable wings, and tail fins fit into a supersized golf bag making storage and transportation simple and efficient. Unlike other UAV systems, which require a skilled radio-control operator or pilot, Silver Fox is easy to fly and allows the operator to program routes into a laptop computer.

Those are some of our highlights for the near-term—"Today's Navy and Marine Corps." Naval S&T is a sustained journey from discovery to deployment in which innovation (invention) and experimentation (validation) transform the operating forces. This is a continuous cycle, so I would like to discuss the "Next Navy and Marine Corps" (roughly the forces that will emerge over the next 5 to 15 years), and finally the "Navy and Marine Corps After Next"—which we will see in 15 to 30 years.

A great deal of our transformational effort is lodged in the Future Naval Capabilities (FNC). S&T enable Navy transformation by achieving the FNCs' goals. The key to successful transformation is the strong business partnership among scientists, industry, requirements, acquisition, and warfighters.

We have focused a major portion of our S&T portfolio on FNC for the "Next Navy and Marine Corps." Approximately two-thirds of our 6.3 (Advanced Technology Development) funds and about 40 percent of our 6.2 (Exploratory Development) funds are invested in the FNC. The FNC process delivers maturing technology to acquisition program managers for timely incorporation into platforms, weapons, sensors, and process improvements. Each of the current 12 FNC focus areas is planned and reviewed by an integrated team with representation from the Office of Naval Research, a Program Executive Office (PEO), the Navy and Marine Corps requirements community, and the fleet/force user community. This gives us constant validation of the relevance of the technologies, and strong buy-in and commitment to transition plans. We have recently strengthened alignment of the FNC process with the naval capabilities development process, which establishes our program requirements and priorities in Sea Strike, Sea Shield, Sea Basing, and FORCEnet.

The current FNCs, in no priority order, are:

- Advanced Capability Electric Systems—The future of naval warfare is electric. Warships will have revolutionary power plants that permit new hull forms and propulsors, reduce manning, streamline logistics, power advanced sensors, and enable future high energy and speed-of-light weapons. We have already successfully transitioned the Aircraft Electrical Servicing Station, a solid state, re-programmable, reliable, high quality deck edge power source for aircraft servicing, and the Reconnaissance, Surveillance and Targeting Vehicle, which demonstrates key hybrid electric components such as Li Ion Battery Pack, power electronics, and in-hub wheel motors in an integrated system demo. In fiscal year 2005 we will transition work on our Ships Service Fuel Cell to the DD(X) program. Fuel cell technology has the potential to significantly reduce fuel consumption, and can also provide distributed power generation, improving the ship's "fight through" abil-

ity. This FNC is aligned most closely with Sea Strike, Sea Shield, and Sea Basing.

- **Autonomous Operations**—This program is pursuing a dramatic increase in the performance and affordability of naval air, surface, ground, and underwater autonomous vehicles—unmanned systems able to operate with a minimum of human intervention and oversight. The Autonomous Operations FNC gives us a great potential to operate effectively in what would otherwise be denied areas. It contributes to Sea Shield and Sea Strike. In fiscal year 2005, for example, we will transition the Modular Mission Payload Architecture to the Fire Scout Vertical Tactical UAV. The prototype system is being used to control the ISR payload on the Spiral 1 Spartan USV, which is currently deployed on the U.S.S. *Gettysburg* in the Middle East.

- **Fleet/Force Protection**—We have very capable ships, aircraft, and ground combat vehicles. It's our business to ensure that they don't fall to the sorts of asymmetric threats our enemies pose. This FNC, aligned with Sea Shield, is working to develop effective organic means of protection: weapons, sensors, countermeasures, stealth and damage control. It has already transitioned the initial phase of the ES Detection of Low Probability Intercept (LPI) Periscope Detection Radars project to Office of Naval Intelligence as part of their Cluster Pennant Program. In addition, this S&T program is transitioning as an upgrade to Naval Sea Systems Command's (NAVSEA) AN/BLQ-10 Submarine ES System.

- **Knowledge Superiority and Assurance**—Information technology is as crucial to naval superiority as it is to any other aspect of contemporary life. This program is developing our ability to distribute integrated information in a dynamic network with high connectivity and interoperability. It will ensure knowledge superiority, common situational understanding, and increased speed of command. This FNC is a key enabler of FORCEnet. It recently provided a prototype Image Processing and Exploitation Architecture tool to the I MEF for deployment on UAVs in Iraq and Afghanistan. This tool provides a geo-referenced composite picture of imagery that builds over time as UAV sensors conduct searches of areas of interest. The picture provides a substantial enhancement to standard imaging techniques that only provide a view of what the sensor sees at any particular point in time. The Knowledge Superiority Assurance FNC has also provided tools that significantly improve our ability to process signals intelligence and weather information in-theater. In fiscal year 2005, this FNC plans several transitions to significantly improve time-sensitive decisionmaking, apertures, networking, interoperability, and the next generation common picture.

- **Littoral Antisubmarine Warfare**—This program is part of our shift in emphasis to littoral, expeditionary operations. The antisubmarine warfare (ASW) challenge in coastal waters is a tough one so, we are focusing scientific efforts on enhancing our ability to detect, track, classify, and engage enemy submarines by using a layered tactical ASW approach. We do this by first countering enemy submarines near shore, followed by addressing threat submarines prior to their torpedo launch, and then countering any threat torpedoes after launch. Each layer by itself will effectively address its individual objective; and when the layers are viewed in their entirety, it offers an effective "system-of-systems" approach that we believe will adequately address the ASW problem. A number of products have transitioned to acquisition systems including Sonar Automation Technology processing techniques that provide automated detection and classification operator alerts to submarines and surveillance platforms, reducing operator workload and increasing performance capability. Sea Shield is benefiting from the products of this FNC.

- **Littoral Combat and Power Projection**—This FNC has two major thrusts: Expeditionary Logistics (aligned with Sea-Basing) and Littoral Combat (essential to Sea Strike). This FNC focuses on deploying uniquely capable combat and logistics systems necessary to deploy and sustain the fleet and the force without building up a large logistical infrastructure ashore. This year, the Expeditionary Logistics Program successfully tested a set of automated Logistics Command & Control/Decision Support Tools essential to the Marine Air Ground Task Force (MAGTF). They have set the stage for transition of a Ground Logistics Command and Control Combat Service Support "Toolkit". The toolkit will provide proactive rapid request support for personnel, equipment, and services, logistics mission planning and execution support, after-action assessment tools, and situational awareness projection

onto the Marine Corps common operating picture. Littoral Combat FNC plans a fiscal year 2005 transition of the EX-45 Stabilized Gun Mount which will use advanced software to sense and compensate for motion about train and elevation axes. The gun mount which additionally houses an Embedded Video Tracker is compatible with the MK-19 40mm, M2 .50 caliber and M240G 7.62 weapon systems. The stabilized, adaptive mount coupled with an auto-tracking feature will significantly enhance warfighting capability in both surface vessel and vehicular applications. Also planned for transition in fiscal year 2005, the Expeditionary Decision Support System (EDSS) software application is designed to support operations ranging from amphibious landings to combat operations ashore. Resident within the application are scheduling engines, computational models, performance algorithms, and the ability to collaboratively access common databases. EDSS's high degree of military utility has garnered substantial warfighter interest and as a result has deployed with Marine Expeditionary Units (MEUs) and Naval Expeditionary Strike Groups (ESGs) in support of Operation Enduring Freedom (OEF) and OIF. The Direct Reporting Program Manager Expeditionary Fighting Vehicle (DRPM EFV) will transition the secure wireless local area network (LAN) and related technologies to enhance the information exchange between individual EFVs, between EFVs and dismounted troops, as well as between EFVs and the ships and operations centers with which they operate.

- **Missile Defense**—This program is focused on technology enabling and supporting lethal engagements of theater missiles, manned and unmanned aircraft at extended ranges in defense of naval forces and assets afloat and ashore. Products being worked will offer ways to expand the battlespace rapidly, identify contacts accurately, and engage threats effectively and efficiently. This year, as part of the Composite Combat Identification project, the Missile Defense FNC will transition advanced algorithms to correlate real-time track files with signals intelligence data and other information files resident in the EP-3E ARIES II surveillance aircraft. When this capability is operational, derived identification information will be provided to fleet tactical users in real-time. As part of the Reactive Materials Warhead project, test results and warhead design parameters of a first generation reactive materials warhead will be available with the goal of high lethality against cruise and ballistic missile targets. In September, there will be an important demonstration at the Combat Systems Engineering Design facility of our Distributed Weapons Coordination capability. These automated battle management algorithms will provide real time priority threat evaluation considering all air threats and all defended assets, at sea and ashore. Recommendations of Preferred Shooter will also be developed considering location, current weapons load and optimal end-game geometry for both ballistic missile defense and defense against “air breathing” threats. In early fiscal year 2005, we will complete development and testing of highly mobile X-band radar technology in the Affordable Ground Based Radar project as a risk reduction concept demonstration for the Marine Corps Multi-Role Radar System (MRRS). The Missile Defense FNC is a strong contributor to the Sea Shield and FORCEnet pillars of the Navy's Sea Power 21 operational concept.

- **Organic Mine Countermeasures**—Because they are cheap, and able to seed the battle space with a menace far out of proportion to their numbers, mines have been and will continue to be deployed against us by terrorists and their state sponsors. We're working to give our forces an organic—that is to say, an inherent—and stand-off ability to detect, characterize, and neutralize mines wherever they may be encountered. Closely aligned with Sea Shield, this FNC has transitioned several important products. One of them, the REMUS autonomous underwater vehicle, is now in the hands of our operating forces in Iraq where it helped clear the rivers to speed supplies to troops. It was also pressed into service in the weeks immediately following September 11 to help secure ports on both of our coasts. I might mention that REMUS emerged from a basic oceanographic research program—another piece of evidence that overnight successes are long in preparation.

- **Time Critical Strike**—We are substantially reducing the amount of time it takes to hit critical mobile targets, like theater ballistic missiles launchers, command centers, and weapons of mass destruction. One of this FNC's products, the Affordable Weapon System, a loitering cruise-missile-like system that can carry a variety of payloads, is currently transitioning to the

acquisition community for development this year. Time Critical Strike is aligned with Sea Strike.

- **Total Ownership Cost**—This FNC uses advanced design and manufacturing processes to significantly decrease the cost of buying, operating, and maintaining Navy systems while promoting increased system readiness. We are working to reduce total lifecycle costs during design and manufacturing as well as increase savings realized from reduced manning and better environmental compliance. Aligned primarily with Naval Enterprise, this FNC has transitioned a number of programs to the user community. The Total Oil Monitoring System is designed for real-time, online applications and will transition to Navy surface ships to monitor critical machinery. The Rapid Cure Ship Tank Coatings Program has been demonstrated in 14 ship tanks and voids. Aircraft corrosion sensors, developed under the Corrosion and Corrosivity Monitoring System Program have been installed on an H-60 helicopter for flight testing. The Turbine Engine Technology Program delivered a thermal barrier coating with significantly reduced thermal conductivity that was selected for inclusion in the F135 (Joint Strike Fighter) engine. In fiscal year 2005, we will transition a Portable Wide Area Non Destructive Inspection Imager that maps surface corrosion and subsurface defects without removal of paint. Payoffs include faster, more reliable aircraft inspection, improved prognostics, longer aircraft life, lower repainting costs and improved safety.

The relatively mature technologies managed in FNCs do not spring up overnight. In many cases they are the result of long term investments in research and invention programs in 6.1 and early 6.2 funding categories. We focus our research and invention investments on areas where the Navy is the only significant U.S. sponsor (such as Ocean Acoustics and Underwater Weaponry), and on S&T Grand Challenges whose solution would provide significant advances in naval capability (such as Naval Materials by Design). A stable, long-term discovery and invention program is essential to keep our pipeline full of enabling technologies and to attract the Nation's best scientific talent to focus on naval problems.

Finally, I would like to talk about the "Navy and Marine Corps After Next"—the fleet and force we will see in 15 to 30 years. We are continuing to support our Grand Challenges and the National Naval Responsibilities as well as our Innovative Naval Prototypes. The Naval S&T Grand Challenges are large, difficult, challenges that, if met, could give us decisive capabilities 15 to 30 years in the future. We encourage the Nation's scientific community to achieve breakthroughs in difficult but achievable scientific challenges like Naval Battlespace Awareness, Advanced Electrical Power Sources for the Navy and Marine Corps, Naval Materials by Design, and Multifunctional Electronics for Intelligent Naval Sensors. The National Naval Responsibilities are fields in which the Department of the Navy is the only significant U.S. sponsor. These include fields like Naval Engineering, Ocean Acoustics, and Underwater Weaponry. If the Department of the Navy didn't invest in them, it is unlikely that anyone would. It is vital to keep such fields healthy, not only for the sake of our own capabilities, but to avoid technological surprise as well.

I am excited about what I call Innovative Naval Prototypes. These are the capabilities that promise to fundamentally change how we prepare for and fight wars. Examples include: the Free Electron Laser, the Electromagnetic Railgun, hypersonic missiles, the x-craft, and superconducting electric drive motors. The Secretary of the Navy and the Chief of Naval Operations (CNO) are committed to making the electric ship our ship of the future and we are providing the S&T. We are well down the path to building the electric propulsion and weapons. The 36 megawatt motor effort is underway and we are using the lessons learned from ongoing testing of the 5 megawatt motor. The Free Electron Laser is progressing to its next demonstration at 10 kilowatt. In addition, we are working collaboratively with the other services, as directed by Congress, on electromagnetic rail gun technology for the future.

Construction is underway on the high speed, experimental vessel called Littoral Surface Craft—Experimental, or "X-Craft." This high speed aluminum catamaran will test a variety of technologies that will allow us to improve our capabilities in littoral, or near-shore, waters. The X-Craft will be used to evaluate the hydrodynamic performance, structural behavior, mission flexibility, and propulsion system efficiency of high speed vessels. X-Craft will eventually be fitted with an advanced lifting body component. The lifting body component is a streamlined underwater appendage that will dampen low-speed ship motions, increasing the operational envelope for helicopter and small craft operations. Liquid polymers will be used on the surface of the lifting body to evaluate drag reduction.

The X-Craft will be the first Navy purpose built ship to demonstrate mission flexibility. Mission flexibility will be demonstrated through interchangeable "mission

modules” housed in the X-Craft’s large Mission Bay in standard 20-foot container boxes. The Mission Bay will be capable of housing 12 containers, permitting the vessel to be quickly reconfigured to support a variety of potential missions, including battle force protection, mine countermeasures, amphibious assault support and humanitarian support. A multi-purpose Stern Ramp will allow X-Craft to launch and recover manned and unmanned surface and subsurface vehicles up to the size of an 11 m Rigid-Hull Inflatable Boat (RHIB). From its flight deck, X-Craft will be able to support 24-hour-a-day operations for up to two MH-60S helicopters.

In conclusion, the Nation’s return on investment is clear. Naval transformation depends on a long-term, stable and sustained investment in S&T. We validate through a cycle of ongoing experimentation and validation so we can transition new capability to the warfighter.

Thank you for the opportunity to testify.

Senator ROBERTS. Secretary Engle, you’re next.

STATEMENT OF JAMES B. ENGLE, DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE FOR SCIENCE, TECHNOLOGY, AND ENGINEERING

Mr. ENGLE. Thank you, Mr. Chairman, members of the subcommittee, and staff. I also very much appreciate the opportunity to be here today and to testify on the 2005 Air Force S&T budget.

The United States Air Force is continuing to transform to a capability-based and focused expeditionary air and space force. We are doing this through the development of our concepts of operations (CONOPs) for each of the seven major tasks that the Air Force must accomplish to support the combatant commander.

Our goal is to make the warfighting effects and the capabilities we need to achieve them the drivers for everything we do. In fact, we are specifically focused on this area in our S&T program.

We have taken the effects and the capabilities required by the seven concepts of operations and the transformational goals and mapped them to the long-term challenges and the short-term objectives identified in the congressionally-directed S&T planning review we completed in 2002.

Let me just briefly highlight some of the most exciting work we’re doing in this area that’s relevant, I think, particularly to the testimony on transitioning work that we’re doing to our warfighters.

We have increased our investment in space communications technology considerably. The objective here is to identify, develop, and demonstrate wide-band technologies needed to build a space-based laser communication network that can provide higher data throughput.

Along with the movement of information, protection and assurance of that information to the commander in the field is equally important. Our work at Rome Labs in New York is world class in this particular area, in both computer network defense and attack as well as assurance of information to the warfighter.

We have completed and transitioned the initial breakthrough work on laser eye and sensor protection developed at our Human Effectiveness Directorate at Brooks City-Base in Texas and the Materials Lab at Wright-Patterson. These efforts have been rated world class by our Air Force Scientific Advisory Board.

Also world class is the space weather research being done at Hanscom up in Massachusetts. We will put the Communications/Navigation Outage Forecast System (C/NOFS) satellite in orbit,

which will help us provide the warfighter with a space weather forecast.

We're also very proud of the work that we're doing on the research for the protection of facilities and equipment that Admiral Cohen spoke about. We've done considerable work on elastomeric coating polymers, which are coating this thing right here. We are, in fact, putting the polymer that's been developed under the DTRA on the Pentagon. Right now, as we refurbish the Pentagon and other buildings, it's incredibly effective in this particular capacity with a very thin coating.

In addition, we're continuing to explore the use of these kinds of polymers embedded in fabrics for less-rigid structures, such as tents and field equipment, for protection of our forces in the field.

Another exciting effort that we see in the near term demonstrated back here is the Vehicular-Mounted Active Denial System (VMADS) being jointly developed with the U.S. Marine Corps. It is a defensive millimeter wave system used for perimeter defense that we have developed down at Phillips Lab or at our Directed Energy Lab in Albuquerque.

It is a directed energy weapon and it omits that nonlethal feeling, Mr. Roberts, that you had to experience three times while they were photographing you; just to make sure we have the right photograph. It is very effective. If any of you would like to have a demonstration of the full body blast, let me know and we can arrange that.

We are working hard for our SOF by reducing the weight and integrating the kit that they use. We call this equipment the Battlefield Air Operations Kit, and improvements are being realized by using very rapid spirals to speed development, prototyping, testing, production, and fielding.

As a result, our special tactics warriors will soon have a digital machine-to-machine capability that helps them quickly connect to the right aircraft with the right munitions on board guided precisely to the right target at just the right time.

These new automated processes help reduce the time it takes to target the terrorist threat, while at the same time reducing human error in the targeting process.

We're also working hard to defend against Man-Portable Air Defense Systems (MANPADS), and that's also demonstrated in the back. I think that is some of our most exciting work, which I think we're going to see fielded more and more, not only within our force structure, but internationally as well.

In addition, Closed-Loop Infrared Countermeasure (CLIRCM) multi-spectrum missile warning system is coming online soon and will be the next generation. We are rapidly trying to get that mature and into the field as well.

We strive to focus on those technologies that we believe we will need to transition over the next 10 to 15 years, principally in our program. But as Dr. Sega and the rest of my colleagues have pointed out, because of the operational necessity of today we have found very effective ways to take the work that is the basis of our technology and transition it quickly to our warfighter.

At the same time, we have to balance that against the long-term and make sure that we have that tech-base viable in the 10- to 15-

year period. One of the most important methods to determine if you're investing in the right things is to maybe dissect some legacy systems and see if the technologies you've invested in in the past have found their way into the developmental or operational systems we have today.

One excellent example is the F/A-22 aircraft. A wealth of technologies have been transitioned into this aircraft and they can be traced back to an investment of approximately a billion dollars in the Air Force S&T over the years. Examples of these transitioned technologies include low observable materials, advanced two-directional thrust vector nozzles, new supercruise non-afterburning turbine engines, fly-by-wire integrated flight controls, solid state active transmit and receive radar, and thermoplastic composite structures, just to name a few.

Additionally, a number of information-related technologies have transitioned into operational use, including the highly-effective information data wall that we're currently using in Afghanistan and Korea, multi-layer communications securities being used by several government agencies, software-defined reprogrammable radios, and secure communications that are adaptable for coalition operations.

In conclusion, the Air Force is fully committed to providing the Nation with the advanced air and space technologies required to meet America's national security interests around the world and to ensure we remain on the cutting edge of system performance, flexibility, and affordability.

The technical advantages we enjoy today are a legacy of decades of investment in S&T. Likewise, our S&T in warfighting capabilities of the future will be substantially determined by today's investment in S&T.

To meet all of the demands of our laboratory, the Air Force is working to increase our S&T funding. Our fiscal year 2005 President's budget request is for \$1.9 billion. This includes \$1.4 billion in core S&T, which represents an increase of over \$80 million or almost 5 percent real growth compared to the President's budget of fiscal year 2004.

As we face the new millennium, our challenge is to advance technologies for the expeditionary air and space force as we continue to move aggressively into the realm of space activities.

The Air Force S&T program provides for the discovery, development, demonstration, and timely transition of affordable transformation technologies that keep the Air Force the best in the world.

As an integral part of the DOD S&T team, we look forward to working with Congress to ensure a strong S&T program tailored to achieve our vision of a superior air and space force.

Mr. Chairman, thank you again for this opportunity to present testimony and thank you for your continuing support of the S&T program.

[The prepared statement of Mr. Engle follows:]

PREPARED STATEMENT BY JAMES B. ENGLE

INTRODUCTION

Mr. Chairman, members of the subcommittee, and staff, I very much appreciate the opportunity to provide testimony on the fiscal year 2005 Air Force science and

technology (S&T) program. The United States Air Force is transforming to a capabilities-focused Expeditionary Air and Space Force. We are doing this through the development of the concept of operations for each of the seven major tasks the Air Force must be capable of accomplishing to support our combatant commanders. Our goal is to make the warfighting effects and the capabilities we need to achieve them the drivers for everything we do. This is especially true in our S&T program. We have taken the effects and capabilities required by the seven concepts of operations and mapped them to the long-term challenges and short-term objectives identified in the congressionally-directed S&T Planning Review completed in February 2002. Not surprisingly, we have a high correlation between our S&T programs and the capabilities required by these concepts of operations. This is because the Air Force Research Laboratory (AFRL) closely links the technologies reflected in its S&T plan to warfighter capability needs.

The United States Air Force is committed to an S&T program that enables us to achieve our vision of becoming an integrated air and space force capable of rapid and decisive global engagement. By continuing our investment in transformational technologies that support a reduced cycle-time, spiral development acquisition process, the Air Force will retain its dominance of air and space in future conflicts, against both traditional and asymmetrical threats.

Innovation is a vital part of our heritage and is key to ensuring the Air Force will meet the challenges of tomorrow. Transforming our warfighting capabilities towards this end will involve continued innovations in how we train our forces and how we think about employing our forces to defend our Nation, as well as continued advances in our technology. We must be prepared to counter regional instabilities, the worldwide availability of advanced weapons, and other emerging and less predictable acts of terrorism against our Nation and allies. We are developing transformational technologies that permit flexible forces to operate far from home, on short notice, and for extended time periods. However, we must also be able to afford transformational innovations once we develop them in order to re-capitalize the Air Force to fulfill our vision. To meet warfighting capability objectives, we invest in the most promising and affordable technologies in order to win decisively, protect our forces, and minimize collateral damage.

S&T BUDGET/SENIOR LEADERSHIP INVOLVEMENT

We continue to be faced with the reality of a fiscally-constrained, but operationally-demanding environment. The high operations tempo (OPTEMPO) the Air Force has sustained in support of peacekeeping operations and conflicts, such as in Afghanistan and Iraq, has placed a great burden on our people and the supporting logistics.

In spite of these rigorous demands, the Air Force is working to increase S&T funding, while maintaining a balanced S&T portfolio. The Air Force fiscal year 2005 President's budget request for S&T is \$1.9 billion—this includes \$1392.8 million in "core" S&T efforts, which represents an increase of over \$80 million or almost 5 percent real growth compared to the President's requested amount for similar "core" S&T efforts in fiscal year 2004. The most significant change in the S&T President's budget request results from the integration of programs that were devolved last year from the Office of the Secretary of Defense (OSD) to the Air Force S&T program. This includes the University Research Initiative program and the High Energy Laser Joint Technology program.

The Air Force understands the concerns of Congress regarding the level of support for these devolved programs and continues to work hard to ensure these programs support the diverse multiple military objectives inherent in joint programs. Furthermore, the OSD continues to provide policy guidance and oversight for these efforts.

In a separate action last year, the Seismic Research Program for detection of nuclear explosions was transferred back to the Air Force from the Defense Threat Reduction Agency (DTRA). We continue to work with the OSD, the Air Force Technical Applications Center, and the Army to invest in a seismic research program that addresses operational nuclear explosion monitoring needs. Under the guidance of the OSD-led intergovernmental steering committee, the Air Force is funding research to increase the understanding of seismic wave propagation at regional distances of less than 2,000 kilometers.

One area in which the Air Force has increased its investment is in space communications technology with initiation of the transformational communications technology development program. This program will identify, develop, and demonstrate the wideband technologies needed to build a space-based laser communications network that could provide higher data throughput to transform our military satellite communications infrastructure.

Warfighter and senior Air Force leadership involvement in the planning, programming, and prioritizing of Air Force S&T continues to be a priority. For example, the Secretary and Chief of Staff of the Air Force, along with the Air Force Service Acquisition Executive and the Air Force Materiel Command Commander, conduct a full portfolio review of the S&T program similar to the former S&T summits. In addition, the Integration Capabilities Review and Risk Assessment process involves several levels of senior Air Force leadership, including the chief and all the four stars, and further promotes a greater understanding within the Air Force of the S&T program and its link to warfighting capabilities. The Capabilities Program Execution Review provides a forum in which the commander of each major command is afforded a focused look at his portfolio and an opportunity to resolve issues at the system/program level and provide insight to the S&T program. Finally, the Applied Technology Councils (ATCs), which are discussed in greater detail later in this statement, bring together acquisition product centers, logistics centers, major user commands, and laboratory personnel to review and discuss S&T efforts—ATCs foster top-level user involvement in the transition of technology from the laboratory to the system developer to the operational user.

TRANSFORMATION

The Air Force continues to transform from a Cold War to a post-Cold War air and space force. As we do so, we must prepare for new forms of terrorism, attacks on our space assets, attacks on our information networks, cruise and ballistic missile attacks on our forces and territory, and attacks by adversaries armed with chemical, biological, radiological, nuclear, or high explosive (CBRNE) weapons. To address this post-cold war reality, the Air Force has established a process of transformation by which it will achieve and maintain the “advantage through changes in operational concepts, organization, and/or technologies that significantly improve its warfighting capabilities or ability to meet the demands of a changing security environment.” Critical to this transformation is the ability to mature and translate a vision into actual operational capabilities in order to prevail in conflict and avert technological surprise.

When examining the concept of combat transformation, it is important to note several fundamental points. First, transformation is not the result of a one-time improvement or change, but rather a continuum of sustained and determined efforts. Second, meaningful transformation requires integrating expanding capabilities with those of the other Services and non-military elements of national power. Third, transformation is more than new “gee-whiz” technologies. It includes adapting existing capabilities and using them in new ways, changes to the organizational structure to increase effectiveness, and changes in doctrine and concepts of operations to include training and tactics that determine force deployments. Fourth, transformation should not be achieved at the expense of ongoing operations in support of the Department of Defense (DOD) strategy of maintaining adequate readiness and infrastructure, conducting critical recapitalization, and attracting quality personnel. To achieve rational transformation there must be a careful balance between these requirements, which all compete for limited resources.

To institutionalize transformational changes, the Air Force will capitalize on three core competencies. One, developing airmen to ensure they receive the education, training, and professional development needed to provide a quality edge second to none. Two, integrating operations to enhance combat capabilities that are pivotal to maximizing the air and space environment. Three, the technology-to-warfighting vision of translating technology into operational capabilities. These three core competencies are the foundation of success and will ensure we remain dominant in air and space operations.

Transformation further translates into Air Force operational concepts—more commonly known as Concepts of Operations (CONOPs). Air Force CONOPs provide the long-term roadmaps to get the right capabilities at the right time and place for the joint warfighter. Implementation of these CONOPs require new and sometimes revolutionary changes to existing CONOPs and organizations, and refocusing technology developments. The CONOPs form the basis of the Air Force investment strategies for technology development, system acquisitions, and support decisions. The Air Expeditionary Task Force is an overarching CONOP that uses the capabilities provided by the following six supporting CONOPs:

- Global Strike provides the capability to maintain battlespace access for all required joint/coalition operations;
- Space and Command, Control, Communications, Computers and Intelligence, Surveillance, and Reconnaissance (C⁴ISR) provides persistent space

and air situational awareness and executable decisionmaking information to the Joint Forces Commander;

- Global Response provides intelligence and strike systems to attack fleeting or emergent, high-value or high-risk targets by surgically applying power anywhere on the globe within hours;
- Homeland Security leverages Air Force capabilities with joint and inter-agency efforts to prevent, protect, and respond to identified threats;
- Nuclear Response provides the deterrent “umbrella” under which conventional forces operate and, if deterrence fails, avails a rapid scalable response; and
- Global Mobility provides the capability to enable rapid, timely, and effective projection, employment, and sustainment of power in support of global interests.

The Air Force goals to achieve transformation include information superiority, air and space superiority, precision engagement, global attack, rapid global mobility, and agile combat support. The Air Force S&T program has been planned and focused to support the Air Force CONOPs and goals. The Air Force Capabilities Review and Risk Assessment (CRRRA) process supports the CONOPs by identifying and analyzing current and future capabilities, capability shortfalls, health risks, and opportunities. Part of the CRRRA process is to provide information on these identified technology gaps and shortfalls to the S&T program planners to provide direction and focus to the S&T capability planning process. The CRRRA process is transformational as it concentrates on desired battlespace effects vice specific air and space platforms.

WORKFORCE

The Air Force scientist and engineer (S&E) workforce is another area where senior Air Force leadership involvement plays a pivotal role. Both Secretary Roche and General Jumper are deeply involved in shaping our future S&E workforce. Air Force civilian and military S&Es are highly motivated and productive, but we need to be vigilant in continuing to recruit and retain the best and brightest individuals. The Air Force is unique in that approximately 20 percent of its laboratory S&E government workforce is active duty military. It is from this cadre that we draw the technical competence needed in our military Service leadership to operate an ever more technical force. In addition, this gives us a direct link to the warfighter, which in turn helps us to focus technology development on warfighting capability needs. Some of these military S&Es come directly from operational commands, while others will serve and support combatant commanders in operational commands later in their careers.

The Air Force is committed to shaping its S&E workforce with the vision to enhance excellence and relevance of S&T into the 21st century and appreciates the support Congress has already provided. This challenge requires the Air Force to maintain a dominant edge in warfighting capabilities and also requires us to provide clear direction and growth for our S&E workforce. However, we, as do others, find it a significant challenge to recruit and retain S&Es. The Air Force has several initiatives, both civilian and military, that address recruitment and retention issues.

Civilian initiatives include the recruitment of college students with critical S&E skills via recruiting incentives, a robust marketing effort, and a co-op central funding program that hires college students while still in school. Central funding for recruiting bonus and retention allowances for journeyman level S&Es also promises to provide much needed assistance with civilian recruitment and retention.

On the military side, we’re employing the Airman Education and Commissioning Program and the Technical Degree Sponsorship Program to recruit additional S&Es into the military workforce. We are in the process of examining the impact of bonus programs such as the Critical Skills Retention Bonus on retention and will assess future Air Force requirements for this and similar bonus programs.

The Air Force is committed to its S&Es and published a “Concept of Operations for Scientists and Engineers in the United States Air Force” last year. We also baselined the requirement for the Air Force S&E workforce and, upon analyzing this baseline requirement, found that while our military and civilian authorizations were about right, our actual demographics were seriously short in some key areas. We continue to shift our focus towards retaining the workforce we have and infusing it with the vitality of new S&Es to meet tomorrow’s need. During the next 7 years, we are investing nearly a third of a billion dollars to support the retention and re-shaping of our technological workforce. As we replenish our S&E workforce, we are providing career guidance and mentoring that will enable us to meet our 21st century challenge. Once the National Security Personnel System is implemented it

could also produce positive results in shaping our S&E workforce. Again, we express our thanks to Congress for your continued support.

MAXIMIZING OUR S&T DOLLARS

We will continue to leverage technology to achieve new levels of combat effectiveness. Our strategy is to pursue integrated technology capabilities that support our warfighter's highest priority needs. In addition to transformational technologies, we must also pursue the fundamental enabling technologies that will improve tomorrow's Air Force. As technological superiority is increasingly a perishable commodity, we work hard to optimize our S&T funding, by not only "inventing the future" ourselves, but also by speeding the transition of new technologies to our warfighters.

One way of identifying technologies for rapid transition to the warfighter is through our ATCs and the Advanced Technology Demonstrations (ATDs). The councils are composed of two- and three-star generals from AFRL, our logistic centers, our acquisition product centers, and our major user commands who formally prioritize proposed ATD programs. We hold an ATC meeting with each major command twice every year and have commissioned 34 ATDs that have transition funding. The ATC process is extremely important in linking the S&T program to the system developers, the logisticians, and, finally, the operational user. This process facilitates technology transition to operational use and secures user commitment for resources to do systems design and development and fielding of the technology. Currently about 50 percent of our Advanced Technology Development (6.3) budget is committed to ATD programs.

Since deployed technology may remain in use for decades, the Air Force S&T program not only focuses on enhancing performance, but also on sustaining our fielded warfighter capabilities. Emphasizing affordability from the very beginning through training of our management, and science and engineering staff, as well as through an in-depth review of technology development efforts, increases our potential to reduce the costs of technology early in the system development process and throughout a product's life cycle.

We maintain an excellent balance of military, civilian, and contractor expertise, which allows us to be very selective about investing in high payoff technological opportunities. We constantly seek opportunities to integrate Air Force planning and leverage our S&T funds by cooperating with other Services, agencies, the private sector, and international partners. For example, we rely on the Army as the lead Service for defensive chemical-biological technology development. The Air Force also has inter-agency efforts, such as our program in aging aircraft, which is focused on detection and management of corrosion and fatigue in aging structures. It is closely coordinated with the civilian aging aircraft research programs at the National Aeronautics and Space Administration (NASA) and the Federal Aviation Administration (FAA). Our partnership with the industrial and university research base is very strong. In fact, we outsource over 70 percent of our S&T funding to universities and industry. Finally, the Air Force is involved in international cooperative technology development efforts for S&T, such as the non-destructive inspection, tactical missile propellants, and aircraft battle damage repair efforts conducted with the United Kingdom, Germany, and Italy, among others. Another example of international cooperation is the multi-domain network management program with Australia and Canada. This program is developing the technology concepts and tools for creating and managing secure computer networks with our coalition partners.

LEGACY PROGRAMS

Over the years, the best and most reliable way to judge whether you are investing in the "right" technologies is to look at legacy systems that are in development or operational use and see how the technologies you invested in previously have transitioned into these "products." An excellent example is the F/A-22. A wealth of technologies that transitioned to the F/A-22 can be traced back to an investment of approximately \$900 million in Air Force S&T over the years. These technologies include efforts such as low-observable materials, advanced two-directional thrust vectoring nozzles, new supercruise non-afterburning turbine engines, airframe design, mission integrated transparencies, solid state active transmit and receive radar, thermoplastic composite structures, and fly-by-wire integrated flight controls. In the space arena, examples of technologies that have transitioned into space "products" include radiation-hardened electronics to protect our satellites from the harmful effects of radiation; longer life, lighter weight lithium ion batteries; compact, more efficient solar cells for more effective processing of sunlight into electrical power; composite bus structures that are lighter weight and stronger; hall thrusters for orbit change and orbit maintenance; and enhanced antenna designs that provide

for more efficient communications. In addition, a number of information-related technologies have transitioned into operational use including the highly effective information data wall that is currently being used in Afghanistan and Korea, multi-layer communications security being used by several government agencies, and software defined reprogrammable radios for secure communications and adaptable for coalition operations.

Some technologies, such as those being implemented as spiral upgrades to the Battlefield Air Operations (BAO) Kit that is used by Air Force ground controllers who call in air strikes, were rapidly transitioned into use during Operation Iraqi Freedom (OIF). The BAO Kit is one of the Secretary of the Air Force's top priorities and continues being developed in several different acquisition spirals as the technology matures. The technology transitioned from S&T into developmental and operational products is extensive and provides the confidence that S&T funding is being wisely invested. The Panoramic Night Vision Goggles (PNVGs) are another prime example and provide operators a significantly wider field of view than the "soda straw" view of earlier goggles. Technology transition into operational use is the ultimate metric for assessing the value of our S&T investment.

WORLD CLASS RESEARCH

The quality of our program is assessed by the Air Force Scientific Advisory Board (SAB) through yearly reviews. The SAB conducts an in-depth review of half of the S&T program each year, covering the entire program over a 2-year period. Twelve technical areas have been identified as world-class research during the last cycle of reviews—let me highlight a few of these areas that were identified as world-class.

The Directed Energy Directorate's Starfire Optical Range at Kirtland Air Force Base, New Mexico, is leading the adaptive optics research for use in large ground-based telescopes to image satellites and propagate laser beams through the atmosphere. This will enable high-quality, ground-based observations of space objects and propagation of laser beams through a turbulent atmosphere. Satellite images using this technology can provide real-time status information that cannot be obtained in any other manner.

Our Propulsion Directorate's Hypersonics Technology (HyTech) work at Wright-Patterson Air Force Base, Ohio, is acknowledged by the SAB as world class and is the cornerstone of future hypersonic capabilities, such as destroying time-critical targets and responsive access to space. Our HyTech program has continued to advance the state-of-the-art in scramjet engines and completed the first ever ground test demonstration of a scramjet producing positive net thrust begun in 2001. In February 2003, HyTech tested a flight weight scramjet ground demonstration engine operating at Mach 4.5. While the 2001 Performance Test Engine used copper heat-sink hardware and weighed 1,500 pounds, the 2003 ground demonstration engine used JP-7 fuel to cool the scramjet engine walls and weighed less than 150 pounds. This marked another first for the HyTech program—demonstrating the structural durability of a hydrocarbon fueled, actively cooled scramjet. Testing at Mach 6.5 has been completed. United States industry developed this particular engine in collaboration with Air Force scientists and engineers.

Another SAB-rated world-class research program is the Warfighter Skill Development and Training efforts worked by our Human Effectiveness Directorate at Brooks City-Base, Texas. Specific research areas include Integrated PNVG and Distributed Mission Training. The Integrated PNVG will improve situational awareness and terrain avoidance at night through its wider field of vision and improved resolution. It will also provide protection from laser target designators, laser rangefinders, and laser threats through compatibility with existing laser eye protection technologies. Distributed mission training will provide an integrated set of training, simulation, and mission rehearsal technologies that will improve warfighter capabilities and mission readiness by enhancing operator and team performance skills. Technologies will increase operational readiness by providing more effective methods and approaches to train and assess personnel. These technologies will contribute to a more highly trained and flexible cadre of personnel at a reduced cost.

Working closely with operational users and the Human Effectiveness Directorate at Brooks City-Base, AFRL researchers in the Materials and Manufacturing Directorate at Wright-Patterson Air Force Base, Ohio, continue to develop and transition new laser eye protection technologies that provide aircrews with improved eye protection. The world-class multi-disciplinary approach anticipates future threats and needs, and assures that next-generation hardening technologies will address the agile laser threat. The Laser Eye Protection program is enabling aircrews to conduct day and night air operations without visual jamming or personal injury. The Materials and Manufacturing Directorate also conducts world-class research to improve

the affordability, durability, and performance of advanced aerospace metals by integrating modeling and simulation into all aspects of the program. The potential cost savings when qualifying metallic materials for insertion into Air Force weapon systems are significant. Revolutionary work on thermomechanical process modeling and probabilistic micromechanical modeling of failure and durability will change the way materials are developed and implemented in air and space applications.

Our research in Electro-Optical Warfare at Wright-Patterson Air Force Base, Ohio, will allow future laser-based sensor systems to penetrate moderate cloud cover, obscurants, and camouflage. This will provide improved target detection and identification for our weapon systems. "See and Avoid" sensors will ease restrictions on unmanned air vehicle (UAV) operations in civilian airspace and allow autonomous operation in conjunction with manned aircraft. These technologies may also be applied as low-cost missile warning sensors to affordably protect military and commercial aircraft from surface-to-air missiles. Also, experimental research in infrared countermeasures is developing threat adaptive techniques for robust defeat of current and future infrared weapons and sensors.

Space Weather research at Hanscom Air Force Base, Massachusetts, is another SAB-rated world-class technology development program. We continue to develop a modeling capability that specifies and forecasts space weather from the Sun to the ionosphere. In conjunction with this modeling capability, our Solar Mass Ejection Imager, launched in January 2003, is greatly increasing our ability to forecast solar-induced ionospheric disturbances that adversely impact communications systems and spacecraft.

At Edwards Air Force Base, California, the Propulsion Directorate is working on world-class research in polynitrogen propellants. The goal is to enable high performance monopropellant rocket propulsion systems with revolutionary performance. By improving the specific impulse of the propellant, we will have environmentally benign exhaust and reduced signatures. This could potentially improve storage, manufacturing, and rocket engine size.

COMBATING TERRORISM

While the traditional focus of S&T has been on developing long-term capabilities, the Air Force S&T program also contributes to the current needs of the Nation and our troops deployed in hostile areas. One example of an Air Force project receiving a great deal of attention since September 11 is the Elastomeric Coating Polymer, which the Air Force developed to protect key buildings and installations from close proximity explosions, such as air dropped weapons or truck bombs. This easy-to-apply spray coating provides greater structural integrity of exterior walls and prevents dispersion of debris as well as separation of wall elements. In addition to protecting lightweight shelters, this polymeric coating is currently being applied to the interior of the outer walls of the Pentagon.

Another transformational effort is the Vehicular Mounted Active Denial System (VMADS). The VMADS is being jointly developed with the U.S. Marine Corps and is a defensive millimeter wave system with many potential applications, including perimeter defense. It is a directed energy weapon that emits a non-lethal, non-damaging beam, which heats up the skin of a potential adversary when in close proximity to the system. The resulting temporary pain causes the person to flee.

Yet another effort of significant interest is something called PING. PING is a standoff, microwave-based interrogation unit that has reliably identified AK-47s, rocket propelled grenades (RPGs), and suicide bomber apparatus in field demonstrations. PING operates by illuminating potential threats and then categorizing the return reflected off metallic objects found in a crowd of people using a laptop computer and specialized software to determine specific weapon types. Metallic substructures on weapons resonate at unique, natural frequencies that permit automatic identification of concealed weapons. The PING demonstration unit is vehicle-mounted and can be positioned up to 100 meters away to monitor persons or groups of people entering a checkpoint for concealed weapons. The unit can also be remotely operated. This Air Force S&T program has been briefed to the Army and we are optimistic that PING will rapidly transition into operational use.

In the war on terror, Air Force Special Tactics Combat Controllers are changing the very nature of warfare. By performing operations deep in enemy territory, they help determine who the terrorists are, where their weapons are located, and who the innocent civilians are. Then, they precisely control the elements of airpower to defeat the terrorist threat, while taking care to spare innocent civilian casualties and minimize collateral damage. Then, these same Special Tactics Combat Controllers are there to provide instant battle damage assessment. We call these deep engagements BAO.

The Air Force is accelerating new technology to these special tactics warriors in the form of significant improvements to their BAO Kit of equipment. As a result of this Air Force enterprise, our special tactics warriors will soon have a digital machine-to-machine capability that helps to quickly connect the right aircraft, with the right munitions, guided precisely to the right target, at just the right time, to achieve the desired effect. This new automated process helps to reduce the time it takes to target the terrorist threat, while at the same time reducing human error in the targeting process.

Working collaboratively with the special tactics warriors, the Air Force "BAO Tiger Team" has also partnered with a national team of industry to field significant enhancements of increased capability, while reducing the weight and size of the individual BAO Kit equipment. They are performing these improvements by developing, prototyping, testing, building, and fielding these BAO Kit improvements in very rapid spirals. These new BAO capabilities will help to save American lives, and the lives of innocent civilians. BAO provides a revolutionary and highly effective way to combat the terrorist threat.

TRANSFORMATIONAL TECHNOLOGIES

There are many other Air Force technology areas that deserve special mention. Let me highlight just a few examples. As mentioned earlier, there's our transformational communications technology development program, whose laser communications technology efforts promise to increase data transfer rates at least ten-fold compared to current radio frequency communications systems. Additionally, laser communications use a narrow beam, which decreases the likelihood of intercept and increases resistance to jamming. While laser communications have a high potential to revolutionize satellite communications, there are technical challenges to overcome such as precision pointing and tracking, weather constraints, and adapting the equipment for use in space. We continue to work on the technology challenges and are implementing the results of our recently concluded study to determine the best architecture for implementing laser communications technologies to complement and integrate with radio frequency-based systems.

To increase aircraft survivability and operational efficiencies, the Air Force is developing the F/A-22 and F-35—Joint Strike Fighter, aircraft that can carry and employ weapons from both external and internal weapons bays. To increase the number of weapons the flight vehicle can fit into its internal weapons bays, part of our investment strategy focuses S&T funding on developing and demonstrating smaller precision weapons.

One of the small munitions currently being flight demonstrated at Eglin Air Force Base is the Low Cost Autonomous Attack System (LOCAAS) technology program. The LOCAAS is a 100-pound class powered munition of which the primary target set is moving and relocatable targets. This ATD program will demonstrate the effectiveness and military utility of this type of munition for the Lethal Suppression of Enemy Air Defenses (SEAD), Theater Missile Defense (TMD) Attack Operations, and Armor/Interdiction mission areas. LOCAAS will integrate a laser radar precision terminal seeker with autonomous target recognition algorithms, a multi-modal warhead, Global Positioning System (GPS)/Inertial Navigation System (INS) mid-course guidance, and a miniature turbine engine with a fly-out range of 100 miles.

In fiscal year 2005, the Air Force will conduct a cooperative program with the Royal Australian Air Force (RAAF) using the small diameter bomb. A test program on the RAAF F-111 aircraft in Australia is scheduled for the first quarter of the fiscal year 2005. This will be an important test for both nations—the U.S. is able to test munitions release at supersonic speeds and Australia benefits from the test results. These results could enable maturation of the computational simulation codes for separation of symmetric and asymmetric miniature weapons, providing for a reduction in the risk and cost of weapons certification efforts for aircraft with internal weapons bays such as the F/A-22, the F-35—Joint Strike Fighter, and unmanned combat air vehicles.

To continue the trend of miniaturization of space platforms, the Air Force is also conducting the Experimental Spacecraft System (XSS) series to demonstrate increasing levels of microsatellite technology maturity. Following the successful XSS-10 mission in January 2003, we plan to launch the XSS-11 microsatellite in late 2004. XSS-11 will demonstrate fully autonomous operations and provide experience with command and control in proximity operations to another space object over several months. If successful, this could provide the capability to repair, refurbish, and perform maintenance operations from unmanned microsatellites.

One of the most transformational and quickly deployable technologies available today is command, control, and communications technology, also known as informa-

tion technology. This technology is at the heart of our Moving Target Indicator Exploitation program, which is developing web-enabled automated tools to exploit data from current and future sensor systems such as the Joint Surveillance Target Attack Radar System (JSTARS). The effort is focused on four technology areas: ground moving target tracking; motion pattern analysis; behavioral pattern analysis; and sensor resource allocation and scheduling, which provide the capability to track moving targets and get the information to the operations center.

BREAKTHROUGH TECHNOLOGIES

In recent years, we have all come to appreciate the success of unmanned vehicles. We hear over and over again the tremendous operational advantages that systems such as Predator and Global Hawk are bringing to warfighters from all Services. Over the first two decades of the 21st century, advances in micro UAVs will provide significant additional capabilities to our Armed Forces. Micro air vehicles utilize advances in microscale aerodynamics, electronic miniaturization, munitions, and propulsion to package sensory and weapons payloads into highly reliable, on-demand systems. These systems will provide unprecedented levels of situational awareness in the most severe threat environments. Whether we are operating in urban environments, sensing biochemical dispersion through the atmosphere, or looking over the next hill, our troops will have the awareness needed to fight and survive. These systems will provide the persistent intelligence, surveillance, and reconnaissance (ISR) in high threat environments needed by our troops on the ground and our airmen in the air. When called for, swarms of these vehicles will cooperate together to generate both lethal and nonlethal effects.

In the next 50 years, advancements in nanotechnology will provide the greatest change in how man operates since the invention of powered flight itself. Nanotechnology is a science and a series of disciplines that works at the atomic and molecular level to create structures, materials, and devices through improved molecular organization. By working with elements at the level of nanometer scale, we have access to the building blocks of nature. This will fundamentally change the way materials and devices will be produced in the future. The ability to synthesize nanoscale building blocks with precisely controlled size and composition and to then assemble them into larger structures with unique properties and functions will revolutionize segments of the materials and device industry. The benefits that nanostructuring can bring include lighter, stronger, and programmable materials; reductions in life cycle costs through lower failure rates; innovative devices based on new principles and architectures; nanosensors and nanoprocessors; and use of molecular/cluster manufacturing, which takes advantage of assembly at the nanoscale level for a given purpose.

Another significant breakthrough technology that will change the way we develop systems is our work in biotechnology. Biology has developed unique materials and processes that may be exploited in non-biological systems. Our research is focused on studying the science necessary to incorporate biological components and organisms into Air Force systems. For example, in biomimetics, we research the adaptation of natural biological sensor in reptiles. The natural infrared sensors in reptiles do not need to be cooled. We hope to adapt this biological process to Air Force sensor applications that normally require cryogenic cooling.

TECHNOLOGY TRANSITION

The majority of Air Force S&T is contracted with industry and universities. This promotes relationships between the S&Es conducting the research and lays the foundation for technology transition. Strong connections between the technology supplier and the end user help speed transition of technology to the warfighter. In addition, the various transition programs in which the Air Force participates further cement this foundation. Air Force technology transition efforts include ATD projects, Small Business Innovation Research (SBIR) contracts, and Cooperative Research and Development Agreements (CRADAs) among others.

The ATCs discussed earlier were initiated in fiscal year 1999 to foster top-level user involvement in the transition of technology from the laboratory to the system developer to the operational user. As noted, these councils review and approve Air Force ATD projects and ensure that the major commands plan for the transition of successful technology by tying approved ATD projects to planned Major Command Future Years Defense Program (FYDP) funding.

Another Air Force technology transition tool is the CRADA—an agreement between a government laboratory and a non-Federal party under which the laboratory provides personnel, facilities, equipment, or other resources (but not funds) with or without reimbursement and the non-Federal party provides funds, people, services,

facilities, equipment, or other resources to conduct specific research and development efforts that are consistent with the agency's mission.

These efforts along with many other programs, such as Dual-Use S&T, Independent Research and Development (R&D), Mentor-Protégé, Personnel Exchanges, etc., are mutually beneficial to the Air Force and the contractors and universities with whom we collaborate. Technology transition is a key component of the Air Force S&T program and is vital to our pursuit of national security requirements.

SECTION 253 STUDY

Section 253 of the National Defense Authorization Act for Fiscal Year 2002, Public Law 107-107, directed the Air Force, in cooperation with the National Research Council of the National Academy of Sciences, to carry out a study to determine the effect of S&T program changes of the past 2 years. The Air Force Science and Technology Board (AFSTB) of the National Research Council prepared a written report, which the Secretary of the Air Force forwarded to Congress as directed. The findings contained in this report indicated that overall the Air Force has made considerable progress during the past 2 years in strengthening its S&T program. The AFSTB noted that great progress has been achieved in increasing the visibility of the S&T portfolio within the Air Force, but challenged us to continue working to stabilize funding levels, strengthen our workforce, and reestablish the "development planning" process. As the report indicated, however, we have already begun many initiatives targeted towards strengthening these areas and will continue to pursue them in the future. In fact, at almost \$2 billion, the fiscal year 2005 President's budget request for Air Force S&T is funded at a level to achieve the distinctive capabilities supporting Air Force Core Competencies. In addition, we have also taken steps to strengthen our scientist and engineer workforce through various recruitment and retention initiatives. Finally, the Air Force has shifted from a threat-based approach to a capabilities-based approach to making investment decisions and providing for requirements generation planning. This transformation will be key to our ability to determine what is necessary to support our defense strategy in the years to come. "Development planning" will be a vital and fully integrated part of the Air Force's new capabilities-based planning process.

CONCLUSION

In conclusion, the Air Force is fully committed to providing this Nation with the advanced air and space technologies required to meet America's national security interests around the world and to ensure we remain on the cutting edge of system performance, flexibility, and affordability. The technological advantage we enjoy today is a legacy of decades of investment in S&T. Likewise, our future warfighting capabilities will be substantially determined by today's investment in S&T. As we face the new millennium, our challenge is to advance transformational and enabling technologies for an Air and Space Force as we continue to move aggressively into the realm of space activities. The Air Force S&T program provides for the discovery, development, demonstration, and timely transition of affordable technologies that keep our Air Force the best in the world. As an integral part of the DOD's S&T team, we look forward to working with Congress to ensure a strong Air Force S&T program tailored to achieve our vision of a superior Air and Space Force.

Mr. Chairman, thank you again, for the opportunity to present testimony, and thank you for your continuing support of the Air Force S&T program.

Senator ROBERTS. We thank you, Mr. Secretary.

Senator REED.

Senator REED. Thank you very much, Mr. Chairman, and thank you gentlemen for your testimony. You've all highlighted the critical role that S&T plays in the defense of the Nation.

Dr. Segal, you pointed out that the President's request was an increase from his last request, but it's a decrease from the money you had last year, am I correct?

Dr. SEGA. That's correct, sir.

Senator REED. That raises the question, do we have money? Are you still committed to the DOD goal of 3 percent funding for S&T programs?

Dr. SEGA. The goal of S&T investment at 3 percent of the total obligation authority (TOA) remains a goal of the Secretary of Defense.

Senator REED. How fast will we reach that goal if we're going backwards with this budget request?

Dr. SEGA. I can't answer that.

Senator REED. Dr. Killion, again for the record, is the position of the Army that 3 percent is a number you support?

Dr. KILLION. We support the goal of 3 percent. In fact, the Army has significantly increased its investment in S&T over the last several years. It's actually approached that goal in the President's budget.

Senator REED. Thank you.

Admiral Cohen.

Admiral COHEN. Navy leadership, both civilian and uniformed. You have testified to the value of S&T, but they have not committed to any percentage for S&T. I will tell you that the Marine Corps exceeds 3 percent. People say, well, they have a small budget in S&T, but to them it's a big budget.

Senator ROBERTS. Well, they've had to put up with baling wire for so damned long, it's about time.

Admiral COHEN. Yes, sir. They've done very well. I'm married to a Marine Corps junior and she got marine and submarine confused. I don't know how that happened. But she keeps me on the straight and narrow.

For the Navy, I'm very pleased to tell you that the fiscal year 2005 budget that you have in front of you stops the decrease in the Navy line that we saw both in fiscal year 2003 and fiscal year 2004. As we look through the Future Years' Defense Plan (FYDP), that is sustained.

Senator REED. Mr. Engle.

Mr. ENGLE. Senator, we support the 3 percent overall as a DOD goal for S&T investment. I would quibble slightly in that the contribution from each of the various components or Services plus DARPA make up the total 3 percent.

As the Air Force looks at it, we see that our share of that 3 percent is probably less than a 3 percent number. Our goal is to hit about 2.4 percent of our TOA, which would probably fit nicely into an overall DOD goal of 3 percent.

So we are moving in the right direction. Right now we're not at 2.4 percent, but we have committed to try to migrate in that direction with the goal of hitting 2.4 percent in the 2007 time frame.

Senator REED. Thank you.

We all recognize that with additional resources, you could do additional things. Could you provide a list to the subcommittee of those unfunded priorities that you have in a priority list as best you can? I think everyone is agreeing to that for the record. Thank you very much.

[The information referred to follows:]

Dr. SEGA. The Department of Defense supports the President's fiscal year 2005 budget request. The science and technology (S&T) program is balanced to meet near-, mid-, and far-term needs to provide options for responding to a full range of military challenges both today and into the uncertain future. The Department's investment in S&T develops the technology foundation necessary to produce transformational capabilities. We are working with the military departments and defense

agencies to ensure sufficient funding is directed toward projects that advance the six QDR transformation operational goals. Some of the technologies that support the QDR are the National Aerospace Initiative, the Energy and Power Technologies, Surveillance and Knowledge Systems, Future Combat Systems, Objective Force Warrior, Electric Ship, High Speed Sea Lift, and Directed Energy Weapons, and Advanced Space Systems.

Dr. KILLION.

LIST OF ARMY SCIENCE AND TECHNOLOGY UNFUNDED PRIORITIES

Close In Active Protection System \$23.3 million.

Admiral COHEN.

Unfunded Program List

PRI	RS	TITLE (Program/issue)	APPN	FY04 (\$M)	Cum Total	COMMENTS (including weighting impact)
1	All	Work Year Funding, MPN shortfalls, targeted personnel bills and Sea Warrior	Mult	326	326	Based upon FY02 retention data, projected workyear costs for 1,333 enlisted/110 officers, and increased longevity costs due to enlisted retention behavior. Projected must pay bills associated with TEMDUINS, CONUS COLA rate increase, Medical Special Pay rate increase, and BAH increases associated with Runshimer and increased permanent change of station costs. This funds the E-4 High Year Tenure Separation Pay and Lateral Conversion Program. Will need to pay separation pay to E-4s at HYT in order to generate required issues to support enlisted strength plan. Lateral Conversion Bonus will give Navy the flexibility to internally adjust the imbalance of personnel amongst skills. Also funds ACP for shortfalls in Dept Head Aviators. Sea Warrior is the Human Resources (HR) component of CNO's Sea Power 21 Transformation Roadmap, specifically focused on maximizing human capital and improving Fleet readiness by ensuring the right skills are in the right place at the right time.
2	78	Additional F/A-18E/F Ancillary Equipment Procurement	APN	113	439	Funding procures 38 complete sets of ancillary equipment to amend current shortfall. F/A-18E/F Ancillary equipment currently underfunded \$139M over FYDP. By FY06 (PBO4 procurement), 51% of non-deployed (DTC) aircraft will have no ancillary equipment. Buys 81% of total requirement.
3	76	Stabilized Chain Guns	WPN	54	493	Funds accelerated procurement of 30 ship systems - stabilization / remote capability kits. 2 Mounts/ship for 60 total (\$800K/system, \$100K/install). Significantly improves ship self defense by increasing effectiveness of minor caliber guns against small boats. Sea Shield enabler.
4	76	Non-Lethal Systems/swimmer detection	OPN	17	510	Funds procurement of non-lethal COTS MIO/ATF equipment including Sea Spider propeller entanglement system, Long Range Acoustic Device (LRAD) and small arms flash bangs for vessel warning and identification. Procures equipment for 3 CSG/ESGs (30 ships) to improve capability and increase effectiveness for Anti-Access and Homeland Defense missions. Swimmer detection system provides capability to detect and track sub-surface threats inport. Procures and installs equipment for 30 ships (\$500K/system).

Unfunded Program List

5	61	ADNS Bandwidth Expansion and Mandated Security Upgrades	OPN	10	520	ADNS upgrades must be funded to eliminate a 2Mbps bandwidth restriction at the routers and multiplexers that currently process Navy's afloat communications. This upgrade will ultimately provide a 8-10 fold increase in available bandwidth to afloat units without purchase of additional RF transport beyond that currently in the POM. Without the investment in this upgrade, we will not be able to take full advantage of additional bandwidth that will come on line during the POM. In addition, the technology inherent in this upgrade will allow Afloat Commanders to dynamically model and allocate RF resources to the applications and systems employed in their current mission. FORCENet MCP/ISCP analysis identified ADNS upgrades as the Navy's most critical near-term C4 warfighting enhancement.
6	78	F/A-18 Weapons Carriage	multi	91	611	Weapons Systems Integration funds mixed load and weapon carriage integration of AIM-9X, GBU-24, AMRAAM C57, HARM BLK VI, JSOW Unitary, JDAM MK 82/83, BRU-55 being developed to enable multiple carriage of 500/1000 Lb JDAM per F/A-18E/F weapon station. Currently limited to single JDAM per station. FY04 funding would procure 200 BRU-55 Smart Racks. By FY05, 50 aircraft would have capability to double DMPIs serviced per sortie. SEA STRIKE ISCP recommendation: If fully funded, this issue could address the following F/A-18E/F carriage issues: - Separation testing for mix stores carriage (JDAM, JSOW, GBU, and Air-to-Air combinations), \$56M - Integration of specific weapons (JSOW Unitary, HARM Block VI, JDAM 82/83 (parent rack only) and AIM-120 C-7), \$10M - Procurement of 200 BRU-55 Smart Racks to support two JDAM per station for F/A-18C/D, \$23M
7	76	LCS Modules	RDTE	35	646	Reduces risk in development of anti-submarine, anti-surface, and mine hunting mission modules to be configured in the LCS class ships. SEA-SHIELD ISCP recommendation.
8	78	18 EA-6B Outer Wing Panels	APN	60	706	Accelerates Outer Wing Panel (OWP) replacements to mitigate current grounding and flight restrictions placed on EA-6Bs from excessive Fatigue Life Expenditure. ISCP recommendation. 8 a/c grounded and 23 a/c restricted to 3-g flight in Dec 02. 50 sets required for fleet. \$60M buys 18 sets in FY04 (max rate production).

Unfunded Program List

9	75	LHA Midlife/FMP	OMN	33	739	Completes necessary Midlife alterations. Improvements include corrosion prevention, propulsion/auxiliary systems, electrical/damage control and cargo handling systems. Completes necessary modernization ALTs on Amphibious ships such as weight and moment.
10	76	ERAM	RDTE	46	785	Engineering and integration efforts to include incorporation of missile self-test, reliability improvements and missile/missile component cost reductions with a focus on elimination of hardware. Combined efforts provide acceleration of SM-5 AKA ERAM FY10 IOC by 6 months.
11	76	IROSS	OPN	63	848	Procures and installs Integrated Radar Sighting & Surveillance System (IROSS) in 30 ships (\$2.1M unit cost). Provides increased detect-through-engage capability against surface asymmetric threat significantly improving effectiveness of minor caliber weapons against small boat threat. Includes integration of digital radar picture, Electro-Optic ID, non-lethal deterrence and remote engagement by small arms and minor caliber guns. Sea Shield enabler.
12	78	AESA	RDTE	11	859	Funding restores \$4M to AESA R&D effort to ensure schedule timeline for IOC and \$7.15M required to comply with AN/APG-79 (AESA) protection plan. Funds anti-tamper technology to prevent compromise of US capabilities and foreign exploitation of AN/APG-79 radar.
13	76	5'62 Shock Test	WPN	11	870	Funds barge Shock test for MIL Standard 901D requirement for 5' 62 Gun Mount to demonstrate full combat readiness. System did not fair well during ship shock trials on DDG81; COMOPTEVFOR gave system a downcheck for operational readiness. Fixes for all failures have been identified.
14	78	Firescout	RDTE	35	905	Keeps program alive, buys one mission system (3 air vehicles, two ground stations, sensor payload) and change to 4 bladed rotor. This is for possible use ICW LCS.
15	61	SEI	multi	12	917	Replaces aging UYX-3 SEI suites that are rapidly becoming inoperable with UYX-4 and expands Fleet inventory to ensure that all deploying Battle Groups deploy with organic SEI capability. Critical enabler to GWOT and counterproliferation efforts.
16	4	AOE-1 Sustainment	OMN	43	980	Provides minimum maintenance required to keep the four AOE-1 class ships safe for personnel and equipment, and free of operational restriction until the AOE-1's protected decommissioning in FY06/07.
17	76	T-AOE(X)	RDTE	15	975	Accelerates T-AOE(X) from FY09 to FY06.

Unfunded Program List

18	78	CH 46 OSIP Inventory Adjustment	APN	4	979	Funds HONA A&B OSIPs (Electrical, Maintenance & Boost Actuators) to outfit all fleet aircraft with these required safety improvements and T-58-16A Engine Reliability Improvement Program (ERIP) due to delay in fielding the MV-22.
19	78	FHP FO	OMN	200	1179	FO supports the fleet by funding TAD/TAT, commercial air services, ADP Spt, including NMCI. Direct flying hours have been fully funded at expense of FO. Funding FO allows fleet to execute the OP-20 FHP to T2.2 level of readiness. SEA STRIKE ISCP recommendation.
20	78	AV-8B ELMP	RDTE	7	1186	RDTE 'N' required to continue the ASMET series of tests to improve engine readiness, availability, and safety.
21	78	SH-60B/H Armed Helo Kits Procurement	APN	77	1263	Procures 28 Armed Helo "B" kits to match "A" kits and Fixed Forward firing mounts for legacy H-60.
22	76	76mm Gun Ammo for FFG/USCG	PANMC	13	1276	Procures additional ammo to support USN/USCG ships anti-access and Homeland Defense missions for FFGs/USCG cutters. Procures 17692 rounds of 76mm ammo to support training requirements and bring ammo levels back up to war reserve level. Sea Shield enabler.
23	78	GP Bombs	PANMC	60	1336	Procures additional bomb bodies (primarily MK-83) to mitigate near term shortfall for PGM kits match. There is still an impending delta between the amount of Guidance Kits procured (JDAM/LGB) and the amount of Bomb Bodies available to bolt these kits on to.
24	61	Challenge Athena - C-Band Space Segment Leases	OMN	10	1346	Challenge Athena connectivity relies on the lease of commercially available satellite transponders, gateways and "tail" circuits b/w commercial and Navy shores sites. Additional funds support Joint Fires Network (JFN).
25	76	SQQ-89 A(V)-15 Backfit	OPN	31	1377	Funds additional procurement for SQQ-89 A(V)15 systems for installation on 3 DDGs. Program acceleration will improve littoral ASW capability. SEA SHIELD ISCP recommendation.
26	78	C-40	APN	134	1511	Funds 2 additional C-40 aircraft in FY04 bringing total to 3.
27	78	Marine Corps Aviation Simulator Master Plan	APN	18	1529	Funds visual upgrade to KC-130 sim in Miramar (\$2.1M) visual upgrade and Lifting II install to AV-8B sim in Yuma (\$7.9M) & install/reconfigure of CH-46E sim in Pendleton (\$8M).
28	78	AV-8B Avionics Upgrades	APN	13	1542	Funds known obsolescence and deficiency issues for improved readiness, availability and safety.
29	78	JAARGM Quick Bolt	RDTE	25	1567	Continue development of the SBIR effort to accelerate delivery to the Fleet and restores funding to PB03 level.

Unfunded Program List

30	76	FFG Gun Integration	WPN	13	1580	FY04 add funds integration of 76mm Gun Weapon System with CIWS fire control system to provide improved capability against asymmetric threats. Funds associated ORDALTS for Navy and USCG platforms. Provides increased effectiveness for FFG/USCG Anti-Access and Homeland Defense missions.
31	1	IT Support	OMN	39	1619	Transition of legacy systems.
32	75	Integrated Combat Weapons System (ICWS)	RDTE	15	1634	Transfers existing ICWS technology to expand offboard sensor/system integration and provide fleet compatible C4I capability on HSV-2X and possibly LCS.
33	75	LCAC SLEP PHASE I	multi	10	1644	Accelerates installation of radars, radars and deep skirt into LCACs not receiving full SLEP II. Provides interim corrosion abatement for craft receiving Phase I SLEP equipment.
34	4	Facilities Sustainment - 100% of FSM 4.0 requirement	OMN	99	1743	Fully funds facility sustainment to 100% of the FSM 4.0 model (per Defense Planning Guidance). Sustainment is an OSD metric which models requirements for maintenance and repair activities to keep a "typical inventory of facilities" in good working order over facility service life.
35	4	Shore Infrastructure - achieve 67 yr recap rate by FY07	MCN	263	2006	Funds facilities recapitalization projects at a level required to achieve a glide slope from 116 years in FY03 to 67 years by FY07 (Defense Planning Guidance requires 67 years by FY07).
36	77	VIRGINIA SSN R&D	RDTE	132	2138	Funds transformational capabilities for existing SSNs and future VIRGINIA class submarines; VA R&D: Information Assurance, subsystem engineering, performance and manufacturing problem resolution. AST R&D: payloads and sensors, advanced propulsors, alternate propulsion concepts, hydrodynamics and maneuverability, acoustic and EM silencing, payload interface technology, hull studies and acoustic sensors.
37	77	VIRGINIA SSN Technology Insertion	SCN	42	2180	Funds insertion of new technologies and new capabilities on Virginia Class Submarines. Ensures spiral development process and transformational capabilities for future VIRGINIA class submarines is continued.
38	61	Littoral Surveillance System	OPN	35	2215	Procure one additional LSS (HMWWV based TES systems). Upgrades system one - program goal is two. Also accelerates TES/JFN equipment fielding to the fleet in response to OEF requirements. (\$16M add)
39	78	Upgrading the F/A-18C/D Training System	APN	33	2248	Funds critical simulator upgrades to current aircraft software configuration. Replaces failing/obsolete components.
40	76	FFG 7 Class Structural Modifications	OMN	7	2255	Provides for planning and correction of FFG limiting displacement, upgrading to 4,300LT. Includes installation of Improved Current Cathodic Protection System.

Unfunded Program List

41	75	RAMICS Upgrade (Sea Shipper)		RDTE	4	2259	RAMICS gun in preliminary design for mine clearance. Funds applied now allow software/hardware design to incorporate (Sea Shipper) capability. CFFC supports (Oct 02 Ltr)
42	76	Tactical Tomahawk (TACTOM) missiles		WPN	38	2297	Procures an additional 44 TACTOMS to achieve PB03 level procurement
43	61	Multiple Security Level Coalition Interoperability		OMN	20	2317	Accelerates shore and afloat implementation of Multiple Security Level IT infrastructure to support Coalition operations. Procures 10 MSL Coalition data servers. Implements MSL Web Replication. Coalition Collaboration at Sea Coalition Common Operational Picture, Multi-Header Chat, and Coalition Public Key Infrastructure.
44	76	5" BB Round		PANMC	5	2323	Funds qualification and delivery of 5" Force Protection Projectile for all MK-15 guns designed to counter existing small boat threat. Shotgun like projectile provides significant effectiveness improvement over current 5-inch Projectiles against the current small boat threat. AT/FP issue.
45	76	ECP-583 for F/A-18A		APN	60	2382	Procures kits and installs for 32 aircraft required to support TacA7 Integration. Upgrades USMC F/A-18A to configuration similar to Ltr 17 F/A-18C. Capability improvement includes APG-73 radar, NVG lighting, digital wingtip for AIM-9X, AMRAAM, ARC-210 radios, GPS, MIDS, and J weapon capabilities (JSCW, JDAM) etc.). Funding also reduces the number of Center Barrel Replacements (CBR) required.
46	2	NAVCENT Ship Tracking		multi	10	2402	Collection system to be deployed to NAVCENT ACR to support NAVCENT maritime intelligence collection requirements.
47	78	12 ICAP III kits		APN	100	2502	Funds 7 ICAP III kits for CVW/FRS EA-6Bs and 5 of 20 ICAP III kits required for the USMC expeditionary squadrons & includes MIDS. ICAP III provides Selective Reactive Jamming and Declassification capability for CVWs, meeting the mobile threats and improved threats. Continuous ALQ-218 production line for installation on EA-18G. Buys 100% of Navy requirement and 5 of 20 additional for USMC.
48	77	Submarine HDR Comms		OPN	11	2513	Funds SubHDR program in Ohio Class SSBNs. Provides for Mast Mechanical Group modification. Provides high data rate communications capability with EHF Medium Data Rate, SHF and SFS capabilities.
49	77	ANBLO-10 ESM shipsets and Type-3 Periscope Infrared Mods		OPN	38	2551	Funds procurement of ANBLO-10 submarine SIGINT upgrade shipsets and Type 8 IR periscope modification shipsets. Provides submarine with an all-weather 24/7 electro-optic imaging capability, enhancing submarine access and safety of ship in littoral environment.
50	78	C-37		APN	55	2605	Buys 1 C-37 so that total requirement is bought out in FYDP.

Unfunded Program List

51	67	Depot/Maintenance	OMN	135	2741	Corrects for ship depot maintenance deferred maintenance requirement.
52	4	Base Operating Support (BOS)	OMN	90	2831	Funding to maintain FY02 normalized (i.e. FY02 inflated adjusted for changed requirements and directed efficiencies) funding levels across FYDP for all BOS functions to halt migration of other O&M funds into the BOS account.
53	78	KC-130J Procurement	APN	237	3068	Funds 4 FY04 KC-130Js that were shifted from program due to Advance Procurement financing strategy. 17 aircraft have been procured toward an inventory objective of 51.
54	78	Increased funding to accomplish four additional F-14 SCLMs in FY-04.	OMN	15	3083	Revised aircraft force structure reflects a delay in F-14 drawdown between FY02-FY07 necessitating 4 additional F-14 SCLMs in FY04 to support continuing squadron deployments through FY 07.
55	78	CH-53E Helicopter Night Vision System (HNVS) "B" Kits.	APN	45	3128	Funds an additional 64 CH-53E HNVS "B" Kits, a 3rd Generation FLIR system that enhances the aircraft's ability to operate at night & during periods of reduced visibility. Puts deployed squadrons at 1:1 ratio of FLIRs to aircraft.
56	78	AH-1W IR Suppressors	APN	12	3140	Accelerate Force Protection measure to increase aircraft survivability. Will outfit entire Cobra fleet of 192 A/C. Forward fit to AH-1Z (H-1 Upgrades program).
57	78	Digital Solid State Recorders	APN	16	3156	Procures digital solid state recorders for the Tactical Reconnaissance system of USMC F/A-18D aircraft.
58	78	AV-8B Litening Pod	APN	37	3193	Buy 22 pods to increase forward deployed precision targeting capability and upgrades 8 existing Litening II pods to Litening AT configuration. Buys 100% of requirement.
59	4	CBR Equipment Storage and Logistics (CFFC submission)	OMNR	5	3201	Funds remaining equipment to fill out 10,000 Chemical Biological Radiological equipments sets including storage and phased replacement.
60	78	F/A 18 Advanced Targeting FLIR	APN	15	3216	Procure ATFLIRs for two NR and 3 MCR VFA squadrons to achieve compatibility and relevancy with active forces.
61	OOT/AT-FP Training		Multi	39	3255	Funds will support increased throughput in the Master-at-Arms Course (NEC 9545) and pre-deployment training for battle groups to meet C4I training requirements. To maintain current courses that were initially supported by the Defense Emergency Response Fund (DERF). Navy sponsors need to assume the funding responsibility. Will also fund live fire gun range instructors, and ATPP training support for the Reserves.
62	78	HELLFIRE	WPN	42	3297	Procures 500 HELLFIRE Missiles. Current and outyear inventories will not meet shipfill or warfighting requirements across the FYDP. These weapons will also be a critical element in the ongoing development and weaponization of UAV's. Replacement missile (JOINT COMMON Missile) IOC is FY06.

Unfunded Program List

79	all	Additional End Strength	MPN	288	5451	Funds 4545 additional end strength for transitioning Naval Coastal Warfare from Reserve to Active and providing end strength for USS Bremerton and USS Jacksonville extension, MIC Detachments, 4th MEB, and 100 additional Irishman at USNA.
80	multi	USS Constellation CV-64	MPN/OMN	237 (MPN), 105 (OMN)	5793	Funds endstrength to begin FY04 2% above NDAA (363,214) and continue CV-64 operations through FY04.
			Grand Total \$	5,793		

Mr. ENGLE. Yes, like many areas in the Air Force, we could wisely invest additional funding in our S&T program if it were available. One of the most important efforts currently ongoing within our S&T program continues to be the work we're doing to enhance the Battlefield Air Operations (BAO) Kit equipment carried by the

Air Force Special Tactics Controllers who perform critical operations deep in enemy territory. Using very rapid spirals to speed development, prototyping, testing, production, and fielding, the Air Force continues to work to realize significant enhancements to these kits, while reducing weight and size. The following list is a representative summary of high priority S&T efforts, including enhancements to the BAO Kit, for which the Air Force could use additional funding in fiscal year 2005. A more detailed, comprehensive list has been provided to the Senate Armed Services professional staff as requested.

[In millions of dollars]

Effort	
BAO Kit Enhancements	\$14.482
Integrated Striker Targeting and Connectivity	10.000
Directed Energy for Airborne Demonstration	12.100
Space Force Enhancement	37.000
Total	\$73.582

One of the other areas that is so critical is the scientific and engineering workforce. You've all either explicitly or implicitly referred to that in your testimony.

Again, for the whole panel, what unique role can you play to help ensure the scientific and engineering workforces? Are there any particular areas of endeavor in science, a particular field of science or engineering that requires more attention?

Dr. Sega.

Dr. SEGA. Senator, that's a great question and one that we are in the process of assessing in more detail.

The trends in terms of individuals receiving especially advanced degrees, physical sciences and engineering, in our country and overseas are being examined and the needs inside for the DOD and defense-related work are being looked at.

There are key disciplines that would probably share the greatest need. For example, in some of the energy-related disciplines for high-power, the needs for directed energy for a more electric force requires expertise and background and education in high-power switches, power supplies, capacitors, those types of things.

Subdisciplines of electrical and mechanical engineering materials would be important. We would suspect that we would see a base that we want to address, areas in nuclear engineering, nuclear physics, areas of high-speed flight, hypersonic flight, the aerodynamics, the propulsion, and aerothermal considerations.

We are at the point now of going through and identifying with more rigor where the demand is versus the potential supply. In our case, much of the work needs U.S. citizens to accomplish it.

Senator REED. When do you anticipate finishing this report or study?

Dr. SEGA. That question is properly referred to Dr. John Hopps, who is the Deputy Under Secretary of Defense for Laboratories and Basic Sciences, an office that we stood up, one of the only offices stood up since being in this position, to focus on laboratory, space, and sciences workforce and education.

Senator REED. Can you provide us with your findings at a more appropriate time?

Dr. SEGA. We will.

Senator REED. Admiral Cohen, do you have a comment?

Admiral COHEN. Senator, the short answer is we play a critical role in this area. The young people in this country today are turning away from science and math. When you ask them why, they say because it's hard. The statistics speak for themselves.

Probably \$1 million I spend each year as Chief of Naval Research that I am most proud of is the monies that we provide through our Navy Reserve Officer Training Corps (NROTC) units, 69 of them, all around the country, for rising juniors, rising seniors, and graduate students to come work in our laboratories, the Naval Research Laboratory and all of our warfare centers, including the Naval Underwater Warfare Center in Newport. They work alongside our scientists and engineers who take them on as mentors. Many of them take them into their homes.

Now, we don't expect all of them to come into government service. About 20 percent are. We're in our third year of doing this and when you look at that group of young Americans, you don't have to worry about diversity. We get them from all over the country. You're looking at the face of America. It's really uplifting.

In the junior highs and high schools, we send our Reserve officers who are located all around the country to be involved with science fairs. We work with Dr. Bob Ballard and the JASON Group, as well as the National Science Foundation, to try and inspire the young people of the importance of S&T.

I was raised on Mr. Wizard. We need a better name for Bill Nye, "The Science Guy." It sounds a little geeky to me, but Rita Colwell and I have had that discussion. So we play a critical role and this is critically important for the future of this country.

Senator REED. Thank you, Admiral.

Mr. Engle, your comments.

Mr. ENGLE. Just briefly, Senator Reed.

The Air Force is very concerned about this issue. Secretary Roche and General Jumper, when they came to office a few years ago, saw this, I think, primarily because of Dr. Roche's background in industry—and the difficulty of finding talent in the engineering career fields particularly—and brought that and highlighted it inside our service.

We have, over the last 2 years, focused our senior leadership on this problem, expended a considerable amount of money to try to make sure that we are well-postured with the scientists and engineering talent we need to continue what is probably one of the most high-tech organizations on Earth.

One difficulty, which I resonate with my colleague, Admiral Cohen, is that we, as the Services and DOD, with John Hopps' good work notwithstanding, we can't do this alone. This is really a national problem.

We need to invigorate our youth in the areas of science, mathematics, and engineering. We need to build a cadre of young people that can grow up and feed not only the DOD but, as Dr. Hopps would tell you, interdepartmental demand for scientific and engineering talent. This is, I think, something that we really need to focus on nationally.

Senator REED. Thank you.

Dr. Killion.

Dr. KILLION. Just as an example similar to the Junior NROTC program that Admiral Cohen talked about, one of the things the Army did last year was stand up a program called E-CyberMission, which was intended to go out via Web-based competition and excite our youth in the seventh and eighth grades in interest in science, math, and engineering to come up with projects. We competed it nationally and actually brought the regional winners here locally for an awards ceremony that included the Chief of Staff of the Army, and my boss, Mr. Bolton, the Assistant Secretary of the Army for Acquisition, Logistics, and Technology.

We're continuing that. One of the things that the chief said at the awards ceremony last year, because we had cut it off at eighth grade, was that we're going to expand it to ninth grade the next year because he got so much feedback from the eighth grade participants that they really wanted to continue this year.

It's an early entry into getting our young people excited about science, math, and engineering, something we vitally need to do. It's important for us in the Army. It's also a contribution that we can make to our communities out there to help them and help our future industrial base.

We have other programs in high school, like our science and engineering apprenticeship program. We have a very strong program going up here at Walter Reed Army Medical Center where we bring young people from disadvantaged areas in the metropolitan area in to serve in the laboratory and learn important skills and get exposed to where the opportunities will be in the future.

So I think we have some very vital programs in that area.

Senator REED. Thank you very much, gentlemen.

Thank you, Mr. Chairman.

Senator ROBERTS. Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman.

When you're in combat, it certainly brings into focus your shortcomings and your merits, your various military equipment and tactics.

The Third Armored Cavalry Division, which is stationed in Fort Carson, will return home later this summer and that cavalry regiment has been subjected to the full spectrum of small arms fire, I believe, from IEDs to RPGs, and other shoulder-fired weapons.

My question is, could you describe your priorities and investments in the fiscal year 2005 budget for advanced armor and crew survivability technologies? A follow-up question: Can we or are we fast-tracking these technologies for introduction to the armored vehicle fleet?

Dr. SEGA. I'll start and just introduce it knowing that most of the knowledge and the work is being done in the Services.

On October 16, Secretary Wolfowitz sent a letter to Members of Congress on the issue of force protection. He had asked me to lead the task force and just facilitate bringing in the input of the technical community as well as those that represent the warfighting community, the combatant command, and the joint staff.

From CENTCOM a prioritized list of items came in this letter, totaling about \$335 million, to do in a rapid fashion. In that was included the armor, the protection pieces to include the Interceptor Body Armor and up-armoring HMMWVs. It included aspects of

surveillance to include lightweight countermortar radars, aerostats, and UAVs. It also included some detect and defeat technologies, including electronic countermeasures and detection types of things.

So in this fiscal year, we are accelerating work in force protection technologies and bringing them to the field. I think that's a good news story.

One request that we would have for Congress, and we're working together as a team, requires some of the reprogramming from current budgets, whether it is the standard budget or that of the supplemental, to augment and move towards some of the force protection technologies. We appreciate expeditious movement of reprogramming actions when they apply in this area.

That's an introduction, and I'll pass it along.

Dr. KILLION. Actually, Dr. Sega introduced a number of the areas. We can certainly provide a more detailed lay-down in terms of the specific investments if you're interested in that.

But just to give some of the highlights, I would include improvements, for example, in Interceptor Body Armor. We have ongoing programs that continue next year in terms of providing the same level of protection at a reduced weight burden for the individuals. So you could get about a 25-percent reduction in the weight associated with those plates. It may not seem like a lot, but it is important to somebody who's carrying that weight around with him in all of his operations when he has to move around and wear those protective devices.

In terms of protection for vehicles, some of the early warning capability that Dr. Sega mentioned, we're continuing to work that through our Communications and Electronics Research, Development, and Engineering Center (RDEC). We are exploring active protection systems, devices that can intercept and deflect or destroy incoming rounds to protect our vehicles and installations.

Lightweight armor, new versions of armor. That Armor Survivability Kit is an expedient solution. The best we can do near term is an affordable capability that meets the weight burden associated with non-up-armored HMMWVs. As Admiral Cohen was talking about, we have a limit on how much weight we can put on them without ending up breaking the axles or making them less mobile than we want them to be. That kind of new armor we're looking at is ceramics to provide equivalent or higher levels of protection and is a byproduct of the work that we're doing for the FCS. We're working on lighter-weight vehicles for the future.

Another example is the change detection capability. We are looking at taking advantage of some work that was done under the Joint Area Clearance ACTD and applying software into our tactical and manned aerial vehicle system which will allow us to fly along a route and then later fly the route again and automatically identify where there have been changes along that route, where we might be able to show that somebody came out and placed a device along that route. Therefore, we would have better advanced warning that there might be some kind of device out there, so we could go out and examine it.

So there are a variety of investments. It would probably be best to follow-up, if you'd like, in terms of giving you a specific profile.

Admiral COHEN. Senator, for the naval forces, we have traditionally followed a philosophy of active protection and defense in depth, destroy the enemy before they come close enough to destroy you.

We've talked a little bit about the applications of some of those underlying technologies with our Army and Marine Corps brethren, and I am the Chief of Naval Research, so we do have the Navy and the Marine Corps.

We had previously briefed a product called Quick Clot. This is now commercially available. In OIF, the application was just carried in your pocket. We lose most of our soldiers who are not killed immediately by bleeding out in that golden hour when we might get them to a field hospital. We believe this has saved 17 or 19 lives during OIF.

So looking at that golden hour, you've heard statements here about the improvements in body armor and it's been on "60 Minutes." The ceramic armor that Natick labs and the Army have worked on so well has really reduced the number of fatalities that we're seeing in Iraq and the ongoing operations today.

The unintended consequence of that is a significantly increased number of amputees, because we're protecting the body, but we're losing the arms or the legs. I have classmates, and I know many of you have friends and associates from the Vietnam War and other conflicts, where you don't want to see them in a T-shirt because they have leg tendons in their forearm, but it's their forearm.

I don't want to raise any hopes here. But a month ago, we started through the Naval Research Lab working with Naval Air Technical Data and Engineering Service Command (NATEC) and working with anyone who will come to the table for an initiative along the lines of when you get in an airplane to fly it, you put on a flight suit. Well, our young kids in Iraq are suffering these IED injuries by making patrols in HMMWVs and four-by-four convoys, et cetera. We've talked about ISR and the need for that, et cetera.

But under the rubric of what can you do to better protect the person and win that mission scenario, we're looking at leggings and stockings made out of what could be some exotic materials. It may not prevent the cuts. It may not prevent the shrapnel. But it may prevent the arm or leg from being blown off so that we then have the ability during that golden hour to take that soldier, take that marine to the field hospital and save the appendage.

Now, I'm not promising anything here. But I'm telling you, you push that balloon. We did it with the body armor. Now we're having the amputees. I'm absolutely committed to this and so that's something that the Navy can do working with our other Services.

Senator ALLARD. Okay. Let me move on to the next question here. A lot of our sources have been reporting that countries of concern are turning more and more to burying their facilities and defense installation as well as offensive.

We've looked at—the subcommittee, which I've chaired and Senator Reed is on there too—various nuclear options on how you go after these deeply buried targets.

My question to you is, are you looking at non-nuclear ways of us getting after these deeply buried targets?

Dr. SEGA. Senator Allard, the short answer is that we are working on a variety of penetration options for buried structures. De-

pending on the details, the type of penetration munitions varies. But work is ongoing and there are several activities—maybe Secretary Engle could pick up on this—of our work in terms of providing additional options for deep penetration munitions.

Mr. ENGLE. Yes. I guess we're doing quite a bit in this area. Our principal customer, as you probably are aware, is Strategic Command (STRATCOM). Admiral Ellis, who has been given this mission for prompt global strike and hard and deeply buried targets is a big part of that.

There are some hard physics involved here in that you can dig deeper and bury yourself to a point where there's not a whole lot of things that we can build that will get that far down and do the job. But we have some fairly effective ways to penetrate. Again, we can certainly provide details for those on a classified level.

There are some large devices that we've looked at as well. Big Blu is one that might have come to your attention that we've looked at pretty heavily. It is a large explosive device.

Then there are some other tactics that you can take to deal with these. If they are hardened and deeply buried and you can figure out how they communicate out and turn that off, sometimes that solves the problem for you. Then they can just live down there for as long as they'd like and really not affect the outcome of the combat.

What we have looked at is some very good technology that helps us understand the connectivity of the communications systems that the enemy might use that emanates from those hardened bunkers, whether they're deeply buried or not, quite frankly.

There's also some work that we have done with some radar systems that look like they might be able to affect communications systems in deeply buried places with kinetic effect. That's something that we're looking at.

I guess there are a broad array of technical approaches in this area, but I will tell you quite frankly, it is very difficult if you want to blow up something several hundred meters under the ground and know that it's blown up. This is a very difficult task technically.

Senator ROBERTS. Senator, as Senator Reed and you and I have discussed, this is an extremely important topic to follow-up on in the classified portion of the hearing that we hope to have in the remaining days of this Congress. It's extremely important and I certainly appreciate you bringing it up.

Senator ALLARD. Thank you. One more question, if I might, Mr. Chairman, just real briefly.

There's a gap between taking these research concepts and then actually bringing them into some kind of weapons development system.

My question is, how would you assess the success of your Technology Transition Initiative and the Quick Reaction Special Project to bridge this gap? Do you require any special authorization from this subcommittee to sustain or improve these technology transition tools?

Probably Dr. Segal would be one of the best to answer to this.

Dr. SEGA. Senator Allard, we appreciate and thank Congress for providing the funds for the Quick Reaction Special Projects Pro-

gram which includes the Quick Reaction Fund. As of today, we have committed or expended all of that fund for fiscal year 2005 based on needs.

A lot of good ideas and people are ready to go on technologies, principally in the force protection area. The Technology Transition Initiative, one good example of that is a small water pen that was developed and there were some residuals that were provided in the field in Afghanistan. It works really well. The Technology Transition Initiative was applied to that to accelerate the production of those and the Defense Acquisition Challenge program also is an effective mechanism for transition.

There are certain technologies that you can move quite rapidly and the base that our panel has talked to in terms of S&T being stable, strong, and in a place where you can draw from is critically important.

We have an acceleration from the discussion of this Combating Terrorism Technology Task Force in September 2001, the thermobaric weapon. It converted a Blu 109 2,000-pound bomb with a different fill. Well, in September, it was still at the basic research stage.

Through the month of October, the team did work at Indian Head to identify a leading candidate. By November, we had done aesthetic testing in Nevada, a collaboration between the Navy, the Air Force, and the DTRA, and there was a flight test on December 14, 2001. So 90 days start to finish on that one.

Then Congress provided quick reaction munitions funds in fiscal year 2002, \$15 million. Thirteen million dollars of that went to a thermobaric hellfire application. So advanced was the technology that another generation flew off four different variances and went from R&D to being built and deployed, and they were used in OIF.

Now, there's further application of that technology forward. So there's two examples where we have been able to accelerate the technology development and then a transition and an initial order of the Marine Corps for thermobaric hellfires.

The Defense Acquisition Challenge program allows a mechanism for some of the spiral development into the programs of records which are longer. I think we're making progress. I also think we have a long way to go.

Senator ALLARD. You don't need any legislation?

Dr. SEGA. I believe that the mechanisms we currently have, not only those three but also the Quick Reaction Special Projects, provide that crucial speed piece of near-term execution in some areas we couldn't anticipate really in submission of the budget. There's no need, so we wouldn't have guessed when the budget process was going.

Some new technologies arise that we would not have anticipated. It is important to us to have flexibility during execution here.

Other programs that are a little further off on the horizon—more like 2 to 5 years—are the ACTD process and areas where we do not have the adequate base. In those programs, we use some of the "Defense Procurement Act, Title 3" mechanism.

So there are several mechanisms to employ new technology transition. I think we're okay regarding the mechanisms. But if someone disagrees, please say so.

Senator ALLARD. Thank you, Mr. Chairman.

Senator ROBERTS. Dr. Segal, you stated that one of your primary goals both last year, and I think you referred to it in your testimony here this morning, was to improve the outreach and the coordination with the Intelligence Community.

Now, having some interest in that, we are taking a look in the Intelligence Committee at the pre-war intelligence on post-war Iraq.

I guess my question is, are you benefitting—and by “you,” I mean the S&T programs—from intelligence requirements in accelerating the technologies that are needed? Both accelerating and the anticipation of what you might need like we see with the new armor additions over here, and countermeasures for future threats. Is there a Grand Central Station arrangement between you and the 14 agencies that compromise the Intelligence Community?

I would add that some of the intelligence that we gleaned or that was predicated or that was provided to the policymakers and to the Defense Intelligence Agency (DIA) and to the Pentagon, one would expect would be obvious, we expected a wave of humanitarian problems. Actually, that did not occur. We had a lot of infrastructure degradation and a lot of sabotage, but that other event did not happen.

I know that some expected a lot of flag waving and thanks in regards to public demonstrations. I think that went on for about 24 hours until we got to the current situation.

But if, in fact, the terrorists worldwide were using their favorite ploy, i.e., truck bombs, explosives, mortars, RPGs, so on and so forth, it would appear to me that the Intelligence Community and the S&T community ought to fit together not only in terms of anticipation, but also lessons learned, and anticipate what we might need a little better down the road.

I’m not—well, I won’t get into the inquiry that we are conducting, but I think we could sure as hell do better. I’m concerned about that. If you would, please comment for me on your relationship with the Intelligence Community and how that’s working out both in terms of anticipation and in terms of accelerating what you need.

Dr. SEGAL. Mr. Chairman, we have made that a priority and we’re making progress on it. From about the second week of the advent of the Combating Terrorism Technology Task Force in 2001, they have been part of that process.

We have developed the surveillance and knowledge systems initiative with the Intelligence Community as part of the road-mapping process of what S&T efforts should go on.

We are working toward coordinating the program and sort of synching up when we need to have the pieces ready to coordinate in the budget process. So we do have funding coordination, if you will, on the programs that—

Senator ROBERTS. Who are you coordinating with? Is that DOD? Is that CIA? Is that FBI? Is this a whole shooting match or what—who do you deal with in regards to these kinds of priorities and the laundry list that you are putting together? I don’t mean that as a pejorative.

Dr. SEGA. I understand that. I have to admit it's not well institutionalized and we're working on—

Senator ROBERTS. Should it be institutionalized?

Dr. SEGA. I would have to think more about how we would do that and what the pros and cons and the mechanisms of—

Senator ROBERTS. If any of you have any ideas on that, if you could provide that to the subcommittee, or if you want to say something right now, please feel free to do that.

Dr. SEGA. Sir, there is the structure called the Science and Technology Intelligence Coordinator (STIC). I may have gotten the term wrong. From that, there is a list of critical areas, critical technologies. Myself and Secretary Cambone have brought together the technology and intelligence folks to take a look at assessments as we look at knocking off, if you will, this list of items, these technologies.

Senator ROBERTS. Well, you went down some of those earlier in your comments in terms of your priorities. But it just would seem to me as we're going through—we used to do that. We pushed and pushed and pushed on the subcommittee to have joint exercises. There was a lot of objection to that because of limited budget dollars and what the Services want to do.

Well, we have two dandies right now, one in Afghanistan and one in Iraq, and maybe one in Haiti by the time we're through with it. So it just seems to me that if there's ever a time where we could—I don't know if we need to say institutionalize, but maybe we ought to create—is STIC recognized as this Grand Central Station that I am referring to?

It's one thing to try to get the 14 different agencies in the Intelligence Community to take down their stovepipes and have better coordination. I think we've achieved a great deal on that since September 11, especially.

Then the thought occurs to me that that obviously would apply in regards to the priorities of the S&T community on lessons learned and where we go and what we provide the warfighter as soon as we possibly can, anticipating what we would need based on the best intelligence that we have.

Dr. SEGA. Within the last few months, under the National Security Technology Council, a subcommittee has been formed on national security R&D. I co-chair it along with Dr. Don Kerr from the CIA. That includes an interagency group beyond the CIA and DOD that has interagency participation and that's under the Office of S&T Policy (OSTP) sponsorship. So there is that interagency mechanism.

What I referred to earlier on these assessments was more detailed. For example, nanotechnology is looked at to better inform our S&T investments for DOD needs, but also to help inform what investments we should be making for R&D for the intelligence function as a customer.

Senator ROBERTS. Okay. I'm sort of an event-oriented person. I think most Senators are. I'm not a chart guy, although we do have awards for the best chart when we get into that. But the lights don't go off or you lose Members.

But in the event-oriented thing, and this is how things work around here, I think, to a certain extent, you read in the fountain

of all knowledge, The Washington Post, where it's going to take the FBI and the Border Patrol 4 years to get back-up technology and better coordinate it so that they can work together on the fingerprinting necessary for Border Patrol. Four years? Yet we have a device back here at PIER 2.3 that can provide an amazing kind of identification security.

It would just seem to me rather than horsing around for 4 years trying to get your fingerprinting computer base worked out so you can share it, why wouldn't you just move to something like this and do it?

We're already having application of this kind of technology, and I'm not trying to sell this product. But it seems to me that they have a very unique advantage or service that can be provided at this particular time. How do you plug that in with your intelligence?

I know the CIA has a great interest in this product. I know the marines already have it and they want more. Yet I have read in the paper that there may be six different reasons why this wouldn't work in regards to the example I'm using.

It seems to me there has to be a better coordination between the Intelligence Community, including the FBI, and I know that's outside your circle that you're working in in regards to Secretary Cambone, et cetera.

That's a rambling road speech. That's really not a question.

Dr. SEGA. Mr. Chairman, let me give you an example of, though it may not be systematic across the board at this point, which I do not believe it is, but there are some examples where there are models that are working and the details we may follow on in a different session.

But in terms of looking at explosive devices, currently in Iraq and in the CENTCOM theater they go to a combined explosives exploitation cell. I believe that's in Baghdad. I believe it has representation from the Intelligence Community, but I could be wrong on that.

The next stop is at the Terrorist Explosive Device Analysis Center in Quantico. I've been down there to look at that. The primary management of that facility with defense dollars is FBI. So there's a level of exploitation of the explosive device.

Then it goes to the proper places, whether Services or others, to understand how it works and then understand how to potentially defeat it.

So as a limited example, there is a coordination process to run something quickly through from start to finish. But in a systematic sense, I've given you a couple coordination points and activities. I've probably mentioned almost half a dozen at this point.

Senator ROBERTS. Well, we'll follow-up on that. I apologize for taking time here. We're getting toward the noon hour. But I'm very happy to learn that and I think that would be very valuable information for members of the subcommittee and the full committee. I was not aware of that in regards to Quantico.

Obviously, what we're experiencing in Iraq in regards to the dangers there applies directly to homeland security and what we're facing on the domestic front.

So I appreciate your commentary and we might have staff get together and you can better inform us and educate us as to how those channels are working now.

Senator, do you have any additional questions?

Senator REED. No, I do not.

Senator ROBERTS. Unless somebody has anything else that is absolutely important, this hearing is adjourned. Thank you so much. [Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR PAT ROBERTS

S&T BUDGET

1. Senator ROBERTS. Dr. Sega, Dr. Killion, Admiral Cohen, and Mr. Engle, the Department of Defense's (DOD) budget requests and statements from DOD officials clearly emphasize applied research. What is the departmental view of the role of basic defense science and technology (S&T) and what is the guidance with regard to future budgets for these programs and for the larger S&T portfolio?

Dr. SEGA. New military capabilities and operational concepts emerge from basic research. Basic research is a long-term investment with emphasis on opportunities for military applications far into the future. Additionally, it contributes to our national academic and scientific knowledge base by providing substantial support for all science and engineering and the education of our future scientists and engineers. Basic research investments over a long period of time have contributed significantly to new warfighter capabilities—low observables (stealth), lasers, infrared night vision, and microelectronics for precision strike, to name a few. Many of these advances were unpredictable. No promising avenue of research should be neglected. Although areas of emphasis may change, it is important to maintain a balanced portfolio in order to deal with unforeseen developments. Investments in basic research should help prevent technological surprise by our adversaries. We have consistently supported investment in basic research that, at a minimum sustains 0 percent real growth. The overall fiscal year 2005 budget request for S&T funding exceeds 0 percent real growth by 1.8 percent. The Secretary has established a long-term goal to fund S&T at 3 percent of the total Defense budget. This goal is becoming difficult to achieve because the projected top line of the total DOD budget is increasing more rapidly than the programmed increasing rate of S&T funding.

Dr. KILLION. The Army's basic research program seeks new knowledge and understanding to achieve revolutionary advances in technology that can be translated into transformational warfighting capability. The program invests in world-class expertise (government, academic, and industry) and state-of-the-art equipment.

The Army maintains a diverse S&T portfolio that has three major components: (1) exploiting basic research to (2) accelerate technology opportunities in applied research and (3) transition technology to systems through the advanced technology development programs. Investments within these three accounts work synergistically to provide the most capable technology solutions to satisfy our warfighting requirements. As we develop technology for the future force we are also seeking opportunities to transition advanced technology to the current force that is engaged in the global war on terrorism.

Admiral COHEN. The majority of the Navy's S&T portfolio is divided into two areas: (1) discovery and invention; and (2) exploitation and deployment.

The strength of the Office of Naval Research (ONR) is its basic research (6.1) investment in discovery and invention. ONR's fiscal year 2005 budget request for basic research funding is \$477 million. Navy's basic research investment funds long term research in the enabling technology for warfare areas such as command, control, communications, computing, intelligence, surveillance, and reconnaissance (C⁴ISR); underwater weaponry; underwater acoustics; naval architecture; and expeditionary warfare. They are absolutely critical to maintaining our future naval battlespace supremacy.

We rely on the expertise of the naval research enterprise at the Naval Research Laboratory and the Marine Corps Warfighting Laboratory, other government labs, as well as academic institutions, to pursue long term, high risk, high payoff, basic research.

Defense Planning Guidance (DPG), used to develop the fiscal year 2005 President's budget request for S&T, supported 3 percent annual real growth. However, the Navy S&T accounts reflect the balance of priorities among the competing requirements of the fiscal year while attempting to be responsive to the DPG.

The most critical element of support for long-term, high risk scientific research is to provide stable investment funding. The Navy fiscal year 2005 6.1 budget meets the DPG goal to provide no less than 0 percent real growth for basic research.

Mr. ENGLE. The Air Force depends on and fully supports its basic research program to provide for future long-term warfighting capabilities. Air Force core basic research is funded at \$217.3 million in the fiscal year 2005 President's budget—an increase of almost \$13 million or almost 5 percent real growth over the fiscal year 2004 President's budget. Total basic research funding within the Air Force also includes the University Research Initiative and High Energy Laser Research, which were devolved to the Air Force from the Office of the Secretary of Defense (OSD) in fiscal year 2004. Basic research funding stemming from these devolved programs is also up from the fiscal year 2004 President's budget by almost \$11 million or almost 8 percent real growth. We expect to maintain at least 0 percent real growth in future years. Overall, core funding for the total Air Force S&T portfolio has increased over \$80 million or almost 5 percent real growth in the fiscal year 2005 President's budget when compared against similar funding in the fiscal year 2004 President's budget. We do not expect any significant changes to the current fiscal year 2005 President's budget funding in the upcoming budget cycle.

2. Senator ROBERTS. Dr. Sega, Dr. Killion, Admiral Cohen, and Mr. Engle, what is the correct funding balance, by percentage, within the S&T accounts between basic (6.1), applied (6.2), and advanced technology development (6.3)?

Dr. SEGA. Determining the correct funding balance of S&T investment is not a precise science; rather, I believe it is a strategic decision. The Department's investment in S&T develops the technology foundation necessary for our modernization effort, and fosters the development of "leap ahead" technologies that produce transformational capabilities. DOD must continue to invest broadly in defense-relevant technologies because it is not possible to predict in which areas the next breakthroughs will occur. The traditional guidelines have been to fund basic research at approximately 15 percent, applied research at approximately 35 percent, and advanced technology development (ATD) at approximately 50 percent of the total DOD S&T budget. This breakout has had success in leading to the discovery of new scientific knowledge and maturing these scientific discoveries into technology demonstrations that provide options for future military capabilities.

Dr. KILLION. The Army is committed to a strong S&T program that does not rely on specific investment goals within the S&T accounts. I think specific percentage targets would be too rigid. We need to maintain the dynamic portfolio management that we are using to accelerate the pace of our transformation through technological advances. As knowledge is gained in the basic research program we increase focus on areas of dramatic payoff. When our warfighting customers have the system development and acquisition resources, we increase investments in ATD to speed transitions of selected technology based upon our soldiers' needs. We balance the need to sustain investments over time to achieve "breakthroughs" in science with the need to seize on opportunities for rapid technology transitions as they present themselves. In this way we are being responsive to the dynamics of the science and technology environment and the business environment of resource allocations beyond the S&T program.

Admiral COHEN. The S&T investment portfolio is driven not by arbitrary percentages within the S&T accounts, but by a careful strategy of investment in promising research and technology at whatever stage it may be. As the Chief of Naval Research, my goal is to balance the Navy's S&T portfolio between two broad investment areas: (1) discovery and invention; and (2) exploitation and deployment.

Discovery and invention focuses on discovering and understanding new phenomena that may hold promise for the "Navy after next." This includes all of our 6.1 investment and a portion of our 6.2 investment. Our investment in nanotechnology in the 1980s is an example of our support for long term, high-risk, high-payoff basic research. We are just at the beginning of delivering the benefits on nanotechnology, such as nano-coatings for submarine pumps. I believe it is crucial for the 6.1 budget to be stable to protect the long term basic research that develops the bold ideas that transforms warfare 10 to 30 years in the future.

Exploitation and deployment, primarily 6.3 and a portion of 6.2, funds the transformational effort supporting "The Next Navy and Marine Corps." Our future naval capabilities program, in close cooperation with the requirements, fleet/force, and acquisition communities, is transitioning components and systems to solve operational challenges. The other major effort in exploitation and deployment is our Innovative Naval Prototypes, large scale, high-risk, long term projects that may change warfare. Ongoing programs include development of the electromagnetic gun, the free electron laser, and electric ship propulsion.

Mr. ENGLE. The Air Force maintains a balance between transformational and enabling technology developments in support of the warfighter. Air Force S&T is funded at a level to achieve the warfighting capabilities that support Air Force core competencies. This includes funding of approximately 18 percent or \$345.5 million for basic research, 42 percent or \$786.2 million for applied research, and 40 percent or \$763.7 million for ATD. Historically, this division has proven successful in providing transitionable technology at a pace we can afford to acquire, while preserving the scientific base for future warfighting needs. Currently, we are skewed slightly to the 6.3 funding, which reflects the Air Force's interest in getting technology into the hands of the warfighter because of the urgency of current events.

DARPA'S STRATEGIC PLAN

3. Senator ROBERTS. Dr. Segal, the National Defense Authorization Act for Fiscal Year 2004 contained language directing the Secretary of Defense to set up "appropriate means for review and approval" of the Defense Advanced Research Project Agency's (DARPA) strategic plan. What means for review have been established and what role will the Director, Defense Research and Engineering (DDR&E), play in DARPA's strategic plan?

Dr. SEGAL. As the DDR&E, I have oversight responsibility over DARPA. The initial DARPA strategic plan was actually published in February 2003 and was coordinated and vetted through the DOD and then approved by me prior to release. I have instituted a top-to-bottom review of DARPA program with my office directors. We also have instituted a detailed review of the DARPA's internal budget to ensure consistency with DOD goals. Finally, I will review and approve DARPA's strategic plan prior to submission to Congress in response to 10 U.S.C. 2352.

CURRENT PROGRAM AND SYSTEM ENHANCEMENT

4. Senator ROBERTS. Dr. Segal, the DOD's S&T programs have an important role to play in providing enhancements for current and future programs and systems. Please briefly outline such efforts in the following areas: blue-force tracking; force protection; and secure networks. In addition, could you please briefly outline the DOD's coordination efforts for S&T in all unmanned systems activities?

Dr. SEGAL. In my testimony I outlined and discussed five research and engineering priorities that directly impact current and future programs and systems, including: Integrating S&T with a focus on transformation; enhancing technology transition; addressing the national security science and engineering workforce; expanding outreach to the combatant commands and intelligence community; and accelerating technical support for the war on terrorism.

The Secretary of Defense places high priority on Joint Blue Force Situational Awareness (JBFSAs), formerly referred to as "blue force tracking." Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) amplified the role of JBFSAs in support of battlespace awareness, command and control, force application, and logistics for the coalition forces. The JBFSAs Overarching Integrated Product Team is formulating the investment strategy and program roadmap in coordination with the Joint Capabilities Integration and Development System Functional Capabilities. The JBFSAs Advanced Concept Technology Demonstration (ACTD) is providing the prototype enterprise architecture and common operational picture for theater commands to improve detection, tracking and identification of all blue and friendly forces.

Our near-term force protection initiatives are focused on activities of the Combating Terrorism Technology Task Force (CTTTF) to rapidly accelerate technologies to mitigate effects stemming from terrorist use of weapons such as improvised explosive devices (IEDs), mortars, and rocket propelled grenades (RPGs). The CTTTF matches emerging laboratory technologies with operational challenges in the global war on terrorism. A number of ACTDs impact force protection. For example, the Counter Bomb/Counter Bomber ACTD detects either suicide bombers or command initiated terrorist conventional and non-conventional explosive devices. The Active Denial System (ADS) ACTD will demonstrate long-range, anti-personnel, non-lethal force options to commanders using a powerful millimeter wave transmitter on stationary and mobile platforms to heat the skin and cause pain in threat personnel.

Our initiatives to secure our networks and protect information include integration of emerging commercial technologies, exploration of new software capabilities and developing capabilities for managing network infrastructure, implementing automatic response to cyber attack, and segregating information for releasability based on content and role of the user. There are a number of ongoing activities across the spectrum of communications and networking, including the active Network Intru-

sion Defense (ANID) ACTD which provides rapid correlation and visualization of cyber events, collaboration between ad-hoc virtual teams of experts and autonomic execution of pre-planned responses where appropriate, consistent with operational activities. Additionally, the Coalition Information Assurance Common Operational Picture (C-IA COP) ACTD is instituting a view of network status and health as it pertains directly to operational plans and activities by integrating defense cyber warfare tools with network management capabilities and processes. The Content Based Information Security (CBIS) ACTD is developing a revolution policy engine implementation which will enable information protection within a common shared network space while permitting role-based access to releasable information to those network users who have clearance and authorization. These are specific examples of many activities in this important area.

For unmanned systems, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) Unmanned Aerial Vehicle (UAV) Planning Task Force's UAV Roadmap consolidated the Services' and components' developmental activities related to UAVs and provided a path for future technology investment. This document is used to review the UAV S&T activities and to optimize areas for cooperation between programs and projects. Within USD(AT&L), there is excellent coordination between the offices responsible for the oversight of unmanned systems development, enabling the leveraging of S&T efforts. An example of this leveraging is the fiscal year 2004 Joint Unmanned Systems Command and Control (JUSC2) ACTD, developed primarily to support ground-based robots by the Joint Robotics Program Office, will be used to demonstrate the integration of surface and airborne unmanned systems.

RESTRICTIONS ON FOREIGN NATIONALS

5. Senator ROBERTS. Dr. Sega, traditionally research conducted within the 6.1 basic and 6.2 applied research accounts has been viewed as fundamental in nature and therefore not subject to restrictions on publication or on participation by foreign nationals. Is the DOD reviewing this policy with a view toward possibly issuing a new security directive to clarify when such restrictions are appropriate and when they are not?

Dr. SEGA. The DOD is not reviewing its policy allowing foreign nationals to participate in fundamental research programs nor is DOD reviewing its policy that fundamental research findings are freely published and shared broadly within the scientific community.

In 1985 President Reagan established the national policy on openness in American fundamental research with National Security Decision Directive (NSDD) 189. DOD supports NSDD-189. Fundamental research is exempt from the export license requirements in both the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR).

While the DOD continuously reviews security policies, our policies with respect to fundamental research are not under active review at this time. We are reviewing and clarifying our policies with respect to the ITAR and the EAR to make clear when export licenses are required for the sharing of technical information with foreign nationals. With rare exceptions, both the ITAR and EAR provide export license exemptions for fundamental research.

QUESTION SUBMITTED BY SENATOR SUSAN M. COLLINS

LIGHTWEIGHT COMPOSITE METALS

6. Senator COLLINS. General Cartwright, how can lightweight composite materials help the Army meet its needs in developing its future force, and how do you believe the proposed Center of Excellence at the University of Maine can help the Army meet its objectives?

General CARTWRIGHT. The Army has great interest in affordable composite materials because they have improved properties over many materials currently in use. Key material properties of composites could be exploited in applications such as lighter weight structural components in vehicles to achieve longer component life and reduced vehicle fuel consumption, and improved ballistic protection with reduced weight burden.

The Army is aware that the University of Maine has proposed the establishment in Maine of a U.S. Army Center of Excellence on Advanced Structures and Materials in Construction. Currently, higher Army priorities and funding requirements associated with current military operations mean that discretionary funding is in-

sufficient to implement such a Center of Excellence focused specifically on structures and materials in construction. However, the Army does have an existing Center of Excellence for Materials to conduct research on metals, ceramics, polymers, and composites. This center is affiliated with the Army Research Laboratory through cooperative agreements awarded competitively. The University of Maine may respond to the Broad Agency Announcement expected in June 2005 for the Center of Excellence's next 5-year contract.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

FUEL CELLS

7. Senator LEVIN. General Cartwright, do you see fuel cells playing a key role in the development of future Army ground vehicles?

General CARTWRIGHT. We see fuel cells as an emerging technology with potential benefits for specific applications where the fuel cell represents a "best fit" when compared with other current and emerging power technologies. Fuel cells have certain inherent advantages such as low noise, high efficiency, high energy density and a potential for low maintenance that are very attractive. However, the technology also has inherent challenges such as high unit cost, low power density, and special fuel requirements. When fuel cells are fielded as power subsystems, consideration must be given to the overall size, weight, and volume of the entire weapon system as well as the infrastructure required. If pure hydrogen is required to feed the fuel cell, a number of issues must be addressed including safety concerns associated with on-board storage and transportation. Additionally, if high energy density hydrocarbon fuels are used, they must first be desulfurized and converted to hydrogen. This reforming process adversely impacts the overall efficiency of the system.

Considering these limitations and given the current state of the technology, the Army's first step is to concentrate on the development of low- to mid-power systems where acoustic silence and high energy density are essential. Fuel cell auxiliary power units (APUs), both stationary and mobile, show near-term promise. APUs can be used to provide supplemental energy during periods of vehicle silent watch. Both cost and complexity are high for fuel cells. As we continue to obtain data through our lab testing, we must also concurrently keep an eye on the business case in order to make a meaningful capability transition for the soldier.

8. Senator LEVIN. General Cartwright, what is your plan for developing Army fuel cells for stationary and ground vehicle purposes?

General CARTWRIGHT. The Army is formulating a strategy for developing the necessary power and energy components and systems to achieve the levels of power and energy required to ensure that future systems will be more efficient, survivable and lethal. Fuel cell development is part of the plan. The first and most important step is to identify appropriate applications.

Currently we are working jointly with the other Services, other Government agencies, the Department of Energy (DOE), DARPA, the National Aeronautics and Space Administration (NASA), the Federal Aviation Administration (FAA), industry, and academia to develop fuel cell systems that can function in an integrated environment.

In addition, the Tank-Automotive Research, Development, and Engineering Center's (TARDEC) National Automotive Center has conducted numerous demonstration projects for fuel cells in cooperation with commercial industry partners. These will continue to be evaluated for both combat and non-combat applications. The Portable and Mobile Power S&T program includes fuel cell work for both vehicle APUs and battery rechargers for soldier power. This ongoing program is being restructured and coordinated with a new program, to include investigating small vehicle prime power. The Army also oversees a number of other projects, including work in Small Business Innovation Research (SBIR), Small Business Technology Transfers (STTR), Multidisciplinary Research Program of the University Research Initiative (MURI), and the P&E Collaborative Technology Alliance (CTA) for developing fuel cell components as well as for logistic fuel reforming.

For installation scale applications (e.g., power for buildings), the Corps of Engineers, in cooperation with Research, Development, and Engineering Command (RDECOM), is installing Solid Oxide Fuel Cells (SOFC) and Proton Exchange Membrane (PEM) fuel cells at several Army and DOD sites. This work will yield meaningful performance and reliability data to support transitioning fuel cells that will provide energy security for fixed sites and forward base camps of the future.

ENERGY SOURCES

9. Senator LEVIN. General Cartwright and Dr. Sega, what efforts are underway to develop the energy-efficient installation of the 21st century?

General CARTWRIGHT. The Army is following DOD policy to invest in cost-effective renewable energy sources, design energy efficient structures, and regionally consolidate Defense requirements to aggregate bargaining power to secure energy at lower cost. The Army is doing all we can to reduce costs and ensure that the program goals are achieved. We defer to Dr. Sega for the DOD position.

Dr. SEGA. It is DOD policy to invest in cost-effective renewable energy sources, energy-efficient construction designs, and regionally consolidate defense requirements to aggregate bargaining power to get better energy deals. Energy management on DOD installations is focused on improving efficiency, eliminating waste, and enhancing the quality of life while meeting mission requirements. Accomplishing these objectives will reduce costs and ensure that the program goals are achieved. The DOD energy program for facilities is decentralized with DOD component headquarters providing guidance and funding, and regional commands or military installations managing site-specific energy and water conservation programs. The funding of energy projects is multi-faceted, using a combination of Federal appropriations and private funds. Installations are responsible for maintaining awareness, developing and implementing energy projects, ensuring that new construction uses sustainable design principles, and meeting energy goals.

In addition, there is a DOD-wide science and technology initiative in Energy and Power Technologies (EPT) that has potential payoffs in this area. This EPT initiative is broad-based and focuses on enabling technology supporting energy generation, storage and use. For instance, the initiative invests in batteries, advanced fuel cells, ultra large capacitors, high-efficiency electronic components, and so forth. We anticipate that many of these technology components will also benefit the energy efficient installation of the 21st century.

10. Senator LEVIN. General Cartwright and Dr. Sega, how will such efforts develop a hydrogen infrastructure, utilize alternative energy sources, and utilize advanced vehicle propulsion?

General CARTWRIGHT. The Army is developing a 21st century base concept that includes a provision for "energy security." As such, the Army is investigating facilities and resources that can be used to help jump-start selected alternative energy projects in coordination with other government agencies and industry. The 21st century base will most likely include facilities to generate hydrogen, which would enable use of efficient fuel cell powered administrative and non-tactical vehicles. In some cases, the Army may be able to provide infrastructure and facilities for testing concepts that would be problematic to execute in the short term if attempted elsewhere. Additional cooperative work with industry and other government agencies is planned to evaluate base hydrogen infrastructures, reforming of fuels and/or utilization of natural gas. Other alternative energy projects, including integrating wind, solar, fuel cell or other capabilities into mini-grids, are being considered to help to reduce dependence on more traditional energy supplies.

Dr. SEGA. The DOD is committed to creating opportunities to install renewable energy technologies and purchase electricity generated from renewable sources to enhance energy flexibility when it is life-cycle and cost-effective. In 2002, funding was set aside by Congress to assess the renewable energy potential of U.S. military installations. DOD created a Renewable Energy Assessment Team, led by the Air Force, to explore solar, wind, and geothermal energy resources at military installations. In fiscal year 2004, additional funding was set aside to further this effort, which is scheduled to be complete in November 2004. Also, the DOD, in partnership with the DOE, is using several military bases as demonstration sites for fuel cell-powered administrative vehicles development under DOE's FreedomCAR program. In addition, DOD has stationary fuel cell systems installed and operational at over 30 military bases across the country. Military bases provide an ideal environment for the controlled demonstration of fuel cell vehicle and stationary power applications, where the DOD has benefited by obtaining extensive practical experience in operating this advanced energy source.

In addition, there is a DOD-wide S&T initiative in EPT that has potential payoffs in this area. This EPT initiative is broad-based and focuses on enabling technology supporting energy generation, storage and use. For instance, the initiative invests in batteries, advanced fuel cells, ultra large capacitors, high-efficiency electronic components, and so forth. We anticipate that many of these technology components will also benefit the energy efficient installation of the 21st century.

HYBRID VEHICLES

11. Senator LEVIN. General Cartwright and Dr. Sega, what investments are being made in fiscal year 2004 to develop hybrid vehicles?

General CARTWRIGHT. The Army has several major S&T objective programs specifically aimed at developing hybrid electric vehicle (HEV) technology for Future Combat Systems (FCS) vehicles in Increment 1 and for future spirals. In these programs we are developing components (including advanced power electronics, electric motors, batteries, switches, and inverters) and HEV architecture that will provide greater power and energy at reduced weight and volume. This will enable vehicles to perform more efficiently and achieve greater lethality, survivability, and agility. Our fiscal year 2004 investments in these enabling technologies total \$59.8 million in applied research, ATD and manufacturing technology (MANTECH) and \$2.1 million in congressionally directed efforts.

In addition to efforts supporting FCS, Army S&T is partnering with the automotive industry to address HEV and hybrid hydraulic technologies for current and future tactical vehicles. The Future Tactical Truck System (FTTS) ACTD focuses on integrating HEV technology into current and future light, and medium/heavy tactical vehicles and evaluating/quantifying the military utility of HEV technology. The FTTS ACTD is a \$50 million effort over 4 years. Contract awards are anticipated in the July-August 2004 timeframe for vehicles that will be used to conduct the performance evaluations and military utility evaluations.

Finally on the acquisitions side we have been looking at HEV technologies for high mobility multipurpose wheeled vehicles (HMMWVs). Due to need to support ongoing warfighting operations this effort has been put on hold.

Dr. SEGA. For tactical vehicles, the DOD continues to focus our HEV efforts through two main programs—the HMMWV acquisition program and the FTTS ACTD program. The HMMWV electric propulsion effort, identified in the August 2003 report to Congress titled “The Feasibility of Fielding Hybrid Electric Vehicles in the Defense Fleets,” has been deferred as a result of HMMWV upgrade efforts to support ongoing warfighting operations. The ongoing ACTD effort will feed the follow-on HMMWV electric propulsion effort. The FTTS ACTD is the primary funded Tech Base effort within DOD in pursuing the demonstration of hybrid vehicles. The goals and designs for tactical vehicles are components of this program. Field testing of vehicles, to demonstrate hybrid electric propulsion performance, is planned to begin in 2005. Lower level efforts include the Joint Marine Corps/ONR/DARPA Reconnaissance, Surveillance, and Targeting Vehicle (RSTV) program and the Army National Automotive Center Dual-Use Tactical Truck Hybrid projects.

For combat vehicles, the Army is aggressively pursuing hybrid electric drive as a prime candidate for the FCS Increment 1 propulsion system. The FCS Lead Systems Integrator (LSI) has let several subcontracts for the development, test, and evaluation of hybrid systems to assess the cost-benefit of these systems in achieving desired capabilities.

12. Senator LEVIN. General Cartwright and Dr. Sega, what agreements are in place or planned for the testing, demonstration, transition, and acquisition of these systems?

General CARTWRIGHT. The leading power pack concept being considered by the FCS LSI is a HEV design. Component and subsystem technology deliveries for the FCS HEV architecture are detailed in Technology Transition Agreements among the program manager (PM) unit of action (UOA), and the vehicle subcontractors who are part of the LSI industry team, and the RDECOM.

U.S. Army Tank Automotive and Armaments Command (TACOM) will be procuring a limited number of HEVs for the FTTS to be used in the military utility assessment in the near future. Award(s) is expected in the July 2004 timeframe.

Under the FTTS program, the ACTD Implementation Directive calls for hardware deliveries beginning in January 2006, with a military utility assessment scheduled for the March through September 2006 timeframe.

The effort to upgrade the HMMWV fleet that was described in the report to Congress last year has been put on hold in order to do other medications to accomplish more urgent upgrades in support of the war.

Dr. SEGA. The only current agreements regarding the demonstration and transition of HEV technologies exists within the Army’s FTTS ACTD program. General Cartwright addresses this program in his response.

With respect to planned agreements to acquire these systems, the DOD’s investment in hybrid electric (HE) technology programs exist at both the component and system levels in an effort to advance HE technologies and provide a more successful transition into acquisition programs. Current and future efforts in developing ad-

vanced power electronics, electric motors, and energy storage devices will enable HE technology to overcome transition hurdles. Improvements in on-board energy and power densities enable a more viable propulsion alternative for integration into military platforms, thereby achieving desired operational capabilities. This work also benefits the commercialization of HEVs by increasing the knowledge base, industrial base, and ultimately, making the technology more affordable for the users.

In addition, the future demand for increased electrical power to satisfy the emerging energy needs of advanced weapons and survivability systems makes the successful demonstration, transition and acquisition of HE technologies even more critical for future systems. The DOD's EPT initiative promotes the tri-service advancement of HE technology. These systems, along with an architecture that can accommodate the insertion of advanced technologies such as fuel cells and high temperature superconducting devices, will provide the infrastructure for the future military fielding of HE platforms.

ACTIVE PROTECTION SYSTEMS

13. Senator LEVIN. Dr. Killion, active protection is a key part of the FCS. What efforts are underway to address close in active protection from kinetic threats as well as RPGs?

Dr. KILLION. Army S&T is working on several synergistic approaches to address the various types of threats to our medium and light vehicles and we are attempting to determine what the right combination of lightweight armor and type(s) of Active Protection Systems (APS) are best for the different platform classes. The close-in threats you mention are particularly difficult to counter because of the close proximity of their employment (in the case of the chemical energy (CE) munitions) and the short response times required to defeat them effectively (i.e., fractions of seconds for both CE and kinetic energy (KE) munitions).

The Integrated Survivability ATD (IS ATD) program is addressing both CE and KE threats launched from distances beyond line of sight. With respect to CE threats, we have successfully demonstrated defeat of RPGs, anti-tank guided missiles (ATGMs) and tank fired high explosive anti-tank (HEAT) rounds using either an electronic warfare system or countermeasure (CM) launched to intercept the threat. We have done this with the protected vehicle both static and moving. This technology is being transitioned to PM FCS for application in Increment 1. Now we are beginning to focus on defeating tank fired KE threats. Proof-of-principle testing has demonstrated that a number of different warhead approaches may be available to either break or deflect the threat KE round at an acceptable distance from the vehicle. The IS ATD is expected to demonstrate KE defeat from a static system in 2005 and demonstrate an on-the-move system in 2006. Concurrently the IS ATD is designing and demonstrating armors since, after a successful intercept, a significant amount of residual debris may still impact the vehicle. It is important to note that use of APS will not eliminate the need for armor; but it will help reduce the amount of armor required.

The Army currently has two different efforts to address CE threats launched at distances of less than 50 meters. The Full Spectrum Active Protection Close in Layered Shield (FCLAS) program is in the early stages of development. The system comprises a mortar-launched munition and a warhead that integrates a tracking and a fusing (detonator) radar, digital signal processor, and explosive CM into a small, self-contained interceptor. The interceptor can be launched from vehicle-mounted tubes similar to smoke launchers. Multiple systems would be placed on the protected vehicle to achieve full 360-degree coverage. The preliminary FCLAS system design is complete and the contractor is currently awaiting component delivery to build a full up system. The next round of FCLAS range testing is scheduled for November 2004.

The Close-in Active Protection System (CIAPS) program uses a suite of vehicle-mounted staring sensors to detect incoming RPGs and ATGMs and launches a CM to defeat the incoming threat. The system has multiple CM launchers to provide full azimuth coverage. The program has developed a prototype system mounted on a light armored vehicle. Live-fire range testing of this prototype system is being conducted at this time.

14. Senator LEVIN. Dr. Killion, how much is being invested in this area in fiscal year 2004 and requested in fiscal year 2005?

Dr. KILLION. The Army is spending \$13.3 million in fiscal year 2004 and \$46.1 million is budgeted in fiscal year 2005 to address vehicle survivability against CE and KE threats through the three efforts.

15. Senator LEVIN. Dr. Killion, is a formal program being developed to advance these efforts given their high operational priority?

Dr. KILLION. We are making great strides in each of these APS programs and are investigating the viability of applying the individual close-in APS systems (from FCLAS and CIAPS) or some combination of solutions (from the IS ATD) on current platforms as well as in the FCS. However, before we commit to any formal strategy for developing and deploying APS, we must develop a confidence in their performance and explore the tactics, techniques, and procedures that would ensure that the risks to personnel and materiel are manageable. We are actively working these issues, but at this time there is no planned System Development and Demonstration (SDD) for either FCLAS or CIAPS.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

SEMICONDUCTOR CAPABILITIES

16. Senator LIEBERMAN. Dr. Sega, DOD has recognized that cutting-edge and domestically produced advanced semiconductors and components are essential to our network centric warfare and defense transformation, and therefore to our national security. As your Department is aware, world semiconductor processing leadership is now being systematically transferred to China, with design and research and development (R&D) leadership widely expected to follow. DOD has put in place a "trusted foundry" approach to assure a secure supply of domestic integrated circuits that can meet DOD's current needs. While the trusted foundry approach mitigates the near term urgency of diminishing supplies of domestic circuits, it remains a short-term solution. As recognized in the October 10, 2003, directive of Deputy Secretary Paul Wolfowitz, DOD needs to make major progress on initiatives to retain U.S. semiconductor R&D leadership and a healthy U.S. industry sector. As the Deputy Secretary's directive suggests, funding key research initiatives and maintaining a healthy U.S. commercial integrated circuit industry is critical to sustaining the technological leadership the U.S. must have for intelligence and security reasons.

In light of the Deputy Secretary's directive, what specific R&D initiatives, funds and programs will you commit to, in order to retain domestic semiconductor capabilities and ensuring a healthy U.S. industry base?

Dr. SEGA. The DOD continues to explore innovative approaches to ensure access to cutting-edge microelectronics. The Trusted Foundry Pilot program will satisfy immediate and near term requirements. Long term solutions are being explored, such as the recently initiated Defense Science Board (DSB) study to address the multitude of complex issues governing the health, stability, and technological future of the U.S. semiconductor industry. The Department has also initiated a SBIR theme to leverage cutting edge transformational technologies to address inspection and measurement of "trust" in microelectronic components of known or uncertain pedigree.

The DOD is pro-actively advancing the technology at two U.S.-based foundries utilizing research, development, test, and evaluation (RDT&E) funds to meet critical needs for radiation hardened electronics. The DOD S&T programs, such as DARPA's Radiation Hardened by Design effort, will continue to address this important need. The Department will keep Congress informed of the progress.

The DOD continues to increase its investments in militarily relevant advanced electronics S&T such as wide band gap devices, focal plane array sensors, maskless lithography and spintronics. These S&T investments are focused on enhancing future defense capabilities and may also provide benefits to the commercial sector.

The DOD maintains a dialogue with leaders from industry and academia to foster support for educational programs for training the next generation engineers. Since 1999, the DOD has been supporting microelectronics research as part of its Government Industry Co-sponsorship of University Research (GICUR) program. The program has supported ground-breaking research with a long-term horizon, as well as education and training in selected areas of strategic importance. The current program is managed as part of the DARPA Focus Research Center Program involving four major university-based microelectronics research centers (with the participation of more than 30 major research universities). These centers are at the forefront of research at the subnanometer scale focusing on providing solutions for the future generations of electronics.

The electronics S&T investment strategy for the DOD will incorporate the findings of the DSB study with the results of ongoing S&T activities within our SBIR programs, DARPA, and the Service laboratories, as well as our efforts with the U.S.

microelectronics industry, to achieve the objectives of the Deputy Secretary of Defense for secure defense electronics.

LAB WORKFORCE

17. Senator LIEBERMAN. Dr. Segal, when the National Defense Authorization Act became law on November 24, 2003, DOD research personnel were excluded from the National Security Personnel System (NSPS) established for the DOD, to continue to provide the flexibility granted by section 342 of the National Defense Authorization Act of Fiscal Year 1995 and section 1101 of the Strom Thurmond National Defense Authorization Act of Fiscal Year 1999. The research labs were given flexibility to establish innovative human resources systems necessary for scientific and technical excellence. The congressional intent for this was confirmed by the passage of section 1101 of the National Defense Authorization Act for Fiscal Year 2004, chapter 99, section 9902(c), where the labs are to be excluded from NSPS until after October 1, 2008. Moreover, the law states that after that date the labs may be included in NSPS only if the Secretary determines that the flexibility provided by NSPS are greater than those already provided to the labs.

In a January 6 letter, Senators Voinovich, Collins, DeWine, and Sessions, along with myself, expressed our concern regarding DOD's intent to standardize the personnel flexibility currently enjoyed by the labs under a Best Practices Initiative that mirrors the not yet established NSPS, which would undercut broad initiatives and authority the labs already have. The February response from Dr. David Chu insists on moving the defense laboratories to the Best Practices Initiative, despite congressional disapproval of this position as summarized in the January 6 letter. This move clearly violates congressional intent. Implementing Best Practices, an integral part of NSPS, on the lab personnel is contrary to the section 9902(c). What are your intentions regarding efforts to include the labs in NSPS?

Dr. SEGAL. The "Best Practices" personnel demonstration system will not be imposed on any of the labs. However, if the labs want to take advantage of some of these flexibilities, we will work with them to implement the improvements. We will continue to utilize and improve the flexibilities and features of the laboratory personnel demonstration systems until 2008. At that time, a comparison will be made with the flexibilities available under NSPS to consider potential conversion options, if appropriate.

BASIC RESEARCH FUNDING (6.1)

18. Senator LIEBERMAN. Dr. Segal, Federal funding for basic research (6.1) in S&T is vital for our Nation's national security and economic growth. It is through our investment in basic research that we ensure our ability to remain competitive and maintain a strong defense in an increasingly globalized economy. As southeast Asian nations aggressively pursue global leadership with targeted R&D subsidies and industrial policies, it is crucial that our defense capabilities remain at the leading edge of technology. This can only be sustained by continued investment in basic research. How does your 5.3 percent cut in 6.1 relative to fiscal year 2004 appropriated levels support our ability to remain ahead of other nations in defense technology?

Dr. SEGAL. Our technological capabilities relies on a strong 6.1 program that is well integrated into an equally robust RDT&E program. The 6.1 investments provide new knowledge and understanding that transition to new defense technologies within 6.2 and 6.3. Ultimately, other RDT&E programs incorporate those technologies into products or processes for military systems. While there are abundant scientific and technical opportunities to be exploited with additional 6.1 resources, there also must be a good balance in the investments among all of the components of RDT&E if research results are to be translated in a timely way into technologically superior, fielded systems. The amount requested for 6.1 in fiscal year 2005 reflects our carefully considered judgment on the best programmatic balance within available RDT&E resources. The fiscal year 2005 President's budget request for DOD 6.1 is 0.2 percent higher in real terms, after adjusting for inflation, than the DOD request for fiscal year 2004. I urge your support for the full amount requested for 6.1 in fiscal year 2005.

GICUR PROGRAM

19. Senator LIEBERMAN. Dr. Segal, for the second straight year the administration has chosen not to provide funding for the GICUR program, and only requests \$10

million in DARPA for the Semiconductor Technology Focus Centers program. While a small program, this program leverages funding from the industry primarily the semiconductor industry which provides \$3.00 for every one provided by the government to support critical fundamental research being conducted at selected universities around the Nation. My understanding is that if the research being supported by this program is not done now, it could have impacts upon our ability to continue to increase computing capacity in the future, which will in turn have detrimental consequences for both our economy and national defense. The administration's limited funding of this program also is inconsistent with Deputy Secretary Wolfowitz's directive of October 10 to DOD to develop efforts to support semiconductor research leadership. What effect will this have on advancing and retaining the domestic semiconductor research, design, and manufacturing base that DOD will depend upon in the future?

Dr. SEGA. The GICUR program is a joint effort with the Semiconductor Industry Association. Since 1999, DOD has provided funds totaling approximately \$35 million, while industry has provided matching funds of approximately \$74 million, or industry has provided approximately \$2.00 for every DOD dollar provided.

The research being performed in the five national semiconductor technology research centers (involving about 35 major research universities) is critical to the U.S. leadership in this important industry. These university research centers perform research that focuses on providing solutions to overcome the projected difficult technological challenges that are expected to occur as deep sub-nanometer dimensional scales are reached in the 2005–2010 time frame. The Focus Centers are developing solutions and paths around and beyond these technical challenges.

If the research being performed by our universities is curtailed or eliminated, there will be a major impact on the ability to provide critical research results needed to solve the problems associated with future generations of nanoelectronics systems. Not only will the research be impacted, but there will also be an impact on the education of future scientists and engineers in critical technical areas of interest to DOD. This will significantly impact the future U.S. leadership position in electronics and computers.

DOD, through DARPA, plans to continue to support this very important initiative.

20. Senator LIEBERMAN. Dr. Sega, what role does this unique partnership of government, industry, and academia play in training future scientists and engineers in this critical field?

Dr. SEGA. During the entire period of the GICUR program, the microelectronics research program has provided support for significant numbers of university faculty, post-doctoral researchers, graduate research assistants, and undergraduates. This program is one of the sources of support for research in silicon-based microelectronics and nanoelectronics. It has also been a resource for the training of graduate students.

In fiscal year 2003, the DDR&E Basic Sciences Office initiated an undergraduate research assistantship program. DOD provided \$1 million per year in fiscal year 2003 and fiscal year 2004 to support this undergraduate education program. The intent was to provide support for a minimum of 5 years. Industry provided approximately \$600,000 each year to augment the DOD funds. This program is focused on attracting undergraduate students to these technical areas and to get them interested in pursuing graduate programs in microelectronics. The combined approach of attracting and supporting undergraduates and graduate students should impact the education of scientists and engineers in this critical S&T area.

21. Senator LIEBERMAN. Dr. Sega, how has the GICUR program and basic semiconductor research in DOD contributed to the developing of new defense capabilities?

Dr. SEGA. Semiconductor integrated circuits are at the core of nearly every defense and weapon system today, and future platforms are likely to have even greater dependence on advanced semiconductors. In this program, we are conducting research and developing technologies that will impact future generations of integrated circuits. Researchers in the Focus Center program are developing solutions to the future technological challenges facing the semiconductor field, to enable faster and lower power transistors, greater computational and signal processing functional power, higher performing mixed signal circuits, and much more. The interesting thing in this program is that we are partnering with the semiconductor industry and the equipment industry in sponsoring and managing the program. Highlighted below are a few examples of program successes:

- Developed design concepts allowing robust operation of deep submicron transistor circuits in noisy and radiation sensitive environments of interest to the Department.
- Invented and patented an interconnect method that allows revolutionary, wafer-level packaging and test of multi-thousand Input/Output (I/O) integrated circuits for the next generation Digital Signal Processing (DSP), microprocessor, and Application Specific Integrated Circuit (ASIC) chips.
- Developed platform-based design concepts that enable rapid design of re-programmable “system on a chip” products which are being adopted as standard operating practice within the design community.
- Identified critical metrics for the performance of 10 nm transistors for future generations of ASICs which includes non-classical silicon devices, carbon nanotubes, and molecular and quantum dot structures.

At the same time, we have an excellent path for transition and exploitation of the good ideas and concepts that are developed in the course of the program. Future defense capabilities will be impacted as Focus Center technologies are developed and transitioned to production, where they will be used to make fundamentally higher performing integrated circuits that will give our systems their tactical and strategic advantages over those of our adversaries.

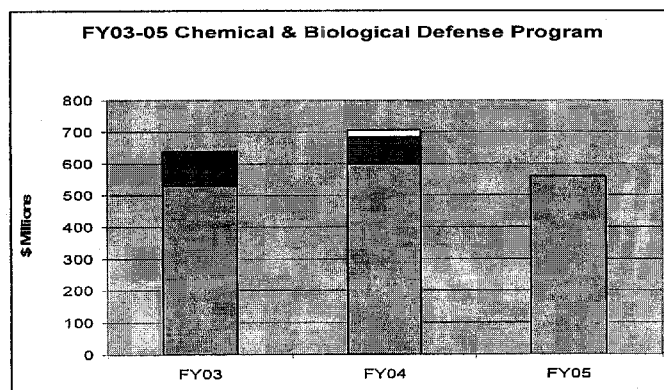
QUESTIONS SUBMITTED BY SENATOR JACK REED

CHEMICAL AND BIOLOGICAL DEFENSE

22. Senator REED. General Cartwright and Dr. Sega, given that terrorists are trying to develop or acquire chemical and biological weapons, chemical and biological defense have become more important. I note that the fiscal year 2005 R&D funding request for chemical and biological defense, which is intended to develop badly needed improved technology, is down \$146 million from fiscal year 2004, and down \$78 million from 2003. How can we provide the needed level of S&T investment and technology development if we are reducing our funding levels?

General CARTWRIGHT. RDT&E funding for the Chemical and Biological Defense Program is under the oversight of OSD as directed by Public Law 103–160. Army S&T defers to OSD on this question.

Dr. SEGA. The primary difference between funding amounts for fiscal year 2003 through fiscal year 2005 as reflected in the fiscal year 2005 budget request is that fiscal year 2003 and fiscal year 2004 have received congressional adjustments. The table below shows that the RDT&E budgeted core program submit has been relatively stable since fiscal year 2003. The fiscal year 2005 budget reflects an actual increase of \$30 million compared to the fiscal year 2003 core budget submit and a \$39 million decrease compared to the fiscal year 2004 core submit program. These differences reflect RDT&E changes as programs transfer from RDT&E to production.



	FY03	FY04	FY05
Core Program Submit	530	599	560
Congressional Adds	108	85	TBD
Internal Adjustments	0	22	0
FY05 PB Request	638	706	560

23. Senator REED. General Cartwright and Dr. Segal, since chemical and biological defense technologies are developed in a joint program office, how do you work to transition these technologies into the hands of combatants in the various Services?

General CARTWRIGHT. The Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) is responsible for the acquisition of technologies to meet the system specifications, delivery schedules, and quantities needed by the warfighter as portrayed through the Joint Requirements Office (JRO-CBD). Army S&T defers to the JPEO-CBD on this question.

Dr. SEGAL. The JPEO-CBD is the primary organization responsible for the acquisition of CB technologies to meet the needs (e.g. system specifications, delivery schedules, and quantities) of the warfighter as specified in capabilities documents developed by the JRO for Chemical, Biological, Radiological, and Nuclear Defense (JRO-CBRN).

The JPEO-CBD contains seven joint program offices; Collective Protection, Decontamination, Individual Protection, Guardian, Contamination Avoidance, Medical Systems, and Information Systems, collectively managing 67 product lines. Each product manager is responsible for coordinating work with the Services to: (1) procure products within the defined JRO requirements, (2) test products to specification in both developmental and operational testing environments as defined by the Services, (3) test products for interoperability with existing battlefield systems, (4) develop the necessary training and doctrine to support fielding, use, and maintenance of the equipment, (5) provide guidance to the Services on operation and support costs and (6) field equipment to the warfighter within the required schedule.

24. Senator REED. General Cartwright and Dr. Segal, what types of chemical and biological protective gear and sensors have you sent over to Iraq and Afghanistan and which of them are new? What have you learned from this experience?

General CARTWRIGHT. The JPEO-CBD has responsibility for this area. Army S&T defers to the JPEO-CBD on this question.

Dr. SEGAL. The attached list provides the chemical and biological protective gear and sensors that were sent to Iraq in support of OIF. OIF data is the most readily available information and provides the most current lessons learned for the services. The JPEO-CBD sponsored a detailed OIF after-action survey that was conducted by the U.S. Army Natick Soldier Center. This systematic Joint Service survey sampled 1,569 service members who had personal experience with 29 different CBD materiel systems during OIF. Detailed results are documented in a March 17, 2004 report. The report identifies the number of survey respondents, common themes, good and bad points, and user suggestions for each system. It is organized around the six joint project managers (JPMs) in the JPEO-CBD who have life-cycle responsibil-

ity in the areas of individual and collective protection, contamination avoidance, decontamination, medical countermeasures, and CBD specific information systems. Based on technical analysis of the survey, action is being taken, where appropriate, to improve tactics, techniques, operational procedures, training and/or equipment issues.

Chemical and Biological Protective Equipment and Sensors Supplied for Operation Iraqi Freedom

Chemical and Biological Protective Equipment

- M40A1 Mask (Army, Marines, limited use Air Force and Navy)—Protective mask for individual warfighter. Protects against all known chemical and biological agents and radiological particulates.
- MCU-2A/P Protective Mask (without blue tint eye lens) (Air Force/Navy)—Head eye respiratory protection for ground forces.
- Protective Mask Carrier (Army, Marines, Air Force, and Navy).
- M7 Voice Amplifier for M40 Mask (Army, Navy, Marines).
- M42 Mask (Army)—Protective mask for combat vehicle crewman. Protects against all known chemical and biological agents and radiological particulates.
- M45 Mask (Army/Special Operations Command (SOCOM))—Protective mask for aircrew and special operations personnel.
- Aircrew Eye and Respiratory Protection (AERP) (Air Force)—Protective mask for aviators
- M48 Mask (Army) Protective mask for Apache aircrew*
- A/P22P-14(V) (Navy/Marine Corps)—Chemical-Biological Aviator Mask. Protects against all chemical and biological agents and radiological particulates.
- M41 Protective Assessment Test System (PATS) (Army, Air Force, Navy and Marine Corps)—Mask Fit Validation Testing Equipment.
- Joint Service Lightweight Integrated Suit Technology (JSLIST) (Army, Marines)—Two piece garment, with integrated hood, that provides protection from chemical and biological contaminants.
- Saratoga Suit (Marines, Navy)—A legacy two-piece chemical protective suit with integrated hood.
- Chemical Protective Undergarment—Part of the Army Aviation Ensemble.
- Aircrew Battle Dress Uniform (ABDU) (Army)—Two piece garment that provides aircrew with protection from chemical and biological contaminants.
- CWU-66P (Air Force) Single piece garment that provides aircrew with protection from chemical and biological contaminants.
- Black Vinyl Overboot (BVO) and Green Vinyl Overboot (GVO) (Army/Marines/Navy/ Air Force).
- Chemical Protective Footwear Cover (CPFC) (Marines, Navy).
- 25 mil butyl gloves and 7 mil butyl gloves (Army, Marines, Navy and Air Force).
- Chemically Protected Deployable Medical System (CP DEPMEDS)—Provides Army DEPMEDS Combat Support Hospitals with a capability to sustain operations in a nuclear, biological, or chemical (NBC) environment by integrating environmentally controlled collective protection elements into the hospital.*
- Chemical Biological Protective Shelter System (CBPSS)—Provides a mobile, contamination free environment for forward medical treatment units.*
- Collectively Protected Expeditionary Medical System (CP EMEDS)—Provides the Air Force air-transportable expeditionary medical facility with a capability to sustain operations in an NBC environment by integrating environmentally controlled collective protection elements into the hospital.*
- Collectively Protected Small Shelter System (CP SSS)—Provides CB agent protection inside the AF Small Shelter System shelter to create a “shirt-sleeve” environment.*
- Collectively Protected Hospital Surgical Expansion Package (CP HSEP)—Provides a surgical wing expansion to the Air Force EMEDS air-transportable expeditionary medical facility with the capability to sustain operations in an NBC environment by integrating environmentally controlled collective protection elements into the wing.*
- Collectively Protected Hospital Medical Expansion Package (CP HMEP)—Provides additional beds with integrated environmental collective protection elements to the Air Force EMEDS air-transportable expeditionary medical

facility, allowing it to sustain operations and treat additional patients in a NBC environment.*

- Interim Collective Protection System (ICPS) for the Modular General Purpose Tent System (MGPTS)—Provides a positive pressure, filtered air, toxic free shelter for protection against chemical or biological weapons attacks and radioactive particles.*
- M20/M20A1 Simplified Collective Protection Equipment—Provides a clean-air shelter for use against chemical or biological weapons attacks and radioactive particles.
- M291 Skin Decontamination Kit
- M17 Decontamination System
- M295 Equipment Decontamination Kit

Chemical and Biological Sensors

- M8 Chemical Agent Detector Paper
- M9 Chemical Agent Detector Paper
- Automatic Chemical Agent Detector and Alarm (ACADA)
- M256A1 Chemical Agent Detector Kit
- M21 Remote Sensing Chemical Agent Alarm (RSCAAL)
- Chemical Agent Monitor
- Improved Chemical Agent Monitor
- M8A1 Chemical Agent Alarm System
- M272 Water Testing Kit
- M93A1 Fox Nuclear, Biological, and Chemical Reconnaissance System
- Biological Integrated Detection System
- Joint Portal Shield Biological Detector
- Dry Filter Unit (DFU) Biological Detector*

25. Senator REED. General Cartwright and Dr. Segal, both the National Institutes of Health (NIH) and the Department of Homeland Security (DHS) have significant investments in S&T to meet chemical and biological threats, ranging from sensor systems to vaccines. How do your organizations connect with these non-DOD entities to coordinate activities and promote rapid technology transition?

General CARTWRIGHT. The President defines executive branch responsibilities and authorities for homeland security in Homeland Security Presidential Directives (HSPD). The President's Homeland Security Council (HSC) was established in HSPD-1, The Organization and Operation of the HSC. The HSC promotes coordination and cooperation across the executive branch. This includes rapid technology transition of weapons of mass destruction countermeasures. The HSC, through HSPD-4, The National Strategy to Combat Weapons of Mass Destruction (WMD), and with the White House Office of Science and Technology Policy, established and operates interagency R&D working groups on countermeasures to weapons of mass destruction. Senior representatives from the DOD—the Assistant Secretary of Defense for Health Affairs—Health and Human Services and Homeland Security, for example, meet regularly in a working group focused on development and availability of medical countermeasures to biological threats.

Scientist-to-scientist interchanges are promoted across the executive departments' laboratory systems, such as in sensor systems technologies between the Army's Edgewood Chemical and Biological Command and the National Laboratory scientists working on Bio Watch for urban monitoring. There are substantial efforts underway to leverage and share critical infrastructure and scientific resources. For example, the Departments of Defense, Health and Human Services, Agriculture, and Homeland Security participate on a Board of Directors for the National Interagency Biodefense Campus that is located at Fort Detrick, Maryland. Fort Detrick was the DOD's biological weapons center until our unilateral renunciation of biological weapons in 1969. Since then, its unique facilities and system infrastructure for safely conducting high security, biocontainment R&D has been used by the DOD for discovery, development, and testing of medical countermeasures to biological agent threats. Excess laboratory capacity was turned over to the National Cancer Institute for discovery, development, and testing of medical products for the war on cancer. The Department of Agriculture maintained its Foreign Weed Science biocontainment laboratories at Fort Detrick. The DHS has joined with these other departments to exploit this infrastructure for biosecurity and biological defense programs. This is a preferred location, pending completion of environmental, cost, feasibility and related analyses, for the establishment of the Homeland Security National Bio-

*Denotes systems—those with initial operational capabilities in fiscal year 2000 or later.

security Analysis and Countermeasures Center that will house the BioThreat Characterization Center and the National Bioforensic Analysis Center.

In addition, the Army currently supports the DHS's portfolio managers in the development of their technology roadmaps, especially in the areas of sensors, vaccines, and chemical/biological protection. Army representatives are currently co-located with DHS representatives to provide timely information and coordination in the development of policies and priority definition.

Dr. SEGA. The DOD and non-DOD entities, including the NIH and DHS, continue to coordinate and promote science and technology activities and rapid technology transition in the formal intergovernmental setting of the President's National Science and Technology Council (NSTC). NSTC's Committee on Homeland Security and National Security, (co-chaired by DOD and DHS representatives, Michael Wynne and Charles McQueary, respectively), is our primary venue for interaction. The committee structure is further complemented with various subcommittees: National Security Research and Development, Radiological/Nuclear Countermeasures, International, Chemical/Biological/Radiological Countermeasures for Health, Standards, and Interagency working groups for WMD Medical Countermeasures and Biometrics. Further, the DOD, coupled with these and other non-DOD entities, continues to promote technology transition in this and many other focus areas through project-level sharing in activities such as those of the Technical Support Working Group (TSWG). There is also an initiative to identify medical countermeasure areas of common interdepartmental (DHS, Department of Health and Human Services (DHHS), and DOD) interest where we can collaborate, by establishing a Memorandum of Understanding that facilitates cooperation and collaboration.

TECHNOLOGY TRANSITION

26. Senator REED. General Cartwright and Dr. Sega, what else could you do to improve coordination and technology transition? How do you work to ensure that, where appropriate, the technologies your organizations are developing are available for use by first responders and other non-DOD personnel?

General CARTWRIGHT. RDECOM currently has initiatives that represent an effort to identify, select, and promote promising new, advanced, and leading edge technologies, as candidates for early technology transfer and insertion into military programs. Currently a number of our laboratories have specific support agreements in specialty areas such as chemical and biological protection with organizations such as the Department of Justice and the NIH. The Army does not have any agreements that leverage some of our most critical technologies such as communications, sensors, and command and control from a system perspective. These critical technologies and systems are currently in use by soldiers in urban and civil applications in Afghanistan and Iraq. This is allowing the Army to create new standards that can be utilized by first responders and other non-DOD personnel.

To better focus and direct the very broad technology base represented by the RDECOM laboratories, the RDECOM commander has recently stood up a DHS working group chaired by his Deputy Commanding General for Operations. This working group is the single point of access for all activities wishing to obtain RDECOM technologies for the purposes of DHS/DOD technology transfer and will maintain a database of products and leverageable efforts which can be made available to appropriate first responder representatives.

The Army has specific support programs where major customers such as the New York City Metropolitan Transportation Authority (MTA) and the Port Authority of New York and New Jersey (PA NY/NJ) have requested assistance for them with large system integration efforts, but these are handled in an ad hoc fashion and there is no well defined method for states to gain easy access to Army expertise.

A new mechanism we are implementing to get technologies developed by the Army labs to the developers faster is Technology Transition Agreements (TTA). The TTA would be appropriate between an Army S&T organization and an outside agency's acquisition office/program. A TTA is intended to formalize and document the needs and timelines for the critical technologies being developed by the S&T community. The TTA documents exactly what is to be delivered and when it will be delivered. The TTA would give the acquisition office/program a format to succinctly define and formalize the transfer of technologies once the need was established. Transitions to first responders and other non-DOD organization could be handled in a similar manner.

Dr. SEGA. The DOD has an active technology transfer program to ensure technologies developed are available, where appropriate, for use in the private sector. In general, we use a variety of tools including Cooperative Research and Develop-

ment Agreements (over 2,000 in fiscal year 2003) and Patent License Agreements (over 350 in fiscal year 2003) to work with the private sector in jointly developing technologies for use or in licensing the private sector entities to use DOD-developed technologies. Our annual report to Congress, which was signed on June 8, 2004, and forwarded to Congress, gives specific examples of technologies and products which have been made available through our technology transfer program. We have ongoing efforts at many of our local activities to transfer technologies for first responder use. One example is the Homeland Security Technology Office at Kirtland Air Force Base in New Mexico. The mission of this office is to share Air Force technologies and knowledge with the local first responder communities. We have also reviewed how best to accomplish this on a Department-wide basis and have established a partnership intermediary at the University of Pittsburgh. This partnership arrangement has allowed us to establish a DOD Technology Transfer Center of Excellence for First Responders at the University. This center will be working with established activities such as the Office of Law Enforcement Technology Commercialization, the Emergency Response Technology Program at the National Technology Transfer Center, the DHS, and regional first responders groups to ensure the user group needs are being satisfied with the technologies we are transferring.

27. Senator REED. Dr. Segal, how much fiscal year 2003 and fiscal year 2004 money has been proposed or approved for reprogramming thus far to support the transition of technologies to Iraq and Afghanistan?

Dr. SEGAL. Last October, the DOD approved a decision to develop and field Rapid Reaction/New Solution (RR/NS) technologies to support force protection, primarily to counter IEDs in the area of operation. The cost of this effort is \$70 million. We received \$35.1 million in fiscal year 2003 funds (\$9.9 million Below Threshold Reprogramming (BTR)) and \$25.2 from a Prior Approval Reprogramming (fiscal year 2004–2006 PA) which has been approved by Congress. Of the fiscal year 2004 funds, \$9 million will be absorbed within the Quick Reaction Special Projects program. An additional \$1.8 million was provided from a BTR. Part of the remaining fiscal year 2004 \$24.119 million (fiscal year 2004–2014 PA) reprogramming received congressional approval on April 24. Only \$15.819 was approved by Congress due to the \$8.1 million decrement for the ADS by Senator Stevens. Of the \$70 million required, \$61.9 million was provided for this work.

28. Senator REED. Dr. Segal, what has been the source of that funding, and what are the consequences on the programs that are the sources of that funding?

Dr. SEGAL. The funding requirement for the RR/NS is \$70 million. The funds came from fiscal year 2003 and fiscal year 2004 funds as follows:

- Fiscal Year 2003 funds
 - \$25.2 million came from a Prior Approval Reprogramming Fiscal Year 2004–2006 PA approved by Congress on March 1. Of that amount, \$19.5 million came from reducing the number of sites (from 95 to 90) where the Global Information Grid (GIG) Bandwidth Expansion effort would be implemented. The reduction of sites was less a priority than the requirements to increase protection for U.S. and coalition forces.
 - \$9.9 million was realigned via a BTR from numerous programs to minimize the impact.
- Fiscal Year 2004 funds
 - \$9 million was absorbed within the Quick Reaction Special Projects program.
 - \$1.8 million was provided from a Below Threshold Reprogramming from numerous sources where the impact, similar to fiscal year 2004–2006 PA, was minimal.
 - \$24.119 million was to come from fiscal year 2004–2014 PA reprogramming which received congressional approval on April 24. However, only \$15.819 million was approved due to the \$8.1 million decrement for the ADS by Senator Stevens. Funding in this reprogramming action became available due to inflation rates being lower than previously budgeted.

OPERATIONAL TESTING

29. Senator REED. Dr. Uhler, General Waldhauser, and General Cartwright, the Pentagon's Director of Operational Test and Evaluation (DOT&E) is responsible for approval and oversight of operational testing prior to deploying new systems, to ensure these systems work in battle. In his last annual report to Congress, he warned

that if we circumvent a rigorous acquisition process, “. . . our warfighters may get weapons without knowing their operational capabilities and limitations.” As you develop technologies to rapidly field to the warfighter, how do you ensure proper operational testing is done?

Dr. UHLER. The Operational Test and Evaluation Division within SOCOM has the staff responsibility to independently report to the Commander, SOCOM, findings and assessments regarding operational testing of SOCOM equipment and systems. Further, these independent assessments are provided to the appropriate milestone decision authority for consideration in making acquisition decisions through the issuance of either System Production Certifications or Fielding and Deployment Releases.

Operational Test and Evaluation within SOCOM is governed by SOCOM Directive 71-5, Operational Test and Evaluation. SOCOM Directive 71-5 addresses Combat Mission Need Statement/Urgent Deployment Action (CMNS/UDA) test requirements.

Each acquisition program has a standing Test Integrated Working Group (TIWG), made up of members from the program office, supporting operational test activity, the SOCOM operational test office, the requirements office, and depending on the system, user representatives. Early user tests and operational assessments for SOCOM systems are conducted by partner operational test activities from the Services and national test assets.

The use of Test and Evaluation Master Plans (TEMPs) or System Acquisition Master Plans (SAMPs) guide the conduct of a system’s test program. It is the SOCOM policy that equipment, including that being fielded under CMNS/UDA authority, is not released to Special Operations Forces (SOF) units without an operational assessment, verified by the SOCOM Operational Test and Evaluation Division. This also applies to systems and hardware developed through the ACTD Technology Insertion and Foreign Comparative Testing (FCT) programs.

These measures ensure that proper operational testing is done and each system’s capabilities and limitations are identified.

General WALDHAUSER. To clarify part of the question, the DOT&E is responsible for approval and oversight of Major Defense Acquisition Programs, and those programs he chooses to specially designate for oversight. We are unaware of any Marine Corps experimental programs under DOT&E oversight.

As demonstrated recently by the Small Unit Remote Scouting System, aka “Dragon Eye” UAV and the PTS-180 “Viper” laser range finding system, experimental or non-traditional programs can be transitioned quickly from experimental demonstration to systems of record, while preserving the need to independently and objectively verify suitability and effectiveness for the acquisition decisionmaker. The Marine Corps Operational Test and Evaluation Activity (MCOTEA) provides the Milestone Decision Authority (MDA) with an objective evaluation of those requirements. Because the experimental programs cannot be evaluated against traditional requirements documents, MCOTEA has attempted to enumerate the performance and suitability characteristics of the system to assist the decisionmaker in assessing the risk of fielding the system to the operational forces. The “Dragon Eye” system has been a template for success in testing and evaluating experimental systems with an immediate tactical need in the operational forces. Another area MCOTEA has been able to contribute test oversight is the observation and documentation of special armor plating for deployed vehicles. In addition to reducing the procurement risk to the MDA, MCOTEA can also provide an invaluable database of information to the warfighter in terms of employment considerations based on system performance. This also helps in the development of tactic, techniques and procedures. If provided the necessary resources, MCOTEA is capable of providing independent documentation of performance and reliability for a broad range of experimental programs.

General CARTWRIGHT. The streamlined procedures discussed are not intended to field systems but are, instead, addressing critical operational needs with immediately available solutions. These efforts are more aptly characterized as experimentation with soldiers actively participating and providing user feedback. Prior to sending any materiel into theater, the operational commander must agree that the materiel answers a critical need and the Army Test and Evaluation Command (ATEC) must determine the materiel to be safe. Once deployed, ATEC may continue to evaluate the materiel by conducting an operational assessment using a task force concept that places evaluators in-theater with the operational units that received the materiel. This feedback is extremely valuable to the developers, especially if it is gathered in an operationally relevant environment, and can cut months, or even years, off from the developmental schedule. Additionally, it serves to focus and refine the requirements documentation processes and reduces the likelihood of discov-

ering significant performance issues during formal operational testing when it eventually occurs. Successful efforts become candidates for handoff to the Program Executive Officer community for insertion in the Program Objective Memorandum (POM) and eventual fielding.

30. Senator REED. Dr. Uhler, General Waldhauser, and General Cartwright, the concepts of “spiral development” and “capabilities-based acquisition” are being implemented throughout the DOD. The idea is to keep requirements flexible to get new technologies to the warfighter quicker. With such flexible requirements, how do you know what you are deploying is “good enough”?

Dr. UHLER. SOCOM has inherently embraced the concepts of spiral development since our beginnings in 1987. Our development community works hand-in-hand with our warfighters to understand their needs and translate them into achievable requirements. We begin by defining the most technically feasible implementation of the solution that can be achieved in the shortest timeframe with respect to the approved requirement and then augment it with an evolutionary (spiral) development plan to achieve the 100 percent solution. After initial fielding, we continue to work with our user to incorporate their feedback and continually enhance the product to achieve the maximum capability for our user. These evolutionary cycles of development allow risks to be taken for products used specifically by our SOF. This benefits our warfighter and allows SOCOM to quickly react to real world material deficiencies.

General WALDHAUSER. Currently, the evaluation of the “good enough” measure of performance is established against the approved requirements or capabilities. However, in some cases, the experimental programs provide a capability where none previously existed. In those cases, the capability is documented and quantified so that decision maker can adequately evaluate the capability against the procurement and support costs for the system. In other cases, the experimental capability replaces, improves or enhances an existing warfighting capability. In that situation, the MCOTEA can quantify the performance and suitability increase (or decrease) that is offered by the new system, if the choice is made to conduct a baseline comparison test. The decisionmaker can then use this information to reduce the risk of the decision. Each of the Service Operational Test Agencies is in the process of transforming their test process to respond to capabilities based testing versus requirements based testing. Adding experimental programs to this new methodology is a natural fit in the evolution of operational testing.

General CARTWRIGHT. Rather than limiting us to search for “perfect” solutions, flexible requirements are what enable us to seek the “good enough” capabilities, especially for our current force. Training and Doctrine Command (TRADOC), as the warfighters’ representative, provides key insights and sets the threshold requirements utilizing professional military experience and judgment available through the proponent schools, concept and capability developers, and professional experimentation forces. TRADOC, Army Test and Evaluation Command (ATEC), and RDECOM have established a teamed approach that provides a framework for Army leadership to determine “good enough” by analyzing experiment-ready technology to meet warfighter needs, linked to operational capabilities. The linking of experimentation and technology demonstrations insures that the demonstrations are operationally relevant and provide a venue to develop operational concepts for new technologies. RDECOM has established technology Integrated Product Teams (IPTs) that look across the command, services, industry, academia, and international organizations to provide enabling technology enablers to the warfighter. These IPTs have strong warfighter participation from TRADOC headquarters and proponent personnel. Again, this teaming assures that only “good enough” operationally relevant experiment ready solutions are put forward for incorporation into the Doctrine Organization Training Material Leavership Personnel Facilities (DOTMLPF) solutions for consideration by decision authority for release to the warfighter.

31. Senator REED. Dr. Uhler, General Waldhauser, and General Cartwright, what criteria are used during operational testing to ensure the system works well enough, and who approves the criteria?

Dr. UHLER. Test and evaluation within SOCOM is governed by SOCOM Directive 71-5, Operational Test and Evaluation. SOCOM Directive 71-5 addresses CMNS/UDA test requirements. Criteria used during SOCOM operational testing and assessments are derived from the requirements documents. Measures of effectiveness and suitability—the test criteria—are directly related to validated capabilities requirements. For CMNS/UDAs, the criterion for minimum acceptable system performance is the successful attainment of the key performance parameters/critical operational issues of the requirement.

Independent assessment of system operational effectiveness, operational suitability and safety of use is conducted by the SOCOM Operational Test and Evaluation Division. Concurrence to field equipment and systems to SOF is addressed by issuing either a System Production Certification (SPC) or a Fielding and Deployment Release (F&DR). These documents are signed by the Chief, Operational Test and Evaluation, the Director of Logistics, and the system's responsible SOCOM PEO.

General WALDHAUSER. For traditional acquisition systems, the criteria under testing are derived directly from the approved Operational Requirements Document or Capabilities Documents, the Operations and Organizational Concepts, and from the Operational Mode Summary/Mission Profile. Criteria are directly cited from those approved requirements documents, and in some cases derived from those documents in a group setting by all the stakeholders.

The new capabilities based system defines the requirement in the Initial Capabilities Document, the Capabilities Development Document and the Capabilities Procurement Document. MCOTEA has not yet tested a system based on these requirement documents.

Approval of the criteria for testing is achieved in several documents. The entire test strategy is published and approved in the Test and Evaluation Master Plan. This document is signed by all the stakeholders, and by the DOT&E for oversight programs. Additionally, MCOTEA, using a proposed test scope letter, informs the MDA of anticipated operational test content and requests concurrence on this scope as adequate to support pending acquisition decisions. The test plan is completed in a teamed environment, and is approved by the Director of MCOTEA for programs not on oversight, and by the DOT&E for oversight programs.

In the absence of requirements documents, the MCOTEA establishes a test planning group, and works with representatives from the combat developer, the material developer, the functional advocate and representatives directly from the operating forces to establish meaningful criteria for evaluation in a capabilities based test. This process is not nearly as exhaustive or defensible as the deliberate requirements process, but facilitates a much more rapid test and evaluation of a capability that has been determined to be of reasonable risk and benefit by the Warfighting Lab.

General CARTWRIGHT. Testing criteria are derived from the Operational Needs Statement (ONS) submitted by the deployed commanders. Specific criteria are developed by an IPT assembled from the operational commands; the PEO/PM that has, or eventually will have, fielding responsibility; RDECOM; and TRADOC.

32. Senator REED. General Cartwright, what is the status of the proposal to establish a limited liability company at the Aberdeen Test Center?

General CARTWRIGHT. In response to legislation allowing for pilot programs to be established at select DOD Test and Evaluation Centers, Aberdeen Test Center proposed a Limited Liability Company (LLC). The LLC would consist of Aberdeen, academia, and private industry.

Public Law 107-314 §241(e)(3)(A), dated December 2, 2002, provided that "Not more than one public-private partnership may be established as a limited liability company." Further legislation was drafted to define the parameters of the LLC. There were several concerns with the proposal forwarded to the Department of the Army and the proposed legislation was subsequently rewritten. The rewritten proposal, which went from DOD to the Office of Management and Budget (OMB), was captioned 10 USC §2374c, Centers for Research, Development, Test and Evaluation Excellence: public-private partnerships. Based on recent discussions with the Army Business Initiative Council (BIC), it appears that OMB has not concurred with the proposal and sent the proposed legislation back to DOD.

TRAINING

33. Senator REED. Dr. Killion, Admiral Cohen, and Mr. Engle, how are you working to ensure that our next generations of military leaders are well-trained and well-versed in S&T?

Dr. KILLION. The Army believes it is vital that military leaders understand not only what S&T can do for the warfighter today, but how S&T investments help sustain U.S. land combat dominance today and for the future. The Army has taken several steps to ensure Army leaders have an understanding of S&T. First, the Defense Systems Management College has incorporated information on Army S&T goals, plans, and investments in their courses available to senior Army Acquisition Corps leaders. Second, the Army created a uniformed scientists and engineers program

through which selected Army leaders with advance degrees are provided hands-on professional development training at the Army's laboratories and Research, Development and Engineering Centers (RDECs). Third, the Army's RDECOM sends representatives to the Combined Arms Center at Fort Leavenworth to participate at seminars to inform Army leaders about the role S&T plays in enhancing Army capabilities. Finally, the Army's TRADOC, which is responsible for developing and implementing professional military education and training across the Army, plays a key role in the Army S&T community through their futures center and participation in S&T planning processes.

Admiral COHEN. My highest priority, as the Chief of Naval Research, is to be the Navy's and Marine Corps' advocate for the S&T. It has been a tremendous challenge. At every opportunity, I argue for a stable, sustained investment to support long-term, high-risk transformational breakthroughs.

In addition, I have several initiatives that also serve to educate the Navy and Marine Corps about the benefits of S&T:

- The Naval Fleet/Force Technology Office puts scientists and engineers in the fleet and force, with the customer, to use their expertise to solve current and future operational challenges with S&T. These advisors not only work with the current naval leaders but also interact heavily with more junior personnel, tomorrow's leaders, to educate them about the possibilities that S&T can provide.
- Naval research leaders and program officers work daily with Fleet/Force personnel to develop longer term capability based options requiring a concerted S&T investment to achieve. This involvement not only helps develop a better product but also provides insight for the fleet/force to the processes needed to mature cutting edge technology.
- Tech Solutions aligns Department of the Navy S&T resources to enable rapid technology-based solutions to problems that have a detrimental effect on the ability of the fleet/force to train, operate, and fight. Due to the rapid delivery, fleet/force personnel are able to see tangible results of S&T.

Finally, my experience is that our young military leaders know the benefits of S&T and are our best advocates. The current war on terror has resulted in several technologies being accelerated, at the request of the warfighter, in order to field a new capability or address a shortfall.

Mr. ENGLE. Under the Air Force's new Total Force Development construct, we are making progress in developing senior leaders with technical expertise. Our Scientist and Engineer Development Teams, in conjunction with the Air Force Senior Leader Management Office, are responsible for implementing Total Force Development. They are identifying general officer and colonel leadership positions that require science, engineering, and technology backgrounds plus the supporting base of personnel needed to grow these future leaders. With this requirement identified, we have put in place career development guides which will help us develop future technically competent leaders. A critical part of these development plans is advanced education. To meet this need, under our Vector Blue Initiative, we are increasing opportunities available to our officers to pursue advanced technical degrees that will make them competitive for future technical leadership positions.

ENVIRONMENTAL CONCERNS

34. Senator REED. Admiral Cohen, there is continuing concern about the use of sonar by the Navy and its effects on marine mammals. Is the Navy making investments to develop alternative undersea imaging and sensing technologies so that military requirements can be met in a more environmentally-friendly way? What areas of research require investment so that we can develop these capabilities?

Admiral COHEN. The Office of Naval Research (ONR) is making investments to investigate the development of a full complement of technologies to effectively implement anti-submarine warfare (ASW) in all places throughout the year and under all operating conditions; however, active acoustics is and will remain a necessary part of that complement. Effective ASW requires a mix of imaging and sensing technologies, including active acoustics. This is primarily because the marine environment, which changes with location and time of year, very strongly affects any given technology. In addition, the way submarines operate affects the use of any given technology. Fortunately, the mix of possible technologies complements each other to some degree. For example, acoustic technologies work well in many places during the winter while non-acoustic technologies work well in many of the same places during the summer. Active acoustic technology often works well against submarines

operating deeply submerged while non-acoustic technology often works well against submarines operating near the surface.

ONR is investing in the development of more effective passive sonar as well as the development of non-acoustic capabilities, including magnetic and optical sensors, with the goal of reducing reliance on active acoustics as a means of anti-submarine force protection. ONR is also developing more effective active sonar technology that the Navy hopes will reduce adverse effects on marine life through reduced source levels, alterations in signal characteristics and focusing of emitted sonar beams. ONR research into the interactions of marine life and sonar sounds will help guide our search for reduced environmental impact from active sonar, while preserving and enhancing the effectiveness of this vital fleet protection asset. Taken together, these programs should enable the U.S. Navy to keep up with the challenges posed by advancing foreign submarine technology while simultaneously reducing the potential risks to marine life from active sonar.

LANDMINES

35. Senator REED. Dr. Killion, the administration recently announced a new policy of anti-personnel and anti-vehicle landmines which details how we plan on using those weapons in future conflicts. In the past, the Army has invested in technologies that would produce mine systems that would meet Army requirements as well as being consistent with the rules of the Ottawa Treaty governing landmine use. Congress has also urged the Army to develop these kinds of systems as part of the FCS. What is the status of the development of these intelligent, Ottawa-compliant landmine systems?

Dr. KILLION. Funding in Program Element 0603606A Project 683, Anti-Personnel Landmine Alternatives, has been used to evaluate and develop distributed surveillance unattended sensors (autonomous, seismic, acoustic, and day/night imaging sensor systems) and communication, command, and control systems (ad-hoc, wireless, networked inter and intra-field sensor communications, and information management tools) to be used with man-in-the-loop over watch fires. These evaluations have included soldier-in-the-loop live-virtual modeling and simulation experiments to evaluate new concepts and doctrine. Output of the simulation experiments have been used to determine specifications and requirements for the distributed networked sensor systems.

The new U.S. landmine policy, announced on February 27, 2004, commits DOD to end the use of persistent mines (both anti-personnel and anti-vehicle) and endorses the continued use of self-destructing/self-deactivating mines of both types. In compliance with Fiscal Year 2003 Appropriations Committee Report language directing "that the Army clearly define the requirements for a next generation intelligent minefield and ensure compliance with the Ottawa Treaty," DOD will consult with the Appropriations Committee concerning the impact of the new policy. Coordination for this consultation is in progress.

36. Senator REED. Dr. Killion, how much are you investing in these technologies in this budget request?

Dr. KILLION. Approximately \$2,949,000 in fiscal year 2005.

37. Senator REED. Dr. Killion, what significant technical challenges remain to producing a system that meets Army requirements and is compliant with the Ottawa Treaty?

Dr. KILLION. Significant technical issues exist and will remain since the Army requirements for an Anti-Personnel Landmine Alternative system and the parameters of Ottawa are not congruent. PE 0603606A, Project 683, Anti-Personnel Landmine Alternatives does focus on the following significant challenges related to remote networked sensor surveillance systems for man-in-the-loop over watch fires and command-detonated munitions:

- (1) Improving low cost, low power unattended imaging and non-imaging sensors to enable more reliable identification of combatant-noncombatant;
- (2) Developing low power, long range, antijam communications technologies; and
- (3) Developing automated, networked sensor field dispensing techniques and developing the hardened low cost sensors and communications devices required for such dispensers.

QUESTIONS SUBMITTED BY SENATOR HILLARY RODHAM CLINTON

AIR FORCE RESEARCH LABORATORIES

38. Senator CLINTON. Mr. Engle, the Information Directorate of the Air Force Research Laboratory (AFRL) develops systems, concepts, and technologies to enhance the Air Force's capability to successfully meet the challenges of the information age. I was disappointed that your testimony did not include a discussion of your vision for the Air Force Research Laboratories in Rome, New York. Can you give a description of the role that Rome Labs will play in the AFRL's future?

Mr. ENGLE. The Rome Research Site in Rome, New York, continues to play a pivotal role in the Air Force's achievement of the warfighting capabilities needed to support our core competencies and will continue to do so. The Rome Research Site has long been a key contributor to the Air Force S&T program and to the Nation as a whole. One of the most transformational and quickly deployable technologies available today is command, control, and communications technology, also known as information technology. This technology is at the heart of our Moving Target Indicator Exploitation program, which is developing web-enabled automated tools to exploit data from current and future sensor systems such as the Joint Surveillance Target Attack Radar System (JSTARS). Perhaps one of the most exciting technologies to come out of our lab at Rome is the information data wall. This data wall has proven highly effective and is currently being used in Afghanistan and Korea. In addition, several government agencies use multi-layer communications security developed at Rome and software-defined reprogrammable radios for secure communications and adaptable for coalition operations have also transitioned into operational use.

The Information Directorate at Rome is at the center of a growing national resource focused on communications technology. We believe the future for this enterprise is to lead the way for our national security needs in information technology and use this expertise to continue to grow this vital Center of Excellence in the Rome area.

LABORATORY PERSONNEL ISSUES

39. Senator CLINTON. Dr. Segal, the DOD intends to convert employees at the Defense laboratories excluded from the NSPS by congressional action into the Best Practices Initiative through a regulatory action and then convert them again into the NSPS personnel system at some future date. What are the implications of such a double conversion on the lives and careers of our scientists and engineers?

Dr. SEGAL. We value our scientists and engineers in accomplishing the mission of the laboratories, their lives and careers are certainly of paramount importance to the Department. It is because of the value placed on our scientists and engineers that we are working to establish the most flexible personnel framework possible. The DOD will not impose the "Best Practices" personnel demonstration system on any of the laboratories.

40. Senator CLINTON. Dr. Segal, what are the costs of the conversion of the laboratory demos to the Best Practices Initiative?

Dr. SEGAL. While "Best Practices" will not be imposed on the laboratory demonstrations, some labs may voluntarily choose to implement some of the flexibilities found in Best Practices. Salary costs would not be affected if the labs were to adopt any of the flexibilities found in Best Practices—employee base salary would be preserved. Unlike the General Schedule system, the lab demonstrations do not provide periodic within-grade increases to basic pay. Thus, if a lab chooses to implement these features of Best Practices, there is no need to "buy in" lab demonstration employees—that is, to pay them a percentage of the next within-grade increase, based on the time each employee has already served toward the next increase. Another point to consider is that there are costs not operating under a single personnel framework, which entail the maintenance of redundant payroll and personnel data, policies, and administration.

41. Senator CLINTON. Dr. Segal, has any independent analysis been performed that has indicated that the Best Practices Initiative will improve the ability of the affected organizations to perform their missions?

Dr. SEGAL. Many private and public analyses have been accomplished over the last four decades to examine the defense laboratory structure, and as an integral part, assess the laboratory personnel framework. The flexibilities available in Best Practices are based upon a review of use and impact of the flexibilities available and

independent analysis performed by the Office of Personnel Management (OPM). OPM's evaluation let us know what was working in the demonstration projects and what could be improved.

INFORMATION ASSURANCE

42. Senator CLINTON. Mr. Engle, as indicated by other witnesses during the hearing, information security is becoming a growing concern for both forces deployed overseas as well as our military activities at home. Please highlight the efforts that the Air Force S&T program is making to address our information security requirements. How are the products and innovations stemming from Air Force research being transitioned for use by the DHS and the private sector?

Mr. ENGLE. The Rome Research Site in Rome, New York, is the center of expertise for command, control, communications, and intelligence (C³I) technology development, including information security requirements. The Information Support Server Environment (ISSE) Guard initiated by the Air Force in 1990 to meet the needs of the Air Force and also of the U.S. Intelligence Community, has become an enabling information security development effort and is a prime example of how the Air Force S&T program is addressing information security requirements. ISSE Guard provides for the multi-level security needed in or between information networks. Since its inception, the ISSE Guard solution has been a mix of best-of-breed commercial items combined with government-sponsored/developed software needed to satisfy military and intelligence requirements. ISSE Guard has been installed and is being used in a variety of Service/Defense agencies, such as the U.S. Air Force Technical Applications Center, U.S. Space Command, National Air Intelligence Center, National Geospatial-Intelligence Agency (formerly the National Imagery and Mapping Agency), U.S. Central Command (CENTCOM), Defense Intelligence Agency (DIA), Navy Warfare Development Center, U.S. Army South, Office of Deputy Chief of Staff, Intelligence (ODCSINT), among others.

The Information Directorate at the Rome Research Site works with a large customer/collaborator group, including the DARPA, the Intelligence Community, the Missile Defense Agency (MDA), and other Services. In addition, the nearby Griffiss Institute is a collaboration of industry, academia, and government in the area of information assurance. While our mission at Rome is in support of Air Force warfighting capabilities, some of the technologies being developed may also benefit other organizations and the private sector. The close working arrangement that the Information Directorate enjoys with these various organizations facilitates the transition of information technologies into operational use by both government and the private sector. In fact, the Joint Defensive Planner (JDP) developed by the scientists and engineers at Rome is currently being used for homeland defense. This program automates the defensive planning process and functions with Service operators who are separated geographically. The JDP program allows planners at widely distributed locations to use common planning software and databases to exchange concepts, overlays, and analyses of options. The JDP program can support multiple clients, interface with other Service tactical planners, and enable access to the JDP application through the Web.

SBIR PROGRAM

43. Senator CLINTON. Dr. Segal, Dr. Killion, Admiral Cohen, and Mr. Engle, the budget materials submitted to Congress include a negative assessment of the DOD SBIR program. What is your assessment of the value of small business research and the SBIR program as part of the overall DOD S&T strategy?

Dr. SEGAL. Small business research and the DOD SBIR program play an important role in developing and maturing needed technologies in support of the DOD S&T program. The negative assessment to which you refer is the OMB assessment which focused on commercialization of SBIR technology. This is only one of the goals of the SBIR program. The four goals are to: stimulate technological innovation; increase private sector commercialization of Federal R&D; increase small business participation in federally funded (DOD) R&D; and foster participation by minority and disadvantaged firms in technological innovation. We are committed to increase our tracking of commercialization in the future to improve our OMB assessment. However, we place as much importance on the other goals of the program, and believe that SBIR is meeting all the intended goals.

Dr. KILLION. Small business research and the Army SBIR program play a critical role in developing and maturing technologies needed to support the Army's S&T strategy. My staff provides guidance to the Army SBIR PM to ensure that solicited

topics are current, relevant and aligned with the strategy. The current SBIR budget of \$228 million will be invested in Phase I and Phase II proposals selected for award that support future force and FCS objectives. Through SBIR and other similar small business research programs, we have learned that the very best ideas do not necessarily come from the laboratories of large corporations or even from our government laboratories. Most often, innovative technologies are invented by creative individuals and small, entrepreneurial companies whose workers truly think “outside the box.” With the strong participation from the Army S&T community, there is a greater chance of SBIR successes that will achieve current Army research goals, thereby leading to increased opportunity for incorporation into the acquisition process.

Admiral COHEN. I believe that this is in response to the Government Performance Results Act (GPRA) rating from OMB on the overall DOD SBIR. Please recognize that all information was not available to OMB at the time of the evaluation.

The Navy’s SBIR program is working extremely well. A number of SBIR technologies have been integrated into the Navy’s ongoing programs. A number of Navy SBIR small businesses have been acquired by large businesses and several products that are being used in the IRAQ which are a result of the Navy’s SBIR program. Some examples:

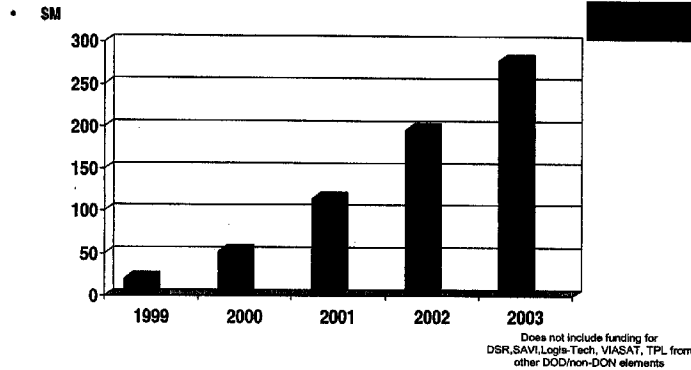
- Flight certification of Silver Fox is underway and training of marines has been scheduled with the goal of providing this UAV capability to I Marine Expeditionary Force (MEF) in Iraq. As soon as higher resolution sensors can be integrated into Silver Fox an upgraded version will also be provided.
- A Persistent Area Surveillance System that includes a 360 degree camera that was demonstrated on 12 Dec 2003, has been identified for possible deployment to Iraq to provide surveillance of high interest areas.
- LogisTech, Inc.—Provides platform protection from corrosion. Has received over \$500 million in DOD PHASE III funding to date. Now provides product to Iraq.
- SAVI Inc.—Solved the problem of total asset visibility for DOD. Developed a “smart” barcode label. On the surface, it looks like a barcode you see at the grocery store. Beneath the surface, however, a radio frequency identification (RFID) chip and an antenna system carry product information, which can be captured by a special reader. Used for DOD container shipments overseas.
- Science and Applied Technology (now AKT Missiles)—Advanced Anti-Radiation Guided Missile (AARGM) development, design, demonstration and transition to SDD and production a multi-sensor fuzed weapon system to defeat advanced surface to air threats employing countermeasure techniques including counter shutdown. Over \$750 million in sales over 10 years. The company has grown from less than 10 employees to over 200.

The Navy’s SBIR/STTR Program is a mission oriented program that has a dual use component. One of the metrics that we use internally to judge the success of the program annually is a comparison of SBIR funds in a given year to the Phase III (non-SBIR funds) provided to Navy SBIR companies by Navy acquisition programs. For example, in fiscal year 2003, the Navy SBIR program had \$200 million for award of contracts to small businesses in Phases I & II of the SBIR program. The Navy acquisition programs provided Navy SBIR participating companies in excess of \$275 million.

Likewise, in fiscal year 2002 the Navy SBIR program had \$156 million and SBIR companies received in excess of \$195 million in Phase III awards from Navy acquisition programs. These figures don’t include funding received by the Navy SBIR participating companies from non-Navy DOD and other government agencies, prime contractors and the private sector. The accompanying chart highlights our success in this area.



Phase III FUNDING from Navy



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Dr. ENGLE. The Air Force is a strong supporter of the DOD SBI program. This program and the small business research it encourages play a vital role in the Air Force S&T program. Although the OMB has expressed concerns that, in some cases, the SBIR program funds companies with poor performance and overestimates commercial successes stemming from Federal funding by treating additional investment the same as product sales, these have not been significant issues for the Air Force. We are sensitive to the capabilities and contributions of small businesses as they interact with us in this program and we have efforts in place to increase their success. For example, the Air Force's Mentor-Protégé program provides funding to small businesses that have successfully transitioned efforts to larger companies so that they can mentor other small businesses towards similar successes. The Air Force has also deployed an e-business solution called the SBIR Shopping Mall, which links small businesses that have or are completing SBIR efforts with large businesses, Air Force product development offices, and logistics centers. The Air Force also has a history of funding those efforts that contribute to both military and commercial capabilities and have successfully transitioned to SBIR Phase III, which is the phase in which commercialization occurs.

The National Science Foundation estimates that small company investment in research and development in the U.S. is about \$40 billion for 2003. The SBIR program provides DOD and the Air Force a valuable tool to leverage this national innovation engine. Phase I and II of this program allow us to solicit and exploit this vast investment in the U.S. Although the management of this program requires significant effort to ensure return on investment, the payback is worth it. As already stated, the Air Force is a strong supporter of the DOD SBIR program and its contributions to the Air Force S&T program. However, one change to the way we currently do business could potentially improve the SBIR program and, in the process, address OMB's concerns. I believe we could improve transition of SBIR efforts to military systems and/or commercialization success by raising the ceilings for SBIR Phase I and Phase II efforts. Raising these ceilings will provide additional funding to mature technologies and should improve the transition of efforts to SBIR Phase III or commercialization.

44. Senator CLINTON. Dr. Segal, Dr. Killion, Admiral Cohen, and Mr. Engle, the assessment also indicates that the administration will "seek to get highly successful awardees to enter the mainstream of defense contracting." What are your plans to execute this plan?

Dr. SEGAL. The DOD has two initiatives to facilitate the rapid transition of SBIR technologies, products, and services into DOD acquisition programs. First, we require the services to solicit letters of interest from their DOD acquisition programs

in order to demonstrate interest in transitioning the successful projects to defense acquisition contracts. At this time, approximately half of the SBIR projects have received statements of interest. Second, we have developed a Phase II Enhancement policy under which we provide a Phase II company with additional SBIR funding if the company can match the funds with non-SBIR funds from DOD acquisition programs or the private sector. Generally, enhancements will extend an existing Phase II contract for up to one year and will match up to \$250,000 of non-SBIR funds. These initiatives have been extremely effective in attracting DOD acquisition and outside investor money as well as attention to SBIR projects. We strive to increase the awareness of SBIR projects in the acquisition community through these initiatives and we believe that this will enable small businesses to compete within the mainstream of defense contracting.

Dr. KILLION. The Army has established two formal initiatives recently to facilitate the rapid transition of SBIR technologies, products, and services into DOD acquisition programs. First, at least 50 percent of the SBIR topics that are solicited must be either co-authored by an acquisition program official or include a memorandum co-signed by the laboratory topic author and a DOD acquisition program official, stating that if the technology is successful, the acquisition program would be interested in providing non-SBIR funding during or after phase II to integrate the technology into the program. This year, over 75 percent of Army topics were endorsed in this manner by an acquisition official. Second, under the Phase II Plus Program, the Army provides up to \$250,000 in matching SBIR funds to expand an existing Phase II that attracts investment funds from a DOD acquisition program or a private sector investor. Phase II Plus allows for an existing Phase II Army SBIR effort to be extended for up to 1 year to perform additional research and development. Since its inception, the Phase II Plus Program has selected and funded 110 projects and continues the Army's emphasis on enabling the development and commercialization of dual-use technologies and products. These two initiatives have been extremely effective in attracting DOD acquisition and outside investor money to SBIR projects to support the Army S&T strategy. We strive to increase the awareness of past and present Army SBIR projects in the acquisition community through conferences, brochures, and Web sites, and by facilitating networking efforts of the small businesses.

Admiral COHEN. With the Navy's SBIR program this is occurring in several ways:

(1) SBIR small businesses that have developed technology that is beneficial to the Navy/DOD have been purchased by the large prime contractors. Such acquisitions allow new small businesses to engage in SBIR. Below is a list of some of those small businesses that have been acquired:

- DSR, Inc.—Multi-Purpose Processor (bought by General Dynamics) provided lower cost and improved performance of weapons systems with commercial off-the-shelf equipment. Over \$200 million in Navy Phase III—partnered with Lockheed Martin.
- Microcom, Inc.—Improved Transponder. Funded as second source and bought by Loral—now L3 Communications.
- Science and Applied Technology (now AKT Missiles)—Advanced Anti-Radiation Guided Missile Development.
- Solopsis Corporation developed Cooperative Engagement Capability (CEC). Purchase by Raytheon.
- Darlington Incorporated developed Combined Wide Area Network (COWAN) Technology purchased by EDO Corporation.

(2) Small Businesses are teaming with large businesses or selling product directly to the government. Below is an example of large business interested in Navy SBIR:

“Raytheon, with 2002 sales of \$16.8 billion, is an industry leader in defense, electronics, space, information technology, and business and special mission aircraft. The company has launched a unique SBIR partnering initiative through its Integrated Defense Systems (IDS) business to leverage both Navy and Raytheon resources. The initiative championed by IDS President Dan Smith, uses the Navy's SBIR capacity to generate new technologies to help fill gaps in Raytheon IDS' own annual technology roadmap for a dozen-odd defense programs—including the Navy's revolutionary DD(X) and other new platforms. . .” Quote from “Transitions” Volume 1, Issue 1, the Navy SBIR Newsletter.

(3) Currently the Navy provides an opportunity for all small businesses that are awarded a Navy SBIR Phase II to enter the Navy's “Transition Assistance Program” (TAP). This is a 9-month program designed to provide small SBIR firms (which are typically scientific or technically oriented) some business acumen. The 9 months are culminated at the Navy Opportunity Forum on 3–4 May 2004. The small companies

brief their technologies to venture capitalists, Navy/DOD acquisition program managers, and Navy/DOD prime contractors. The outcome of the presentations provides a unique opportunity for large and small businesses to work together.

Mr. ENGLE. The Air Force fully supports the administration's plan to encourage successful SBIR awardees to actively participate in the mainstream of defense contracting. We believe this could make a meaningful contribution to the U.S. industrial base by increasing the number of trusted sources available to support Air Force contractual needs. There are several efforts currently underway to assist small businesses, including extended intellectual property rights that can extend well after the end of Phase III vice the normal 5-year period, an extended Phase II program that uses SBIR funding to help transition promising Phase II efforts that aren't quite ready for Phase III, and the Mentor-Protégé program under the Air Force's Small and Disadvantaged Business Utilization office that provides funding to small businesses that have successfully transitioned efforts to larger companies so that they can mentor other small businesses towards similar successes. The Air Force's SBIR Web site also provides a "shopping mall" of current SBIR efforts to provide insight to the larger companies and hopefully generate interest in the various efforts ongoing within these small businesses. This Web site also links to the U.S. Small Business Administration SBIR/STTR Web site for an even broader look at what's currently ongoing.

45. Senator CLINTON. Dr. Segal, Dr. Killion, Admiral Cohen, and Mr. Engle, do you plan to establish and fund more formal Phase III programs for SBIR contractors who have successfully executed Phase II SBIR contracts?

Dr. SEGAL. Phase III is the goal of every SBIR effort, and represents the commercialization phase of the program. In Phase III, the successful company markets the products or services developed in Phase II, either to the government or in the commercial sector. As you are aware, no SBIR funds can be used in Phase III. The two initiatives described in the previous answer help facilitate the transition of small business research from Phase II to Phase III. We believe these projects will successfully market and compete for follow-on contracts, without separate funding.

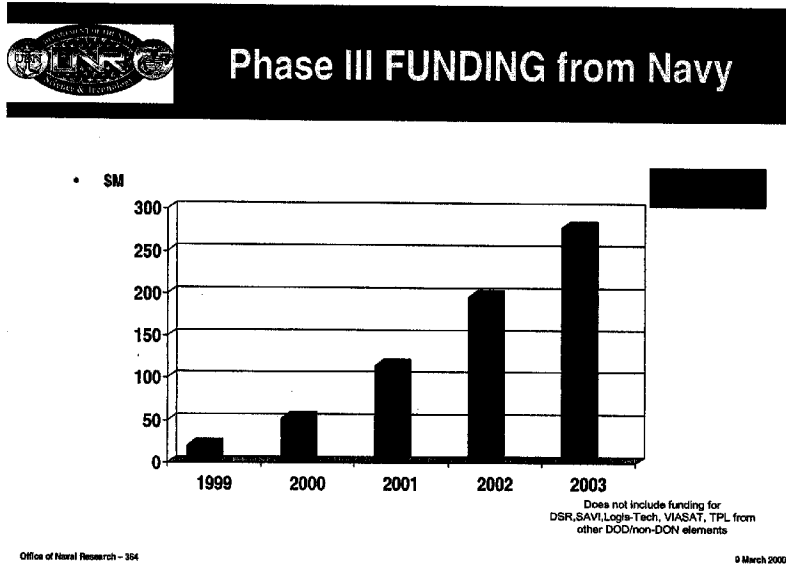
Dr. KILLION. Phase III is the goal of every Army SBIR effort, and represents the commercialization phase of the program. In Phase III, the successful company markets the products or services developed in Phase II, either to the government or in the commercial sector. As you are aware, no SBIR funds can be used in Phase III. Besides the two initiatives described previously to help facilitate the transition of small business research from Phase II to Phase III, the Army maintains data on successful Phase II and Phase III projects which is maintained on a Web site for ready access. The Army also publishes this data in a yearly commercialization brochure that is disseminated widely throughout DOD and the small business community. This visibility helps to facilitate the transition of successful Phase II projects. Also, the Army established a Venture Capital Initiative recently with the mission to discover, invest in, and support companies and programs developing innovative mobile power and energy technology with potential application to U.S. Army needs. This program uses a range of investment approaches, including making equity investments, project partnering, research sponsorship, licensing arrangements, and others. It also acts as a bridge between the Army and the innovation community (entrepreneurs, established companies, universities, researchers, and venture capitalists) to develop business relationships. The Army aligns all SBIR projects with the S&T strategy that is supportive of Army acquisition programs, thereby creating a Phase III market for the small businesses that participate in the Army SBIR Program.

Admiral COHEN. The Navy views SBIR as an important component in its toolbox for developing technologies/products to perform its mission. Some acquisition programs such as PEO—submarines have a formal method of providing incentives to prime contractor's awards to incorporate SBIR awardees. However, the majority of acquisitions have not used this method but rely more on the Navy's SBIR program to "show them."

The Navy's SBIR program attempts to connect its SBIR topics to acquisition programs in the Navy. Approximately 80 percent of the topics in the Navy section of the DOD solicitation are associated with a mission need associated with the sponsoring Navy acquisition program. We rely on the guidance of the Navy SBIR technical monitors to provide guidance to the small business relative to which acquisition programs may be interested in a company's technology and the Navy TAP to provide the small business the tools to enable them to make contacts in the DOD acquisition/prime contractor community.

One of the metrics that we use internally to judge the success of the program annually is a comparison of SBIR funds in a given year to the Phase III (non-SBIR

funds) provided to Navy SBIR companies by Navy acquisition programs. For example, in fiscal year 2003, the Navy SBIR program had \$200 million for award of contracts to small businesses in Phases I & II of the SBIR program. The Navy acquisition programs provided Navy SBIR participating companies in excess of \$275 million. Included below is a chart highlighting our past success.



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Mr. ENGLE. The Air Force is a strong supporter of the SBIR program and encourages small business contractors to participate in this highly effective program. Our principal objectives are to stimulate technological innovation by small businesses, to increase small business participation in meeting Federal R&D needs, and to increase the commercialization of technology developed through Federal R&D efforts. Phase III is the phase in which this commercialization occurs and the Air Force has a history of funding those efforts that contribute to both military and commercial capabilities and have successfully transitioned to Phase III. We plan to continue to fund Phase III efforts when it can be demonstrated that there are Air Force benefits to be derived from these investments.

[Whereupon, at 11:54 a.m., the subcommittee adjourned.]

**DEPARTMENT OF DEFENSE AUTHORIZATION
FOR APPROPRIATIONS FOR FISCAL YEAR
2005**

WEDNESDAY, MARCH 10, 2004

U.S. SENATE,
SUBCOMMITTEE ON EMERGING THREATS
AND CAPABILITIES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

**DEFENSE NUCLEAR NONPROLIFERATION PROGRAMS
OF THE DEPARTMENT OF ENERGY AND THE COOPER-
ATIVE THREAT REDUCTION PROGRAMS OF THE DE-
PARTMENT OF DEFENSE**

The subcommittee met, pursuant to notice, at 9:34 a.m. in room SR-222, Russell Senate Office Building, Senator Pat Roberts (chairman of the subcommittee) presiding.

Committee members present: Senators Roberts, Reed, and Akaka.

Majority staff members present: Elaine A. McCusker, professional staff member; Paula J. Philbin, professional staff member; and Lynn F. Rusten, professional staff member.

Minority staff members present: Madelyn R. Creedon, minority counsel; William G.P. Monahan, minority counsel; and Arun A. Seraphin, professional staff member.

Staff assistants present: Michael N. Berger and Nicholas W. West.

Committee members' assistants present: Darren Dick, assistant to Senator Roberts; Russell J. Thomasson, assistant to Senator Cornyn; Elizabeth King, assistant to Senator Reed; Richard Kessler, assistant to Senator Akaka; and Andrew Shapiro, assistant to Senator Clinton.

OPENING STATEMENT OF SENATOR PAT ROBERTS, CHAIRMAN

Senator ROBERTS. The Subcommittee on Emerging Threats and Capabilities will come to order. The subcommittee meets today to receive testimony on the defense nuclear nonproliferation programs of the Department of Energy (DOE) and the Cooperative Threat Reduction (CTR) programs of the Department of Defense (DOD).

We welcome our witnesses: the Honorable Paul M. Longworth, who is the Deputy Administrator for Defense Nuclear Nonproliferation within the National Nuclear Security Agency (NNSA) under the DOE; and Ms. Lisa Bronson, who is the Deputy Under Sec-

retary of Defense for Technology Security Policy and Counterproliferation. The programs for which you are each responsible are critically important to the national security of the United States. In a major address on this topic at the National Defense University (NDU) on February 11, the President indicated, and I am quoting here: "The greatest threat before humanity today is the possibility of a secret and sudden attack with chemical or biological or radiological or nuclear weapons." He was referring, of course, to the threat of weapons of mass destruction (WMD) getting into the hands of terrorists.

The President proposed to expand the U.S. and international nonproliferation efforts both in the former Soviet Union (FSU) and in other countries. Speaking of CTR, he said: "Under this program we are helping the FSU states find productive employment for former weapons scientists. We are dismantling, destroying, and securing weapons and materials left over from the Soviet WMD arsenal. We have a lot more work to do there."

The President also called on the international community to cooperate on nonproliferation beyond the FSU. He said: "We will retain the WMD scientists and technicians in countries like Iraq and Libya. We will help nations end the use of weapons-grade uranium in research reactors. The nations of the world must do all we can to secure and eliminate the nuclear, chemical, biological, and radiological materials."

Now, the reason I went into that in some detail is that I do not think the speech received the press it deserved in regard to the international effort to address this very key question. I know we are getting a lot of press about the events of the day in Iraq and the events of the day in an even numbered year, but in regards to the NDU speech I think the President certainly highlighted what needs to be done.

In the National Defense Authorization Act for Fiscal Year 2004, the DOE and the DOD were given the authority to use nonproliferation and CTR funds outside the FSU.

We look forward to your testimony regarding your current or anticipated nonproliferation activities in new countries. For instance, the DOE has just announced a program aimed at funding science projects for former Iraqi WMD scientists. We are prepared to continue this discussion in closed session as necessary.

The fiscal year 2005 budget request demonstrates the administration's continuing commitment to these threat reduction and other programs. I strongly share that commitment. The vast majority of these programs have been successful, but there have been some unfortunate past instances where the United States taxpayer dollars were invested in projects that never came to fruition.

I am sure you would agree that continued support for these very critical programs requires both that the American people understand how they contribute to U.S. national security and that the programs be managed well to ensure that the American taxpayers are getting the maximum return on their investment.

In that spirit, the subcommittee looks forward to your testimony in support of your fiscal year 2005 budget request for these very important nonproliferation programs. I thank you for your service,

I thank you for your time and effort. I thank you for taking time out of your busy schedule to appear before this subcommittee.

I will now turn to my distinguished friend and colleague, Senator Reed, for his opening remarks.

STATEMENT OF SENATOR JACK REED

Senator REED. Thank you very much, Mr. Chairman, and let me join you in welcoming Administrator Longworth and Secretary Bronson. Thank you very much for being with us today. I want to thank the chairman for scheduling this hearing on an extraordinarily critical and timely subject.

Preventing the spread of nuclear, chemical, and biological technology, materials, and weapons is vitally important to our Nation's security and to international stability. Our witnesses today are responsible for many of the important nonproliferation and threat reduction programs that are actively engaged to address the dangers presented by nuclear, chemical, and biological weapons. These are challenging problems.

I want to particularly thank the people in the DOD and the DOE who have been working the field on these programs, often in very difficult circumstances, over the last 10 years. They are committed Federal and contractor employees who understand the importance of what they do.

The cooperative efforts in Russia have been ongoing for over 10 years and, while much has been done, much remains to be done. For example, the effort to destroy Russian chemical weapons is finally aggressively under way. This effort is a truly cooperative effort, with substantial funding and support being provided by Russia, the United States, and the international community.

To be successful, however, the program will require the continued support of the administration and Congress. For example, the authority of the President to waive certain certifications needed to keep this program on track will expire in fiscal year 2004. I believe the DOD will be seeking permanent authority to allow annual waivers of the certifications. Permanent authority is important to ensure that the program runs smoothly from year to year. I hope that we will be able to support the President's request in this year's National Defense Authorization Bill.

Both the DOE and the DOD have expanded their programs in the republics of the FSU outside of Russia, expanding the work with countries such as Kazakhstan, Uzbekistan, Georgia, Ukraine, and others. It is important to building strong relationships with the United States. While what is required in each country is unique, there are opportunities to address chemical, biological, radiological, and nuclear (CBRN) issues. I look forward today to discussing what your organizations are doing to expand the work in these countries.

In the National Defense Authorization Act for Fiscal Year 2004, the DOD was authorized to conduct CTR activities outside the FSU and the DOE was authorized to conduct materials protection control and accounting activities outside of the FSU. We would like to hear what each of you might do utilizing this authority.

There are still challenges to be met, including the plutonium reactor shutdown program, mixed oxide fuel program, biosecurity and bio early warning programs, and the resolution of the current

standoff between Russia and the United States on liability issues. I would very much like to get your thoughts on these and other challenges today.

Again, welcome. We look forward to hearing from you.

Thank you, Senator Roberts, again for holding this hearing.

Senator ROBERTS. Senator Akaka, do you have any opening statement to make here?

Senator AKAKA. Yes. Thank you very much, Mr. Chairman. Thank you for calling this hearing.

I welcome our witnesses. The programs you administer I feel are very vital to our national security and I am concerned the President or his people may not be giving you the priority that you deserve.

I have a longer statement that I would request to be made part of the record, Mr. Chairman.

Senator ROBERTS. Without objection.

[The prepared statement of Senator Akaka follows:]

PREPARED STATEMENT BY SENATOR DANIEL K. AKAKA

Thank you Mr. Chairman for calling this hearing. I welcome our witnesses. The programs you administer are vital to our national security, but I am concerned the President is not giving them the priority they deserve.

The Department of Energy (DOE) plays a vital role in maintaining the security of our country.

In that regard, I am pleased to see that the Off-Site Source Recovery Project has been transferred from DOE's Office of Environmental Management to the National Nuclear Security Administration (NNSA), where there will be a greater focus on safety and security. I am also pleased that the funding level for this project is now more in line with the importance of its mission. I have introduced legislation, S. 1045, on this program which was incorporated into the pending energy bill. I am pleased to see that DOE is taking action to secure domestic radioactive sources.

However, when it comes to the administration's approach to nuclear weapons, I have a number of concerns.

The time and resources being devoted to research and development (R&D) of new weapons technology, such as the Robust Nuclear Earth Penetrator (RNEP) and new low-yield nuclear weapons, are taking away from other nonproliferation and threat reduction programs.

As I have said before, these weapons systems are not needed and will require an ongoing funding commitment that we cannot afford. On the one hand, the administration is asking for an increase in funding for nuclear weapons by 5.4 percent. While on the other hand, the resources for programs critical for preventing the spread of nuclear weapons to terrorists is only increased by 1.1 percent, with cuts to some key programs.

The President's budget priorities are sending the wrong message to would-be proliferators. We seem to be telling states that when it comes to nuclear weapons development, "do as we say, not as we do!"

When the administration seeks funding both to increase our test readiness and for new weapons research, while reducing the budget for nonproliferation programs, why should other countries not see that as a green light to develop nuclear weapons?

We can't have it both ways.

The U.S. cannot expect other nations to agree to give up their weapons while we seek to develop a newer, more usable nuclear arsenal.

Moreover, the failure by the administration to accelerate the Cooperative Threat Reduction (CTR) program is disturbing. Last spring, a Harvard study noted that a dramatic acceleration of the CTR program is clearly needed. The CTR and other DOE nonproliferation programs are the primary means we have to prevent weapons, weapon-usable materials, and the expertise in the former Soviet Union (FSU) from falling into the hands of terrorists.

Just yesterday, in testimony before the Armed Services Committee, the Director of Central Intelligence (DCI) George Tenet said, "Russian weapons of mass destruction materials and technology remain vulnerable to theft or diversion. We are also concerned by the continued eagerness of Russia's cash-strapped defense, bio-

technology, chemical, aerospace, and nuclear industries to raise funds via exports and transfers—which makes Russian expertise an attractive target for countries and groups seeking weapons of mass destruction and missile-related assistance.”

We cannot afford this risk.

We should heed the advice of experts at Harvard and the Central Intelligence Agency (CIA) and develop an accelerated plan to take control of nuclear material at the most vulnerable sites worldwide.

By not doing this, the President is leaving the door open for terrorists to steal nuclear weapons.

We must close that door.

I welcome our witnesses, and I look forward to their testimony.

Senator AKAKA. Mr. Chairman, I am concerned that the President’s budget priorities are sending the wrong message to would-be proliferators. We seem to be telling states that when it comes to nuclear weapons development, “Do as we say, not as we do.”

When the administration seeks funding both to increase our test readiness and for new weapons research, while reducing the budget for nonproliferation programs, we ask ourselves why other countries should not see that as a green light to develop nuclear weapons. In a way, we cannot have it both ways. The U.S. cannot expect other nations to agree to give up their weapons while we seek to develop a newer, more usable nuclear arsenal.

Moreover, the failure by the administration to accelerate the CTR program is disturbing. Just yesterday in testimony before the Armed Services Committee, the Director of Central Intelligence (DCI) George Tenet said, “Russian weapons of mass destruction materials and technology remain vulnerable to theft or diversion. We are also concerned by the continued eagerness of Russia’s cash-strapped defense, biotechnology, chemical, aerospace, and nuclear industries to raise funds via exports and transfers, which makes Russian expertise an attractive target for countries and groups seeking weapons of mass destruction and missile-related assistance.”

At this point we need to really consider whether we can afford this risk.

Thank you very much, Mr. Chairman.

Senator ROBERTS. Thank you, Senator.

We now recognize the Honorable Paul M. Longworth, who is the Deputy Administrator for Defense Nuclear Nonproliferation, NNSA, within the DOE. If you have to repeat that to everybody in regards to what you do, you probably spend a great deal of time doing that.

Paul, your entire statement will be made part of the record. Every golden word will be ensconced for memory and shining the light of truth into darkness, so you feel perfectly free to summarize if you so wish. We recognize you at this time and thank you again for appearing.

STATEMENT OF PAUL M. LONGSWORTH, DEPUTY ADMINISTRATOR FOR DEFENSE NUCLEAR NONPROLIFERATION, NATIONAL NUCLEAR SECURITY ADMINISTRATION, DEPARTMENT OF ENERGY

Mr. LONGSWORTH. Thank you, Mr. Chairman. I will be brief.

I do want to thank you for holding this hearing today. It is a pleasure to be back here before the subcommittee to discuss the important activities that we conduct in the nonproliferation arena.

Before discussing specific activities, I want to first again thank this committee for its continued support for the very important efforts that you have all laid out. On behalf of the men and the women and the scientists and technicians that carry out this work in these far-flung locations, I want to say thank you on their behalf as well.

In my oral statement I would like to briefly describe the specifics of our nonproliferation activities, address the critical components of our 2005 budget, and highlight some key accomplishments we have made. Mr. Chairman, as you have requested, I will discuss some of the challenges that we face.

You quoted the President's speech and I think it bodes restating. He said at the NDU in February that, "The greatest threat before humanity today is the possibility of a secret and sudden attack with chemical or biological or radiological or nuclear weapons. America and the entire civilized world will face this threat for decades to come." The President went on to say that, "We have to address this challenge with open eyes and unbending purpose."

I would say that that is what the programs in the Defense Nuclear Nonproliferation Office do. We carry out programs in 70 countries across the world to prevent the spread of WMD and in many cases we are reversing the capabilities to support WMD programs. Our mission has seven principal components: We conduct cutting-edge nonproliferation and national security research and development (R&D); we secure nuclear weapons and North Korea and radiological materials at potentially vulnerable sites in Russia and throughout the world; we reduce the overall quantities of nuclear and radiological materials; we bolster border security overseas; we support international nonproliferation and export control regimes; we help downsize the nuclear weapons infrastructure in the FSU; and we work to mitigate the risks and consequences at nuclear facilities worldwide.

By addressing key elements of the proliferation spectrum, these activities play an essential role in stemming proliferation of WMD.

While our nonproliferation programs are international in scope, our activities also support the global war on terrorism by removing the raw materials that a terrorist might use to attack the U.S. or our interests abroad. In all of these cases our programs directly strengthen U.S. national security.

Our mission goals form the crux of a multi-layered capability that reduces the incentive for terrorists and drug states to obtain WMD and reduce the access and the wherewithal to obtain such weapons. All of our program efforts are designed to bolster national security in the United States. We do not conduct foreign aid. We carry out projects that directly enhance U.S. national security interests.

Our fiscal year 2005 budget is \$1.35 billion. That is roughly a 1 percent increase over 2004, but it is a 60-percent increase over the 2001 appropriation. Some would argue that our budget is flat-lined. I think they would be wrong.

We have moved into an era of global burdensharing. In 2002, President Bush proposed that the G-8 member nations join together to form a global partnership to step up proliferation. The President committed the U.S. to spend \$10 billion initially in Rus-

sia over 10 years on such an initiative. Since then our partners in the G-8 have committed to spend up to \$10 billion over 10 years to match the U.S. funding.

The President has now proposed an expansion of the global partnership, both in terms of donors and recipient nations, to address proliferation threats worldwide. This burdensharing must be accounted for when we do an overall assessment of how much funding is going into nonproliferation programs globally.

Let me just briefly walk through a few budget highlights in our fiscal year 2005 request. In the area of fissile materials disposition, this is by far our largest program. It accounts for about 43 percent of our total budget. The President's request includes \$649 million for this work, of which \$549 million is for plutonium disposition.

The fiscal year 2005 budget request seeks funding to begin construction of both the U.S. and the Russian mixed oxide (MOX) fabrication facilities in 2005. We are currently targeting May 2005. We must resolve liability with the Russian Federation soon in order to meet that schedule, but this request reflects the U.S. commitment for proceeding with plutonium disposition.

In the area of plutonium reactor shutdown in Russia, not only are we pursuing the disposition of weapons-usable plutonium, we are also working hard to get Russia to shut down its last remaining plutonium-producing reactors. They have three remaining reactors. We are on a schedule now to shut those down by 2008. We will shut down two by 2008 and we hope to shut down three by 2011. This is a program that actually was transferred from the DOD to the DOE.

By shutting off these reactors, we will reduce the production of 1.2 metric tons of new plutonium each year. So every year that we do that sooner is another 1.2 metric tons of plutonium that will not be created.

We expect to complete design by the end of 2004, and by that time we will have a firm, validated cost estimate for this project.

In the area of material protection, control, and accounting, the President's request includes \$238 million, which includes efforts to secure Russian warheads, plutonium, and highly-enriched uranium (HEU). It also includes our Second Line of Defense and Megaports programs, which are intended to detect illicit trafficking of nuclear and other radiological materials at border crossings, airports, and seaports. The objective of that program is to detect and stop weapons-usable material before it arrives at the U.S. border.

In some smaller areas, which are by no means unimportant, we have requested an increase for the Off-Site Source Recovery Program. This recognizes the serious global threat that radioactive source materials might be used in radiological dispersal devices. This is a new effort for the NNSA and we are assuming responsibility for this program after it was transferred to us from the Office of Environmental Management. We estimate the initial program funding will be \$5.6 million, with a projected cost of about \$40 million over the next 5 years.

If you allow me, Mr. Chairman, I would like to walk through a few of the accomplishments we have achieved. I think these are important to go through because we are not very good at tooting our

own horn. I think the folks that do this work throughout the world have achieved many laudable successes.

I will start with the most obvious one. It is in Libya. The DOE played a key leading technical role to support the operation to verify Libya's pledge to dismantle its WMD. In North Korea, we are participating in the six-party talks on a technical level and we are beginning to develop the tool kit that will be necessary to support the complete, verifiable, and irreversible dismantlement of North Korea's nuclear weapons program when that occurs.

In the area of materials protection, control, and accounting (MPCA), we have accelerated the time line for securing the 600 metric tons of weapons-usable nuclear material at 55 sites in Russia and Eurasia, and we have accelerated that schedule by more than 2 years. From 2002 to 2003, we tripled the amount of new fissile material that is under safeguards and secured in Russia, and are operating at about the same pace this year.

With the Russian Navy, we have completed 77 percent, or about 30 sites, of the 39 Russian nuclear navy sites where they store warheads, and we will be finished with that we think at the end of 2005. We are expanding our work with the Strategic Rocket Forces (SRF) to secure warheads at their sites. We have added three additional sites this year and hope to add additional sites in the near future.

In the area of our Second Line of Defense program, we are continuing to install radiation monitors at sites throughout Russia and we plan to install this year 25 new sites in Kazakhstan and 25 sites in the Ukraine. Worldwide, we expect to be at 165 locations with nuclear trafficking detectors by the end of fiscal year 2005.

In addition, we are very close to completing installation of radiation detectors at the largest seaport in Europe, the port of Rotterdam. That will be completed by mid-summer. We expect to conclude other letters of intent and agreements with other countries, most notably China, which has three very large ports, and we hope to do those in the April-May time frame.

Under our Russian highly-enriched fuel return program, we have repatriated HEU fuel, fresh fuel, from Yugoslavia, Romania, and Bulgaria. This material in total was sufficient to make several nuclear weapons.

Finally, in our R&D program, an often overlooked part of our program, we continue to have a 100-percent on-time payload delivery record for nuclear explosion monitoring satellite capabilities.

So we have accomplished a lot, but there are many challenges and I would like to walk through those just briefly. Liability is the largest challenge we face right now. We are in a disagreement with Russia about what is an appropriate level of liability protection for U.S. workers and the U.S. Government. American contractors must have adequate liability protection in Russia and elsewhere, and we are urging the Russian government to seek a quick ratification in the Duma of the CTR umbrella agreement that contains full liability protections for U.S. work.

CTR ratification will facilitate agreement on a number of other critical nonproliferation programs which are currently not being renewed until that agreement is ratified, most notably the mixed oxide fuel program and the Nuclear Cities Initiative (NCI).

Transparency is another area that is a challenge. Achieving adequate transparency is an ongoing problem for many U.S. non-proliferation initiatives within the Russian Federation. Assuring that we are in fact securing the materials and facilities intended to be secured is challenging. It takes technology and it takes access. The NNSA is continuing to work bilaterally and multilaterally to ensure that our mutual goals are met in this area.

I mentioned access. That is an ongoing problem. Our non-proliferation programs often require access to other countries' most sensitive facilities. In Russia, considerable progress has been made accessing the less sensitive sites, but we continue to be blocked from some of their most sensitive sites that have ongoing defense activities.

We have established a working group that the Secretary and his counterpart, Minister Rummyantsev, formed to break down those barriers, and we believe it is working pretty well. It goes without saying that reaching agreement on access at these sites is a major challenge and will require patience and steadfastness on our part.

Finally, concluding contracts and agreements is a complex process that often delays our work in Russia as well. Even though there is agreement in principle to undertake a given nonproliferation program, actually implementing the program requires time. The Russians have a fairly large bureaucracy. They inherited it from the Soviet era. It did not go away, and we face normal bureaucratic challenges there.

Some of the solutions are: First and foremost, Secretary Abraham has developed a close working relationship with his counterparts in Russia in order to identify and address roadblocks to our progress very quickly. This has worked very well and he has committed to work with Mr. Rummyantsev's successor once they meet.

To summarize, I would just like to draw your attention to the progress that our programs have made in recent years and the programs that have been accelerated and adapted to meet the complex and unpredictable security threats that we face. In his February 11 address, President Bush outlined the path forward to better strengthen the global nonproliferation regime, to control exports, and to further restrict access to nuclear technologies. The Office of Defense Nuclear Nonproliferation will continue to address these myriad of threats across the proliferation spectrum and we will do that in concert with our other Federal agencies.

Mr. Chairman, thank you very much.

[The prepared statement of Mr. Longworth follows:]

PREPARED STATEMENT BY PAUL M. LONGSWORTH

INTRODUCTION

Thank you, Mr. Chairman and members of this subcommittee, for the opportunity to appear before you today to discuss the activities of the National Nuclear Security Administration's (NNSA) Office of Defense Nuclear Nonproliferation. Before discussing our specific activities, I want to express how critically important I consider your contributions, both past, present, and future, to the United States' efforts to prevent the spread of weapons of mass destruction (WMD). Of course, it goes without saying that our ability to address the myriad of proliferation threats that confront us requires that the U.S. Congress fully understand those threats, and that its Members are confident that the money they are authorizing and appropriating to NNSA's programs is being used effectively and efficiently to both meet and exceed the goals to which this funding is directed. Your continued support for our programs dem-

onstrates the committee's long-standing commitment to furthering nonproliferation throughout the world. I appreciate your strong support and I look forward to our continued work together.

There have been concerns raised in the past that our nonproliferation programs are akin to an aid program to Russia rather than a focused element of our Nation's agenda to prevent WMD proliferation. As it is a cooperative effort, U.S. and Russian nonproliferation objectives are not mutually exclusive, and substantial progress has been made. I hope this presentation will help to ease these concerns by drawing attention to the critical role our programs play in stemming the spread of WMD throughout the world, and enhancing our national security.

In his recent speech at the National Defense University (NDU) in February, President Bush stated, "The greatest threat before humanity today is the possibility of secret and sudden attack with chemical or biological or radiological or nuclear weapons . . . America, and the entire civilized world, will face this threat for decades to come." To meet this challenge, the President asked that we confront it "with open eyes, and unbending purpose."

The Office of Defense Nuclear Nonproliferation has expanded and accelerated its programs to address this proliferation threat. We now work with more than 70 countries to prevent the spread of WMD, and we are continuously adapting our activities to meet today's complex and unpredictable proliferation threats posed by "rogue" states and terrorist networks.

I would now like to briefly describe the specifics of our nonproliferation activities, address critical components of our fiscal year 2005 budget request, highlight key accomplishments we have made, and outline current challenges that we face.

MISSION

Today, we are faced with a number of proliferators, rogue states, and terrorist networks that threaten United States and international security by actively pursuing WMD capabilities, technologies, and expertise. The Office of Defense Nuclear Nonproliferation plays a prominent role in responding to these WMD proliferation threats. We recognize the broad scope and complex nature of this threat, and understand that our programs must identify and address potential vulnerabilities within the nonproliferation regime before terrorists or rogue states exploit them.

Our mission is to detect, prevent, and reverse the proliferation of WMD, while mitigating the risks associated with peaceful nuclear energy operations. We implement this mission by:

- Conducting cutting-edge nonproliferation and national security research and development (R&D);
- Securing nuclear weapons and nuclear and radiological materials at potentially vulnerable sites in Russia and across the globe;
- Reducing overall quantities of nuclear and radiological materials;
- Bolstering border security domestically and overseas;
- Supporting international nonproliferation and export control regimes;
- Downsizing the nuclear weapons infrastructure of the former Soviet Union (FSU); and
- Mitigating risks at nuclear facilities worldwide.

By addressing key elements of the proliferation spectrum, these activities play an essential role in strengthening United States and international security. Our efforts are making the world more secure. But the nonproliferation regime still faces serious challenges from a few rogue states and terrorist threats seeking the capability to obtain WMD, and from those states that facilitate such activity or often appear indifferent to it. Lastly, we continue to receive reports of illicit efforts to acquire nuclear or radiological weapons technologies and materials.

BUDGET

The Office of Defense Nuclear Nonproliferation program works to prevent the spread of nuclear weapons and materials to terrorist organizations and rogue states. For fiscal year 2005, the administration requests \$1.35 billion to support activities to reduce the global WMD proliferation threat. Total dollars spent, however, is not the only measure for judging overall program effectiveness. It should be measured on accomplishments, which I will talk about later. This \$1.35 billion is a 1 percent increase over fiscal year 2004, but it does not reflect the total funding for nonproliferation worldwide. We have moved into an era of global burdensharing. In 2002, President Bush proposed a new G-8 initiative on proliferation, and our partners have committed to spend up to \$10 billion over 10 years to help decrease the proliferation threat, initially in Russia. The President has now proposed an expansion of the global partnership's donors and recipients, to address the proliferation

threat worldwide. This burdensharing must be accounted for in the overall assessment of nonproliferation spending.

One of the key obstacles we have encountered this year is a disagreement with Moscow regarding liability protection for plutonium disposition work performed in Russia. Even with the liability issue being worked on at high levels of the administration, lack of resolution to date has resulted in a 10-month delay in the start of construction of a mixed oxide (MOX) facility in Russia as well as a similar facility in the United States. The President's fiscal year 2005 budget request seeks funding to begin construction of both the U.S. and Russian MOX facilities in May 2005, as we work to resolve the liability issue this spring. This reflects the U.S. commitment for proceeding with plutonium disposition.

Not only are we pursuing the disposition of weapons-useable plutonium, we are also working hard to stop Russia from producing more plutonium that could be used for nuclear weapons. We have assumed the responsibility from the Department of Defense (DOD) for shutting down the last three plutonium production reactors in Russia and replacing them with fossil fuel plants by a targeted 2008 and 2011 timeframe. This will result in the cessation of Russia's annual production of 1.2 metric tons of weapons-grade plutonium. Under the Elimination of Weapons-Grade Plutonium Production Program, we have selected the Washington Group International and Raytheon Technical Services to provide oversight for Russian contractors who will actually be performing the work at two Siberian sites. We are preparing preliminary designs for the planned fossil-fuel replacement plants and validating cost estimates for the program. As more of the engineering design work is completed, we will be better able to refine the overall cost and schedule for the replacement fossil-fuel plants. We expect to complete the detailed designs by the end of calendar year 2004, at which time we will be able to provide Congress with firm cost estimates.

Given recent threats to the United States, it has become increasingly clear that protecting and securing nuclear materials and detecting nuclear and radioactive material at foreign ports, airports, and border crossings is a very high priority. Our budget request for Material Protection, Control, and Accounting (MPCA), which includes our Second Line of Defense programs and Megaports Program, is \$238 million. Of that, \$15 million will go toward moving ahead with our Megaports Program to train law enforcement officials and equip key international ports with radiation detection equipment to detect, deter, and interdict illicit trafficking of nuclear and other radioactive materials. We are scheduled to complete work at ports in Greece and the Netherlands by late summer 2004. We have made a number of security improvements to nuclear Navy sites in Russia and we are now focusing resources on securing Strategic Rocket Force (SRF) sites.

In addition to this work, we are also pursuing a dialogue with other countries, including China. We hope that these activities will lead to broader MPCA cooperation in the coming years.

In fiscal year 2005, NNSA assumes responsibility for the Off-Site Source Recovery Project from the Office of Environmental Management. The requested program funding is \$5.6 million, with a projected cost of about \$40 million over the next 5 years to substantially reduce the risk of these source materials being used for radiological dispersion devices. The program works closely with the U.S. Nuclear Regulatory Commission (NRC) to prioritize source recovery.

I would now like to detail our core mission activities and highlight some of our most recent accomplishments in each of these areas.

ACCOMPLISHMENTS

The President's recent speech at the NDU included several nonproliferation measures designed to strengthen U.S. national security. Among his proposals, the President underscored the need to address the demand for the most critical elements of the nuclear fuel-cycle, enrichment and reprocessing, as well as a renewed, stronger approach towards the implementation of safeguards.

The Office of Defense Nuclear Nonproliferation is working directly with the members of the Nuclear Suppliers Group and with the Zangger Committee to strengthen the nuclear export control regime, that includes making the adoption of the International Atomic Energy Agency's (IAEA) Additional Protocol a condition of supply and banning the spread of enrichment and reprocessing technologies. Recognizing the need to work with emerging nuclear technology suppliers and transshipment states, we increased our work in the area of export controls by \$6 million.

Our work to secure nuclear materials, nuclear weapons, and radiological materials at potentially vulnerable sites in Russia and elsewhere is one of our most important missions. We are promoting the further safeguarding and physical protec-

tion of nuclear materials at nuclear sites worldwide, including the states of the FSU and in over 40 countries with U.S.-origin material. The United States and Russia continue to accelerate cooperative nonproliferation efforts, and we are making progress. For example, we have accelerated the timeline for securing 600 metric tons of weapons-usable nuclear material at 55 sites in Russia and Eurasia by 2008. To date, we have upgraded the security of 41 percent of the material and compared to 2002, we tripled the amount of new material placed under comprehensive upgrades in 2003. We are also working internationally to consolidate and secure fissile materials and at-risk radioactive sources. We have upgraded security at 13 nuclear facilities in Eurasia, holding 3.5 metric tons of weapons grade nuclear material, to meet international physical protection guidelines. Although our work continues to expand beyond the FSU, we are still working in the region to improve security at Russian Navy and SRF facilities—among the most sensitive facilities in Russia. We have expanded security upgrades of Russian Navy and SRF nuclear weapons sites and have secured 77 percent (30 sites) of the 39 Russian Navy warhead sites and initiated security upgrades at three Russian SRF sites.

Downsizing the nuclear weapons infrastructure of the FSU remains an important activity. Since the fall of the Soviet Union, we have worked hard to reduce the potential for diversion of WMD expertise, materials, and technologies to terrorists and proliferant states. To meet this objective, we are working to redirect WMD scientists, engineers, and technicians to peaceful work and reduce WMD complexes by downsizing facilities and creating sustainable civilian alternatives. Through the Russian Transition Initiatives Program, we have engaged over 14,000 former weapons scientists at over 200 institutes across the FSU in peaceful and sustainable commercial pursuits, attracting \$162 million in private sector matching funds and over \$140 million in venture capital and other investments, created 25 new businesses in the closed cities, and facilitated the downsizing of Russia's nuclear weapons complex.

Last year, the Office of Defense Nuclear Nonproliferation established the Nuclear and Radiological Threat Reduction Task Force, which represents another important step in combating the threats posed by radiological dispersion devices or "dirty bombs." We created this task force to identify, secure, store on an interim basis, and facilitate the permanent disposition of high-risk radiological materials that could be used as a radiological dispersal device, both in the United States and overseas; and identify the most vulnerable research reactors worldwide and develop an action plan to mitigate these vulnerabilities. Working in close concert with foreign countries and the IAEA, this task force will ensure that the NNSA has the capability to address the full spectrum of radiological threats, including locating and securing vulnerable radiological materials overseas, and recovering and securing unwanted and abandoned radioactive materials within the United States that pose security and health risks.

Bolstering border security as a second line of defense is another important component of our strategy. To implement this core mission, we develop and employ nuclear detection equipment at key border crossings, airports, and ports, including major seaports or "megaports," worldwide. We also work hard to assist and train customs officials at home and abroad to detect the illicit trafficking of nuclear and radiological materials as well as identify dual-use commodities that might be used in WMD programs. Our hard work and cooperative efforts are paying dividends. For example, we have installed radiation detection equipment at 39 sites in Russia to detect, deter, and interdict the trafficking of nuclear and radioactive materials. Russia has also supplemented our cooperative border security efforts by upgrading and installing similar radiation detection equipment at many more of their prioritized border checkpoints. We maintain radiation detection equipment in more than 20 countries in the Baltics, Central and Eastern Europe, Central Asia, and the Mediterranean. We launched our Megaports Initiative at the Port of Rotterdam, which we are currently equipping with detection equipment at this international, high-traffic "megaport."

We are not alone in our efforts. The international community and recipient countries have responded with strong support to advance our mutual nonproliferation interests. The G-8 Global Partnership has committed \$20 billion over the next 10 years to work on nonproliferation issues in Eurasia. We are working cooperatively with our G-8 partners to leverage the funding that we have committed to Russia and the work in which we are involved. In another program, we are working with India and Pakistan to help them cooperatively work to find means to stop cross-border infiltration and avoid conflict.

Our cutting-edge R&D program improves the United States' ability to detect and deter WMD proliferation and strengthen nuclear treaty regimes such as the Nuclear Nonproliferation Treaty (NPT). Our R&D programs serve as the technical base that

provides operational agencies—including the DOD and the Intelligence Community—with innovative systems and technologies to meet their nonproliferation missions. For example, we have tested laser-based remote sensing systems to detect and characterize effluents from suspect WMD production facilities, and are designing miniature synthetic aperture radar sensors to fly on board unmanned aerial vehicles. Our technology-base programs yielded several radiation detection systems now being used by the Department of Homeland Security (DHS), and evaluated at the test bed that we established at the Port Authority of New York and New Jersey. We have developed and produced nuclear explosion monitoring sensor payloads for deployment on Global Positioning System (GPS) and Defense Support System satellites, began designing the next-generation of space-based sensors, and are developing new tools to lower the threshold for detecting the yield of any nuclear explosion by two orders of magnitude. We continue to seek out improved solutions to emerging proliferation problems, and to coordinate our efforts with our U.S. Government partners.

Strengthening international nonproliferation and export control regimes is another essential cornerstone of our efforts. We support U.S. nonproliferation treaties, initiatives, and agreements and work to strengthen international safeguards to detect clandestine nuclear programs and diversion of nuclear material from declared programs. By working with our international partners, we have accomplished a great deal to further the world's nonproliferation regime. Some of our recent accomplishments include Secretary Abraham's signing of the Statement of Intent on Peaceful Uses of Nuclear Energy and Nuclear Nonproliferation and Counterterrorism with Chairman Zhang Huazhu of the China Atomic Energy Authority this January in Beijing. Also in January, NNSA Administrator Brooks testified before Congress to urge prompt action on the Additional Protocol between the United States and the IAEA, to strengthen our hand in seeking other states' acceptance of strengthened international safeguards. In addition, we opened a Cooperative Monitoring Center in Amman, Jordan that will serve as a regional forum to discuss technical solutions to proliferation and other regional security problems. We are spearheading changes to Nuclear Supplier Group Guidelines to make the prevention of nuclear terrorism an explicit export control objective.

To reduce stockpiles and available quantities of nuclear materials, we are working with Russia to irreversibly blend-down at least 500 metric tons of surplus highly-enriched uranium (HEU). At the end of 2003, over 200MT had been eliminated. We are also working with our Russian counterparts to shut down the three reactors in Russia that are still producing weapons-grade plutonium, and we are coordinating with them to return Russian-origin spent fuel to Russia. We further reduce quantities of weapons-usable HEU by converting research reactors in the United States and abroad to use low-enriched uranium (LEU) and working to eliminate 174 metric tons of HEU in the United States. The Office of Defense Nuclear Nonproliferation also is working proactively and cooperatively with Libya and international partners to dismantle Libya's WMD infrastructure. Currently, we are playing a leading technical role in the support of the operation to verify the dismantlement of Libya's nuclear program, and are playing a similar role in preparing for the complete, verifiable, and irreversible dismantlement of North Korea's nuclear weapons program. In 2003, we helped remove 17 kilograms of Russian-origin HEU from Bulgaria and returned it to Russia for safe storage. We also worked with Russia and the IAEA to return approximately 14 kilograms of fresh Russian-origin HEU from Romania to Russia to be down-blended and used for civil nuclear purposes.

Our final core mission objective is to mitigate risks at nuclear facilities worldwide. To reach this goal, we are providing assistance to Russia and Eurasian countries to establish enhanced emergency response programs, and we are working cooperatively with Russia to improve the safety and security of its nuclear weapons during transportation and storage in connection with dismantlement. We are focused on improving nuclear emergency management practices worldwide by working with the IAEA and other western countries. For example, we worked to strengthen the IAEA's notification capability in the event of a nuclear emergency and are assisting Ukraine, Russia, and Japan in establishing emergency management training programs.

CHALLENGES

Preventing the proliferation of WMD materials, technology, and expertise is a major undertaking, and developing a multi-layered approach to address these threats has not been without its challenges. In implementing our nonproliferation programs, liability issues, transparency, access, and concluding contracts and agreements will remain challenges in the years ahead. Since our nonproliferation pro-

grams are cooperative in nature, the progress we make is largely dependent on complex negotiations with Russia and other countries. Consequently, we will continue to face challenges in our work, particularly in Russia. I will now discuss these challenges in more detail.

LIABILITY

Resolving liability issues with the Russians remains a key challenge. American workers and contractors must have adequate liability protection in Russia and elsewhere. We are urging the Russian government to seek quickly Duma ratification of the Cooperative Threat Reduction (CTR) umbrella agreement that contains full liability protections. CTR ratification will facilitate agreement on a number of our critical nonproliferation programs, including the construction of U.S. and Russian MOX facilities to dispose of 34 metric tons each of surplus plutonium and continuing cooperative projects under the Nuclear Cities Initiative (NCI).

TRANSPARENCY

Achieving adequate transparency is an ongoing problem for many U.S. nonproliferation initiatives with the Russian Federation. Assuring that we are, in fact, securing the materials and facilities intended has been challenging. The NNSA will continue to work both bilaterally and multilaterally to ensure that our mutual goals are met and that cooperative programs remain objective, are preventing the proliferation of WMD, and promote long-term self-sustainability.

ACCESS

Nonproliferation programs often require access to other countries' most sensitive nuclear facilities. In Russia, considerable progress has been made accessing less sensitive sites. While we have had some success, we must continue to work to gain access to Russia's more sensitive sites and facilities. A working group has been established by Secretary Abraham and Minister Rumyantsev to address this issue and is testing new procedures for access to more sensitive Minatom facilities. It goes without saying that reaching agreement on access to these sites is a major challenge and will require patience and steadfastness on our part. After access agreement is reached, we must assure that its terms are honored.

CONTRACTS AND AGREEMENTS

Finally, concluding contracts and agreements is a complex process. Even after there is agreement in principle to undertake a given nonproliferation program, actually implementing such a program requires time to bear fruit. Achieving concurrence on written agreements to move forward is often the first challenge to overcome. As a recent example, the Russian interagency must digest an agreement to return Russian-origin spent fuel back to Russia and dispose of it to reduce the amount of global HEU. While we expect this review to happen in the near future, it is indicative of the substantial efforts that both sides must undertake. After the requisite agreements are in place and agreed to by both parties, objective and realistic milestones have to be developed before any contract can be awarded, and performance metrics established to address how those milestones will be met. Overall program success is incumbent on sound fiscal stewardship, and we believe that we are taking the necessary steps to effectively maximize program success rates.

There are a number of steps we have undertaken to meet these challenges. First, the Secretary of Energy has developed a close relationship with the acting Minister of Atomic Energy and overcoming these challenges in the nonproliferation arena has been a priority. Secretary Abraham intends to continue to work constructively with the acting Minister or his successor. Second, at the working level, experts from our programs leverage over a decade of experience and relationships with their Russian counterparts to resolve contentious issues through sustained negotiations.

The subcommittee's support is also critical to overcoming these challenges and to the overall success of our programs. Although I am optimistic that we will be able to work through these challenges, your continued support will play an important role as we create and implement solutions to overcome current obstacles.

CONCLUSION

To summarize, I would again draw your attention to the progress our program has made in recent years and the acceleration with which we have expanded our activities to meet the complex and unpredictable security threats of our time. In doing so, we have strengthened the security of our Nation and are making the world a safer place. Working in concert with other U.S. Government agencies, the Office

of Defense Nuclear Nonproliferation will continue to promote high-level political commitment among our cooperative country counterparts to establish an effective, comprehensive capability that can proactively react to an evolving threat environment. Our focus is on stemming the proliferation of WMD materials, technology, and expertise, and we will continue to work diligently and responsibly to counter that threat.

Mr. Chairman and members of this subcommittee, this concludes my prepared statement. I would be pleased to answer any questions that you and members of this subcommittee may have.

Senator ROBERTS. Paul, thank you very much for your statement.

We now hear from Ms. Lisa Bronson, who is the Deputy Under Secretary of Defense for Technology Security Policy and Counterproliferation. Lisa, the same goes for you as it did for Paul. Please feel free to summarize and please be assured that virtually every verb, adjective, and adverb will be in the record.

Please proceed and thank you for coming.

STATEMENT OF LISA BRONSON, DEPUTY UNDER SECRETARY OF DEFENSE FOR TECHNOLOGY SECURITY POLICY AND COUNTERPROLIFERATION

Ms. BRONSON. Thank you. Good morning, Mr. Chairman, Senator Reed. Thank you for inviting me to discuss the DOD CTR program. My written testimony submitted for the record reviews some of the important work accomplished during the last 2 years. I will not repeat it here this morning.

Mr. Chairman, the achievements noted in my written testimony represent a reduction in the threat posed by the former Soviet WMD stockpile to the United States and its allies. Threat reduction has always been a key measure of how well CTR is doing. Another measure is how well we ensure that the taxpayers are getting value for the money they invest in nonproliferation through the CTR program.

The Heptyl and Vodkinsk situations, which involve significant losses in CTR investments, reminded us that there is a third important measure of success for this program. That is the extent to which our partner countries truly cooperate in CTR.

In his February 4, 2004, testimony before the full committee, Secretary Rumsfeld was asked why the President's fiscal year 2005 CTR budget request for \$409.2 million is lower than that requested in fiscal year 2004. The question implies that the annual budget request is the single measure of progress and the single indicator of commitment. It is an important metric, but there are three others: actual threat reduction, value for U.S. investments, and increasing the recipients' stake in the success of specific projects. Measured against the aggregate of these four metrics, the CTR program continues to be a vital component in the U.S. Government's national security strategy.

My written testimony describes the underlying rationale for our budget request. Mr. Chairman, we have reported to you in detail on the \$106 million loss suffered by CTR in the so-called "Heptyl situation," in which Russia did not tell us that liquid rocket fuel destined for a CTR-constructed neutralization facility had been diverted to commercial uses. We have also had extended discussions about the Vodkinsk situation, in which CTR invested nearly \$100 million in designs and site preparation for a solid rocket fuel elimi-

nation facility that was abruptly blocked by local Russian authorities.

These two situations delivered a severe blow to the credibility of our Russian partners and caused us to rigorously review how we do business. My written testimony describes our management changes in detail.

Mr. Chairman, it could be argued that the array of management changes implemented over the past 2 years risks a slowdown in CTR project execution. With the recent losses in Russia, we had no choice. We are carefully balancing our three goals of threat reduction, value for taxpayers' investment, and increased participation by partner countries. In some cases, simultaneous achievement of all three goals creates extra steps in project execution. In our judgment, this results in a better program.

During the past 2 years we have significantly improved our responsiveness to Congress. We have resolved the backlog of reports and notifications. Some 24 reports and notifications have been delivered in the past 2 years. For the first time since the inception of the requirement, the CTR annual report was delivered on time in early February of this year.

In March 2003, we began a 6-month comprehensive project by project review of the CTR program, building on the overall administration review conducted in 2001. This rescoping review for Russia revalidated the contribution of all project areas to current threat reduction areas, with some important adjustments, described in detail in my written testimony.

The importance of continuing elimination of submarine-launched ballistic missiles (SLBMs) and intercontinental ballistic missiles (ICBMs), as well as the silos and launchers from which they are removed, was revalidated. However, CTR will cease to regrade the silo sites once current commitments are fulfilled. This function will be turned over to Russia. We concluded that silo regrading, while an important safety matter, did not contribute to CTR's core threat reduction mission and could reasonably be assumed by Russia.

CTR will continue to de-fuel nuclear-powered ballistic missile submarines (SSBNs), seal the reactors, and remove and eliminate the missile launcher components. However, the practice of cutting up the bows and sterns will be turned over to Russia. We concluded that the work on bows and sterns did not contribute to threat reduction because it is not essential to the disabling of the submarine as a whole and elimination of the launcher compartment. In addition, this is an area where Russia can reasonably be expected to increase its stake in the success of this project.

The rescoping review for Russia will ultimately affect approximately \$185 million. These funds will be reallocated to other CTR projects.

As a result of our review of Ukrainian projects, we decided to cancel a CTR project that would have built a hydro-mining system to remove solid fuel from previously demilitarized SS-24 missile stages and convert the byproduct to mining explosives that would be turned over to Ukraine for sale. This project was significantly over budget and presented further cost escalation risks. Technical aspects of safely storing the propellant byproduct and converting it

into mining explosives were also unresolved after significant expense.

All warheads and proliferable components have been removed from the 163 rocket motors, which are in safe storage built by CTR. Accordingly, the threat from these missiles has already been eliminated. We have offered Ukraine an alternative, less risky means of disposing of these motors. After understandably tough consultations, we recently received an expression of interest from Kiev.

Overall, we assess that over \$100 million in CTR activities previously programmed for Ukraine did not make a direct contribution to threat reduction. These funds will be reallocated to other CTR activities in Ukraine, including the bio-weapons and WMD proliferation prevention project areas.

Mr. Chairman, reviewing, revalidating, and rescoping these project goals in Russia and Ukraine will help ensure that CTR remains focused on current threat reduction priorities. Our adjustments to project areas are designed to ensure that CTR is returning real nonproliferation value for the taxpayers' investments. Our insistence on increased Russian participation in certain ongoing projects is directed toward increasing Russia's stake and accountability in the CTR program.

Of course, none of these works can go forward until we have completed the fiscal year 2004 congressional notification requirement of section 1304—Mr. Chairman, excuse me for a moment. Sorry, I lost my place. Let me begin again.

Senator ROBERTS. I do that a lot. You go right ahead.

Ms. BRONSON. The pages stuck together. My apologies.

Senator ROBERTS. You at least admit it. We do not admit it. [Laughter.]

Ms. BRONSON. Mr. Chairman, we estimate that there are approximately 40 institutes that were part of the Soviet biological weapons program. These institutes often contain extensive collections of dangerous pathogens. They face threats from within—underemployed experts—and from without—poorly secured facilities and weak inventory controls.

We address this former Soviet biological weapons threat by balancing carefully the risks of proliferation against Russia's compliance with international commitments. In Uzbekistan, Kazakhstan, and Georgia, CTR's biological weapons proliferation activities continue. In addition, an agreement to support Biological Weapons Proliferation Prevention (BWPP) work in Ukraine is nearing completion, and we hope to expand this project area to the Kyrgyz Republic later this year.

Of course, none of the BWPP work can go forward with fiscal year 2004 funds until the congressional notification requirements of section 1304 of the National Defense Authorization Act are met. I do not anticipate problems meeting this requirement for Kazakhstan, Ukraine, Uzbekistan, and Georgia.

However, Russia poses unique challenges in this area. We continue to be concerned with Russia's compliance with the Biological Weapons Convention. Keeping Russia's bioweapons technology, pathogen collections, and expertise out of terrorist hands strengthens U.S. national security. However, those national security benefits need to be carefully weighed against the inherent risks of en-

agement. The risk of misuse can never be reduced to zero, but we are using policy and implementation strategies to minimize this risk and allow us to focus on the goal of biological weapons proliferation prevention.

In conclusion, Deputy Secretary Wolfowitz wrote his Russian counterparts in mid-2003 to urge their prompt action on a pending CTR legal agreement. He told these senior officials that, "We are reviewing all CTR project areas for consistency with U.S. non-proliferation goals, as well as good stewardship of U.S. resources." Secretary Wolfowitz's message captures what we have done with CTR since the Heptyl and Vodkinsk situations and through the course of the rescoping review.

CTR has been reducing the threat of WMD since it began over a decade ago. We have revalidated that goal and the contribution of our activities to that goal in an exhaustive review. However, we have also been reminded that, even if we protect Americans from the threat of WMD proliferation, we must constantly improve our processes to ensure that Americans receive true value for their investment.

One of the recent lessons in this regard is that the original concept of a cooperative program pays dividends by increasing our partners' stake in the success of the assistance activities they receive. Reemphasizing the "C" in "CTR" is an important way to keep this key U.S. threat reduction program on solid footing in its second decade.

Thank you, Mr. Chairman. I would be happy to respond to any questions you might have.

[The prepared statement of Ms. Bronson follows:]

PREPARED STATEMENT BY LISA BRONSON
COOPERATIVE THREAT REDUCTION PROGRAM

Mr. Chairman, Senator Reed, thank you for inviting me to discuss the Department of Defense (DOD) Cooperative Threat Reduction (CTR) program. It has been 2 years since this subcommittee received testimony on the CTR program, when Assistant Secretary J.D. Crouch II appeared before you on March 6, 2002. Today, I would like to review some of the important work accomplished since then.

- In December 2003, the Fissile Material Storage Facility at Mayak, Russia—some 7 years in construction—was completed and certified by Russian regulators. The Mayak project will consolidate and securely store more than 25 metric tons of Russian weapons-origin plutonium.
- In March 2003, construction on the Chemical Weapons Destruction Facility (CWDF) at Shchuch'ye began after 11 years of planning and negotiation. This facility will destroy all of Russia's nerve agent inventory, thus eliminating a significant proliferation concern. On March 18, 2003, Russia formally committed to destroy all of its nerve agent weapons at Shchuch'ye.
- As of December 31, 2003, six countries have pledged \$69 million to CWDF infrastructure, helping to ensure that this key project can begin operations on schedule.
- In February 2003, Russia signed the Nuclear Weapons Storage Site Security Protocol, granting CTR unprecedented access to help consolidate and secure decommissioned nuclear warheads.
- DOD completed vulnerability assessments for six of these sites and began designing comprehensive security upgrades for each. The Russian Ministry of Defense (MOD) will shortly designate the next 10 sites for security enhancements. In addition, CTR has procured and transferred to the MOD 123 "Quick Fix" fencing and sensors sets for installation at nuclear weapons storage sites, including the 12 noted above. The Quick Fix sets are designed to provide interim security upgrades to individual weapons bunkers. In all, DOD expects to provide comprehensive security upgrades at more than 32

long-term nuclear weapons storage sites, including Quick Fix and more permanent measures.

- In 2003, Azerbaijan and Uzbekistan signed legal agreements with us to provide the foundation for our Weapons of Mass Destruction-Proliferation Prevention Initiative (WMD-PPI). Kazakhstan and Ukraine are ready to sign similar agreements. Georgia and Kazakhstan supplied us with dangerous pathogen samples as our Biological Weapons Proliferation Prevention (BWPP) program moved forward.
- In May 2003, we began destroying rail-mobile intercontinental ballistic missile (ICBM) launchers and missiles in Russia.
- In Autumn 2003, we delivered 60 small-arms training sets and 1,200 hand-held radios to support nuclear weapons storage security forces at all 60 sites we believe to be active or used for training.
- In December 2003, we completed and commissioned systems to enhance security at the Kizner and Planovy chemical weapons storage sites in Russia.

HOW IS PROGRESS MEASURED?

Mr. Chairman, the achievements noted above represent a reduction in the threat posed by former Soviet WMD to the United States and its allies. Threat reduction has always been a key measure of how well CTR is doing. Another measure is how well we ensure that the taxpayers are getting value for the money they invest in nonproliferation through the CTR program. The Heptyl and Votkinsk situations, which involved significant losses in CTR investments, reminded us that there is a third important measure of success for this program. This is the extent to which our partner countries truly “cooperate” in CTR. CTR has never been traditional foreign assistance, and increasing the stake that recipient countries have in the execution of CTR projects has proven an essential measure of success.

In his February 4, 2004, testimony before the full committee, Secretary Rumsfeld was asked why the President’s fiscal year 2005 CTR budget request for \$409.2 million is lower than the fiscal year 2004 request (\$450.8 million). There are a number of reasons for the modest decrease. The question implies that the annual budget request is the single measure of progress and the single indicator of commitment. It is an important metric. But there are three others: actual threat reduction, value for U.S. investments, and increasing recipients’ stake in the success of specific projects. Measured against the aggregate of all four metrics, the CTR program continues to be a vital component of the U.S. Government’s national security strategy. The President and his administration remain firmly committed to his 2002 pledge of \$10 billion over 10 years for nonproliferation and threat reduction programs in the former Soviet Union (FSU), including—but not limited to—CTR. Yearly programmatic requirements mean that some annual requests, as for fiscal year 2005, will be slightly below the \$1 billion average; others will be slightly above.

It is important to acknowledge that, of the 62 CTR program areas Congress has funded since the program’s inception, 51 of those areas are now complete. This reflects the large amount of former Soviet nuclear weapons inventory and infrastructure that CTR has helped eliminate or secure. Many of CTR’s original array of projects are reaching completion. These include projects that were capital-intensive in their early construction phases. CTR’s fiscal year 2005 program plan includes only two “infrastructure-heavy” projects: the Shchuch’ye chemical weapons destruction project already under way, and infrastructure supporting nuclear weapons site security enhancement projects. Newer areas of CTR focus—biological weapons nonproliferation and WMD-PPI—do not require capital-intensive construction projects to achieve their threat reduction goals.

The fiscal year 2005 budget request for Strategic Offensive Arms Elimination in Russia—which accounts for strategic systems work—is the same as it was for fiscal year 2004: \$58 million. No money is requested for this capital-intensive work in Ukraine for fiscal year 2005 because our threat reduction goals have been accomplished and we have sufficient funds to eliminate the 163 remaining SS-24 solid rocket motors by detonation or burning, pending Government of Ukraine agreement on the technical approach and process.

The change from fiscal year 2004 to fiscal year 2005 is caused primarily by the initiation of construction at the Shchuch’ye CWDF. Construction of the CWDF began in 2003, requiring a boost in fiscal year 2003 and fiscal year 2004 spending. Consistent with similar construction projects, customized, long-lead equipment that will be inside the facility was ordered in 2003 and more will be ordered in 2004. Thus, the construction spending plan for the CWDF, adjusted for delayed commencement, always included high spending at the onset of the project. Decreased

spending on Shchuch'ye, reflected in the fiscal year 2005 CTR request, tracks with completion of the capital-intensive construction phase, not a decrease in commitment. In fact, the actual schedule to complete Shchuch'ye has been accelerated in accordance with President Bush's direction: we plan to complete construction by February 2007 and transfer custody to Russia by September 2008.

The authority Congress has granted to the President to waive the conditions on the Shchuch'ye project has been critical to our progress on this essential non-proliferation and threat reduction project. We urge Congress to make that waiver authority permanent beginning in fiscal year 2005, so that we can continue to work with Russia both to resolve the concerns underlying the congressional conditions on the Shchuch'ye projects and to allow the earliest possible destruction of Russia's nerve agent.

The aggregate fiscal year 2005 request belies the number of important new CTR projects that will move forward without large capital infrastructure investments. These include the WMD-PPI and projects designed to address potential biological weapons proliferation. A summary of the fiscal year 2005 budget request is attached.

MANAGEMENT CHALLENGES

Mr. Chairman, we have reported in detail to you and other committees on the \$106 million loss suffered by CTR in the so-called "Heptyl situation," in which Russia did not tell us that liquid rocket fuel destined for a CTR-constructed neutralization facility had been diverted to commercial uses. We have also had extended discussions about the Votkinsk situation, in which CTR invested nearly \$100 million in designs and site preparation for a solid rocket fuel elimination facility that was abruptly blocked by local Russian authorities. Although the two situations were very different, they collectively represented a severe blow to the credibility of our Russian partners and caused us to rigorously review how we do business.

- We asked the DOD Inspector General (IG) to review CTR from top to bottom. The last of the IG's four reports that responded to this request was issued last month. The IG's work has been instructive and our staffs ultimately developed such close working relationships that the IG accompanied one of the DOD teams that meet semi-annually with Russian counterparts.
- In 2002, we did a baseline risk assessment of all CTR projects for weaknesses similar to the Heptyl situation—reliance on good faith Russian promises or assumptions. Today, legal commitments have replaced good faith obligations whenever CTR-provided infrastructure or equipment is used to carry out elimination projects.
- Six of these new agreements already have been signed. Based on our "post-heptyl" approach, we are awaiting signature of two additional agreements by the Russian MOD before any new work on the associated projects (enhancement of additional nuclear warhead storage sites and nuclear warhead rail transport car replacement) will be initiated. New legal commitments are introduced as needed to respond to new assistance requests.
- Each new project proposal is considered only after methodical analysis of "Heptyl-like" risks. This is the potential for the recipient country to use CTR assistance for purposes other than those intended. If the risk can be mitigated by legal and implementation strategies, then the proposal can be reviewed on its merits. If the risk cannot be mitigated the project will not be pursued.
- The Under Secretary of Defense for Acquisition, Technology, and Logistics created the office of the Deputy Assistant to the Secretary of Defense (Chemical Demilitarization and Threat Reduction (CD&TR)) with special oversight over CTR implementation. CD&TR and the Defense Threat Reduction Agency (DTRA), implemented several management changes to reduce our risks. These changes follow DOD acquisition management processes to promote a disciplined, business like approach to mitigate risk:
 - First is the adoption of the Milestone Decision Authority (MDA) system, which is modeled after the Defense Acquisition Board process. The MDA is the one person responsible for balancing requirements with risks, and approving and overseeing cost, schedule, and performance baselines.
 - Second, we evaluated all projects against cost, schedule, and political risk, and assigned the appropriate level MDA for each project. Each project will have a baseline approved and monitored by a MDA.
 - Third, we adopted the Integrated Product Team (IPT) system to include all the stakeholders in the implementation process, so tradeoffs between risk and requirements can be made in a cooperative and working atmosphere.

- Fourth, we adopted a new reporting system to alert higher management of any issues related to cost, schedule, and performance.
- Finally, we are opening up more overseas offices in the FSU to allow for better onsite management. These include offices in Tblisi, Georgia to support biological weapons proliferation prevention, Perm, Russia for solid ICBM elimination, and Shchuch'ye, Russia for chemical weapons destruction. Other offices may be opened up as our work expands.

Mr. Chairman, it could be argued that the array of management changes implemented over the past 2 years risks a slow down in CTR project execution. With the recent losses in Russia, we had no choice. We are carefully balancing our three goals of threat reduction, value for taxpayers' investment, and increased participation by partner countries. In some cases, simultaneous achievement of all three goals creates extra steps in program execution. Our judgement is that this results in a better program. For example:

- The program of semi-annual "executive reviews" with Russian agencies responsible for CTR projects has been a vehicle to streamline communication, if not actually expedite projects. The executive reviews have transformed the way we do business with Russia by putting a premium on regularized transparency, accountability and open dialogue. Since July 2002, five executive reviews have been held and our teams report that their Russian counterparts have been progressively more responsive and better prepared.
- In 2003, the Russian Aviation and Space Agency (RASA) volunteered to pay for refurbishment of three open-burn stands—potentially a \$65 million expense—to help keep the mobile missile elimination project area on track after the loss at Votkinsk. RASA also readily agreed to new legal commitments we proposed to limit our risks on other aspects of the mobile missile elimination project area. This was the first time Russia independently increased its stake in a threat reduction project's success.
- We are also improving our business practices within the U.S. In the past, the complicated process of releasing appropriated CTR funds for actual obligation took over 180 days. This involved certification or waiver of eligibility for the recipient country and congressional notification. For 2004 funds, a certification or waiver was executed for most CTR countries, including Russia, on November 7, 2003, only 37 days into the fiscal year. The waiver authority has proven an important threat reduction tool with respect to Russia, and as the waiver authority expires at the end of fiscal year 2005, we will urge that Congress make this authority permanent in the next legislative cycle (2006).

Finally, we have significantly improved our responsiveness to Congress. During the past 2 years, CTR policy and implementation staff have worked very hard to resolve a backlog of reports and notifications—some 24 reports and notifications have been delivered. For the first time since the inception of the requirement, the CTR annual report was delivered on time in early February of this year. Congressional oversight of the CTR program is important and welcomed. I estimate that the CTR policy and implementation staff spent an average of 5,300 hours per year during the past 3 years responding to reporting requirements and audits. We appreciate the move by Congress to consolidate several of those reporting and notification requirements into a single "CTR Annual Report." This allows us to provide the same amount of information in a more efficient manner.

THE FIRST PROJECT-BY-PROJECT REVIEW

Since September 11, 2001, DOD has refined the CTR program to ensure that it effectively addresses new threats associated with the global war on terrorism, even as we continue to pursue the program's longstanding goals and project activities. In March 2003 we began a 6-month, comprehensive, detailed, project-by-project review of the CTR program, building on the overall administration review of non-proliferation and threat reduction assistance in 2001.

We evaluated the Strategic Offensive Arms Elimination and Nuclear Weapons Transportation/Security project areas against several criteria: actual contribution to threat reduction, support to national strategy and the global war on terrorism, best value for taxpayers' money, and the extent to which our Russian and Ukrainian partners have had an increasing stake in, and responsibility for, a project's success. We chose these project areas because they included a number of activities that had been under way for many years—certainly prior to the changes in U.S. strategy brought on by the September 11 attacks. We did not review the chemical weapons

destruction, BWPP, or WMD-PPI project areas because they are more recent projects that are clearly in line with our current nonproliferation priorities.

The review resulted in the revalidation of a majority of Strategic Offensive Arms Elimination and Nuclear Weapons Transportation/Security projects in Russia including the rescoping of 20 projects. All current contractual and other commitments in Russia will be fulfilled. The review resulted in the revalidation of our general approach in Ukraine with extensive refinements to certain projects.

We reviewed Ukrainian and Russian projects separately because of a significant difference in key acquisition milestones. The Ukraine review was completed in March 2003, approved by the U.S. interagency in April and briefed to Ukrainian officials in May. The Russia review was completed in August 2003, approved by the interagency in October and briefed to Russian officials in November.

Russia

The rescoping review for Russia revalidated the contribution of all project areas to current threat reduction efforts, with some important adjustments.

- Liquid-fuel missiles: The importance of continuing elimination of submarine-launched ballistic missiles (SLBMs) and ICBMs as well as the silos and launchers from which they are removed was revalidated. However, CTR will cease to regrade silo sites once current commitments are fulfilled. This function will be turned over to Russia. We concluded that silo regrading, while an important safety matter, did not contribute to CTR's core threat reduction mission and could reasonably be assumed by Russia.
- Solid-fuel missiles: Most of the activity in this area is yet to begin, as mobile SS-24 and SS-25 missiles are just beginning to be decommissioned. The importance of eliminating these strategic systems, as well as their launchers, as rapidly as Russia will turn them over was reaffirmed. However, CTR will refrain from eliminating a number of SS-N-20 missiles that have already been decommissioned until Russia turns over additional nuclear-powered ballistic missile submarines (SSBNs) for dismantling. As a matter of policy, CTR always insists that launchers (silos, mobile launchers or SSBN launch compartments) be turned over for elimination if we are to eliminate the associated missiles. Eliminating the missiles alone could facilitate modernization of overall Russian force structure.
- SSBN dismantlement: CTR will continue defueling SSBNs, sealing the reactors, and removing and eliminating the missile launcher compartments. However, the practice of cutting up the bows and sterns will be turned over to Russia. We concluded that the work on bows and sterns did not contribute to threat reduction because it is not essential to the disabling of the submarine as a whole and elimination of the launcher compartment. In addition, this is an area where Russia can reasonably be expected to increase its stake in the success of this project area.
- Spent Nuclear Fuel. CTR will continue defueling SSBN reactors and securing the fuel in specially designed casks. However, the project to refurbish a building for long-term storage of the casks at the Mayak nuclear complex will be suspended once designs are complete. There is enough storage space at the shipyards where SSBNs are dismantled to temporarily store these casks pending final disposition by the Russian Federation. CTR is prepared to improve security at the shipyard storage areas if necessary. The Mayak refurbishment project was judged to be an unnecessary infrastructure requirement that did not contribute to threat reduction.
- Nuclear Weapons Security/Transportation. We revalidated the value of supporting Russian transportation of warheads to secure, central storage sites with improved inventory controls. However, CTR will turn over to Russia responsibility for the personnel reliability and emergency response support activities under this project area. These activities will be at low cost to Russia, and provide an opportunity to increase Moscow's stake in the success of this project. In addition, CTR will continue transferring responsibility for certain nuclear weapons storage site security projects to the Department of Energy (DOE). The DOD and DOE have worked closely on these complimentary efforts over the past 2 years. Among other issues, storage sites more closely associated with DOE activities were shifted to the DOE for security improvements. These sites were often sites linked to Russian naval facilities.

The rescoping review for Russia will ultimately affect approximately \$185 million. These are funds that will be reallocated to other CTR projects, or that will shift to DOE through the transfer of certain nuclear weapons storage security responsibilities.

Ukraine

As a result of our review, we decided to cancel the CTR project that would have built a hydro-mining system to remove solid fuel from previously demilitarized SS-24 missile stages and convert the byproduct to mining explosive that would be turned over to Ukraine for sale. The project was significantly over budget and presented further cost escalation risks. Technical aspects of safely storing the propellant by-product and converting it into mining explosives also were unresolved after significant expense. All warheads and proliferable components have been removed from the 163 rocket motors, which are in safe storage built by CTR. Accordingly, the threat from these missiles has been eliminated. We have offered Ukraine an alternative, less risky means of disposing of these motors. After understandably tough consultations we recently received an expression of interest from Kiev.

We also cancelled CTR projects in Ukraine that would have neutralized fuel from air-to-surface missiles, and destroyed liquid rocket fuel tank farms and concrete aprons where strategic bombers once sat on alert. We concluded that these projects no longer supported CTR's central threat reduction and nonproliferation mission because this infrastructure, in its current form, could not be used for any threatening activity or proliferated outside Ukraine. The requirements to eliminate this infrastructure are not complex or expensive, and were judged readily assumable by Ukraine. We revalidated projects to destroy strategic bombers still in Ukraine, as well as several old nuclear warhead storage bunkers, the designs for which could be exploited.

Overall, we assessed that over \$100 million in CTR activities previously programmed for Ukraine did not make a direct contribution to threat reduction. Of that total, approximately \$30 million had already been appropriated. These funds will be reallocated to other CTR activities in Ukraine, including the biological weapons and WMD proliferation prevention project areas.

Mr. Chairman, reviewing, revalidating, and rescoping these project goals in Russia and Ukraine will help ensure that CTR remains focused on current threat reduction priorities. Our adjustments to project areas are designed to ensure that CTR is returning real nonproliferation value for the taxpayer's investments. Our insistence on increased Russian participation in certain ongoing projects is directed toward increasing Russia's stake and accountability in the CTR program.

BIOLOGICAL WEAPONS PROLIFERATION PREVENTION

Mr. Chairman, we estimate that there are approximately 40 institutes that were part of the Soviet biological weapons program. These institutes often contain extensive collections of dangerous pathogens. They face threats from within—under-employed experts; and from without—poorly secured facilities and weak inventory controls. We address this former Soviet biological weapons threat by balancing carefully the risks of proliferation against Russia's compliance with international commitments. In Uzbekistan, Kazakhstan, and Georgia, CTR's BWPP activities continue. In addition, an agreement to support CTR BWPP work in Ukraine is near completion and we hope to expand this project area to Kyrgyz Republic this year. CTR helps to reduce the biological weapons proliferation threat by:

- Consolidating and enhancing the security of dangerous pathogen collections at biological institutes to help prevent their theft, diversion, or accidental release;
- Eliminating infrastructure, equipment, and facilities previously used to perform biological weapons related research, testing, and production;
- Engaging former biological weapons scientists in peaceful pursuits by refocusing research priorities and projects, increasing transparency at biological institutes, promoting higher standards of ethical conduct, preempting a potential "brain drain" of scientists to rogue states and terrorist groups, and providing U.S. access to scientific expertise and pathogens to improve public health and enhance preparedness against biological threats;
- Implementing a Biological Weapons Threat Agent Detection and Response (TADR) project in Central Asia and the caucasus to access medical intelligence, consolidate pathogen collections into central labs, modernize diagnostic capabilities to minimize need for pathogen retention at vulnerable field stations, and develop a network of trained, ethical scientists to prevent, deter, and contain either a naturally occurring outbreak or a bio-terrorist attack.

Of course, none of this work can go forward with fiscal year 2004 funds until the congressional notification requirements of section 1304 (National Defense Authorization Act for Fiscal Year 2004) are met. I do not anticipate problems meeting this requirement for Kazakhstan, Ukraine, Uzbekistan, and Georgia. Outside Russia, co-

operation on BWPP activities has been very good. We have had prompt agreement on the legal architecture to cover this CTR project area. In addition, a number of countries readily provided samples of dangerous pathogen strains native to their regions. DOD management and technical teams made nine trips in support of BWPP overall during 2003. Our teams traveled to Kazakhstan and Uzbekistan to discuss anticipated projects and toured three Uzbek and two Kazakh institutes to record observations and photographs to support future work. These teams also reviewed the ongoing threat and vulnerability analyses of these institutes and evaluated recommendations for emergency security upgrades proposed by the CTR contractor on these projects.

Russia poses unique challenges in this area:

- We continue to be concerned with Russia's compliance with the Biological Weapons Convention.
- We are also concerned about the solvency of certain Russian laboratories being assisted by CTR.
- Russia has still not provided a sample of its altered anthrax strain. A research grant was made with the clear understanding that the altered anthrax strain would be provided to the U.S. The Russian government has obstructed the release of this strain. This is inconsistent with the spirit of cooperation against the bioterrorism threat to which Presidents Bush and Putin agreed in November 2001.
- We are also concerned that Russia has not been more forthcoming on developing an efficient legal architecture through which to provide CTR assistance. This assistance is currently provided through the International Science and Technology Center agreement negotiated by the Department of State. While it is possible to carry on CTR activities in this manner, it is inconsistent with CTR's strategy of using project-related implementing agreements.

Sound implementing agreements are one of the ways we manage program risks that are inherent in CTR's work. We also took several important steps in 2002 and 2003 to manage the proliferation risks associated with Russia's collections of pathogens and biological infrastructure.

- In September 2002, the administration adopted interagency guidelines for U.S. efforts to engage the former Soviet biological weapons community, which take into account our concerns about Russia's failure to fully comply with its Biological Weapons Convention commitments. These guidelines help U.S. agencies support nonproliferation policy choices by providing project evaluation and selection criteria and by establishing a coordination mechanism for agencies involved in bio-related assistance to Russia.
- We refined and added to the internal DOD review mechanism that is designed to mitigate risks associated with Cooperative Biological Research (CBR) projects. A new CBR project proposal is reviewed by a DOD Advisory Board consisting of biodefense, counterproliferation, technology security and intelligence experts. Proposals are studied for dual-use potential, scientific and technical merit, relevance to national strategy, risk of diversion, and feasibility. These projects are also scrutinized using the MDA review process.
- The DTRA and the Department of the Army concluded a memorandum of understanding in January 2004 that will help ensure a supply of seasoned U.S. personnel to support CTR's cooperative biological research program. These personnel, under the auspices of the U.S. Army Medical Research Institute of Infectious Disease (USAMRIID) will help to bring western standards of research transparency and conduct to the former Soviet biological weapons community. The experience of the USAMRIID personnel also helps limit the risk of CTR assistance being surreptitiously diverted for purposes inconsistent with international law.

Keeping Russia's biological weapons technology, pathogen collections, and expertise out of terrorist hands strengthens U.S. national security; however, those national security benefits need to be carefully weighed against the inherent risks of engagement. The risk of misuse can never be reduced to zero, but we are using policy and implementation strategies to minimize this risk and allow us to focus on the goal of BWPP.

WEAPONS OF MASS DESTRUCTION-PROLIFERATION PREVENTION INITIATIVE

The WMD-PPI is designed to address the vulnerability of the FSU's porous borders to WMD smuggling. DOD intends to build capabilities of Kazakhstan, Azerbaijan, Uzbekistan, and Ukraine to stem the potential proliferation of WMD.

During 2003, the CTR staff began building the necessary legal framework for assistance to the four WMD-PPI recipient governments. Much progress has been made, with agreements signed between the DOD and Azerbaijan in January 2004, and between the DOD and Uzbekistan in October 2003. Ukraine has notified us that it is ready to sign, and we are in final negotiations with Kazakhstan. Discussion of requirements with these recipients is also at a mature stage, and obligation of funds will begin this year. We will provide equipment, training, and other support to help develop self-sustaining capabilities to prevent the trafficking of WMD materials across recipients' borders. WMD-PPI is being implemented in close coordination with other U.S. agencies to ensure it complements ongoing government assistance projects.

Our plans include providing Uzbekistan the ability to detect radiological materials at key border crossings. This project area will be designed to transition into the larger DOE "Second Line of Defense" program once DOE is better positioned to assume responsibility. This activity helps WMD-PPI leverage pre-existing relationships in Uzbekistan during a period of increased DOD activity in the area.

A key element of WMD-PPI will be a Caspian Sea WMD maritime interdiction project. We will provide surveillance radars and boarding and maritime interdiction equipment, to include small vessels, to Azerbaijan and Kazakhstan to build their capabilities to police their own borders against illicit WMD trafficking. An essential aspect of this project will be inclusion of WMD-related training both for operation of the equipment as well as follow-on maintenance requirements. This is a capabilities-based WMD non-proliferation activity: CTR's goal is to do what is necessary to build the capability, and then eventually turn it over to Azerbaijan and Kazakhstan to execute as their contribution to the global war on terrorism and WMD. Our initial plan calls for a 5-year project timeline to create the necessary capabilities.

In Ukraine, WMD-PPI will assume a larger place, along with the BWPP, now that strategic infrastructure projects have been cancelled or wrapped up more quickly. Notional plans include building Ukrainian capabilities to detect and interdict smuggled radiological materials in the Transnistria region.

EXPANDED AUTHORITY

The administration appreciates the new authority granted the President to use up to \$50 million annually in existing CTR appropriations outside the FSU. Section 1308 of the National Defense Authorization Act for 2004 provides this important flexibility in the global war on terrorism. Enactment of this provision was a truly significant modernization of CTR's basic authorities. It allows our important work to go forward while improving readiness for a variety of contingencies in the global war on terrorism where DOD might bring special non-proliferation expertise to bear. On February 11, the President called for the expansion of the G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, of which CTR is an important part, to address WMD proliferation threats worldwide. He specifically mentioned retraining WMD scientists and technicians in countries like Iraq and Libya, and the need to secure and eliminate WMD and radiological materials worldwide. The ability to use CTR outside the FSU is an important tool to help realize the President's proposal; we urge Congress to maintain the new authority.

CONCLUSION

Mr. Chairman, Deputy Secretary Wolfowitz wrote his Russian counterparts in mid-2003 to urge their prompt action on a pending CTR legal agreement. He told these senior officials that "we are reviewing all CTR project areas for consistency with U.S. nonproliferation goals as well as good stewardship of U.S. resources. The amendment we have requested is reasonable and will facilitate the important cooperative nonproliferation work DOD has undertaken . . . through the CTR program."

Dr. Wolfowitz's message captures what we have done with CTR since the Heptyl and Votkinsk situations, and through the course of the rescoping review. CTR has been reducing the threat of WMD since it began over a decade ago. We have revalidated that goal and the contribution of our activities to that goal in an exhaustive review. However, we have also been reminded that even as we protect Americans from the threat of WMD proliferation, we must constantly improve our processes to ensure that Americans receive true value for their investment. One of the recent lessons in this regard is that the original concept of a "cooperative" program pays

dividends by increasing our partners' stake in the success of the assistance activities they receive. Re-emphasizing the "C" in CTR is an important way to keep this key US threat reduction program on solid footing in its second decade.

ATTACHMENT

FISCAL YEAR 2005 BUDGET REQUEST

Russia: Strategic Offensive Arms Elimination (SOAE)

The fiscal year 2005 budget request includes \$58.5 million for SOAE—unchanged from fiscal year 2004. SOAE assists Russia in eliminating strategic delivery systems and infrastructure. One of the larger project areas under SOAE relates to Solid Propellant ICBM/SLBM and Mobile Launcher Elimination, where \$29.1 million is requested for fiscal year 2005. Other funds eliminate SLBMs and liquid-fueled ICBMs and their launchers. The program supports placement of spent naval reactor fuel into casks for long term storage, destruction of the launcher section and sealing of the reactor compartment.

Russia: Nuclear Weapons Storage Security (NWSS)

CTR's NWSS program assists Russia with safe and secure storage for nuclear warheads. We requested \$48.6 million in the fiscal year 2005 budget for this program. All of the funds are directed toward the Site Security Enhancements project, which provides urgently needed security enhancements to the MOD nuclear weapons storage sites and select temporary transshipment points for movement of deactivated warheads. DOE provides comprehensive security enhancements to storage sites on all Russian Navy and some Strategic Rocket Forces (SRF) bases. These activities are closely coordinated with DOE and other U.S. agencies.

Russia: Nuclear Weapons Transportation Security (NWTs)

We have requested \$26.3 million for the NWTs program, which will provide safe and secure transport of approximately 1,500 nuclear warheads from deployed sites to dismantlement or enhanced security storage sites. This is a \$3.1 million increase over the fiscal year 2004 budget. This increase reflects an anticipated increase in railroad shipping tariffs and a need to replace aging warhead cargo railcars.

Russia: Fissile Material Storage Facility (FMSF) Construction

In December 2003, CTR completed work on and transferred custody of the FMSF to the Russian Federation. This facility provides a secure, centralized storage facility for weapons grade fissile material. DOD is negotiating a transparency agreement to ensure the quality and quantity of material stored at the FMSF. DOD may require funding to design, construct, test, and certify a system to assess whether the contents of the fissile material containers to be loaded in the FMSF are of the desired quality and quantity.

Russia: Biological Weapons Proliferation Prevention

Overall funding requested for the BWPP program in fiscal year 2005 rose slightly from \$54.2 million in fiscal year 2004 to \$54.9 million. The BWPP funding request reflects the administration's firm commitment to combat biological weapons proliferation as part of the war on terrorism. DOD anticipates obligating approximately \$20 million of fiscal year 2005 funds for BWPP activities in Russia.

Russia: Chemical Weapons Destruction (CWD)

The budget request for the CWD program in Russia is \$158.4 million, a decrease of \$41.9 million. The reduction results primarily from the fact that we have passed the high point of the construction funding curve on the CWDF at Shchuch'ye. In addition, we will complete work on the Chemical Weapons Production Facility Demilitarization project at Volgograd this year.

The CWDF saw a significant increase in fiscal year 2004 spending due to initiation of construction in March of last year. Since the design for the entire facility was over 80 percent complete, the construction drawing sets for many buildings were approved for construction. DOD has authorized construction of those buildings using the prior-year funding. The fiscal year 2005 funding level (\$155.2 million) continues to meet the President's direction to accelerate the CWDF consistent with the rebaselined schedule that calls for construction completion in February 2007 and transfer of custody to the Russian Federation by September 2008. Congress, in fiscal year 2002, conditioned all future funding for construction at Shchuch'ye on its certification of six conditions; the administration continues to press Russia on the two that remain unfulfilled: a full and complete accounting of the size of the Russian

chemical weapons stockpile, and the completion of a practical plan for eliminating nerve agents.

NON-RUSSIAN FSU STATES: BWPP

The budget request for BWPP increased slightly from the fiscal year 2004 level of \$54.2 million to \$54.9 million. DOD anticipates obligating \$34.9 million toward non-Russian FSU states in fiscal year 2005, a significant increase from fiscal year 2004. This increase is due primarily to the expansion of the CBR project area and Biosecurity and Biosafety projects in the region, as well as continued implementation of the biological weapons TADR project in Uzbekistan, Kazakhstan, and Georgia. Ukraine and the Kyrgyz Republic have expressed interest in BWPP program activities and CTR staff are negotiating the necessary legal framework to support such assistance.

- For CTR's Biological Weapons Infrastructure Dismantlement and Restructuring program, DOD is requesting \$1.7 million for fiscal year 2005 to continue eliminating remnants of Soviet biological weapons-related infrastructure in Georgia and Kazakhstan.
- For CTR's CBR project area, DOD is requesting \$7.1 million for fiscal year 2005. This will continue projects in Kazakhstan and Uzbekistan to help prevent the proliferation of biological weapons expertise, enhance transparency, improve standards of conduct of former biological weapons scientists, and leverage their extensive expertise. There is currently one project in Kazakhstan and two in Uzbekistan; CTR plans to develop new projects in both Uzbekistan and Kazakhstan as well as in Georgia. In addition, we hope to be able to move forward with this project area in Ukraine during fiscal year 2005.
- For CTR's Biosecurity and Biosafety project area, DOD is requesting \$12.6 million for fiscal year 2005. We will continue projects in Kazakhstan, Uzbekistan, and Georgia. We hope to initiate projects in Ukraine and the Kyrgyz Republic under this project area.
- For CTR's TADR project area, DOD is requesting \$13.5 million for fiscal year 2005. Under this project area, CTR promotes biosecurity and biosafety at biological facilities in Kazakhstan, Uzbekistan, and Georgia by strengthening dangerous pathogen detection and response networks, facilitating the discovery of the diversion or accidental release of biological materials and allowing the removal of dangerous pathogen collections from existing sentinel stations and consolidation of them in central reference laboratories. We hope to initiate projects in Ukraine and Kyrgyzstan.

NON-RUSSIAN FSU STATES: WMD-PPI

As in 2003 and 2004, we are requesting \$40.0 million in fiscal year 2005 to support WMD-PPI, which is designed to enhance Kazakh, Azeri, Ukrainian, and Uzbeki capabilities to prevent, deter, detect, and interdict illicit trafficking in WMD and related materials. While this is not a security assistance program, DOD is coordinating with other U.S. agencies to finalize the overarching strategic plan for export control and border security assistance to these states. This initiative builds on the foundation created by the CTR Defense and Military Contacts program.

In implementing the WMD-PPI, DOD has developed projects designed to produce comprehensive operational capabilities based on the interagency approved U.S. strategic plan and country/regional requirements. These projects will provide not only equipment and related training, but also self-sustaining operations and maintenance capabilities.

Senator ROBERTS. Ms. Bronson, I thank you for an excellent statement. Thank you for summarizing your very important points, especially in regards to your emphasis on the cooperative nature of these programs.

I am not going to get into a personal history of this, but this subcommittee was first formed on the suggestion of Senator Warner, Senator Lieberman, and Senator Coats, and I did have the privilege of chairing it at its first beginning. Obviously, the Nunn-Lugar program and the other programs have a life of their own in terms of value. But we have experienced serious problems and we have come up with some requirements, as a matter of fact, the require-

ments that basically saved the program from the criticisms that were being voiced in the House, and agreed to by the Russians and many delegations that would come here.

Under the circumstances, I think that your comments are right on point.

Senator Reed.

Senator REED. Thank you very much, Mr. Chairman.

Thank you for your testimony. Both witnesses and the chairman referred to the President's speech, and it was a sobering but also a very ambitious challenge to all of us. I wonder how the budget for this year measures up to the challenge and to the scope of the problem. I know, Secretary Bronson, you said it is only one measure of what you are doing, but as I understand it the DOD budget goes down by \$40 million. There are significant cuts of programs, but deferral in some cases of programs that were anticipated to begin.

Can you comment on how the resources match the nature of the challenge and also the President's commitment to do a great deal more about it? Secretary Bronson?

Ms. BRONSON. I would be happy to do that. While my written testimony goes through line by line our budget request, you have raised an important point. If you look at the size of our budget request in fiscal year 2003, we asked for \$414.4 million. Last year, for 2004, we asked for \$448.6 million. This year, as you have correctly pointed out, we have asked for \$409.2 million.

The vast majority of that extra \$40 million or so was specifically asked for in 2004 to help us with the Shchuch'ye chemical weapons destruction facility (CWDF). In 2003 and 2004, we went ahead and we got over what I would refer to as the heavy infrastructure construction bump in this project. We are spending this year and we began to spend the money to go ahead and complete the construction and buy the capital-intensive equipment for that facility. We are not going to have those same kinds of up-front costs in 2005 and 2006.

The amount of money we are requesting for the strategic offensive arms elimination is exactly the same as we asked for last year. The amount of money that we are requesting for BWPP activities is a bit more than we are for last year. The amount of money that we are requesting for an important new program, the WMD proliferation prevention initiative, is also more than we asked for last year.

These two programs, the BWPP and the program for assisting the countries in the Caucasus and Central Asia to deal with their porous borders, these are not capital-intensive projects. These are projects where we can achieve results without the kinds of expenditure of money that we have to spend in a case like the CWDF.

So I would urge close review of what we are trying to do and what we are trying to do with the money, in addition to scrutiny of the actual amount that we have asked for, Senator.

Senator REED. Well, I thank you. That is a very thoughtful response. I am going to turn to Mr. Longworth in a moment. It strikes me too that in a situation where your theater operations have been expanded outside of the FSU, which would argue probably for more challenges and more money, also there is a refocus-

ing on the war on terror, not just the traditional sort of dismantling of national weapons depots and national weapons systems like in the FSU. Also, the impression I have is that every time we turn around we discover the scope of this problem is much bigger than we ever thought, and also time does not seem to be on our side.

We all will carefully look at the budget. It seems to me that we can and should do much more, but I thank you for your very careful and thoughtful response.

Mr. Longsworth, I would ask you the same question, essentially.

Mr. LONGSWORTH. Our budget, has a 1-percent increase. As I noted in my testimony, that is augmented by the contributions from other G-8 nations, which are also spending increasing amounts of money in Russia. In our budget, I agree with what Ms. Bronson said—some of the things that will have the greatest impact on stemming proliferation are not high dollar activities. We have a \$7 million increase in our export control program. That is a very small amount of money that pays big dividends in terms of detecting and creating a capability in other countries to detect and address proliferation that comes through their ports or across their borders.

So it is not all about large capital projects. Some of these activities do not require large amounts of money to get a big bang. So we have focused on those. Our radiological dispersal device (RDD) program, where we are helping other countries to secure, consolidate, and in some cases dispose of, RDD-usable materials, again those are not large dollar amounts, but again it gets a big bang for the buck, no pun intended.

Senator REED. I am not going to touch that, Mr. Administrator.

Mr. LONGSWORTH. Yes, sir.

Senator REED. Let me focus on a specific area, and that is the emerging news from Pakistan about proliferation, about diversion of materials. Can you comment in general—we will start with you, Mr. Longsworth—about what you may be doing in Pakistan today?

Mr. LONGSWORTH. I think what the U.S. is doing I would prefer to defer to closed session.

Senator REED. Thank you.

Secretary Bronson, similar?

Ms. BRONSON. Yes, I think that is best discussed in a closed session.

Senator REED. Thank you very much.

As I mentioned before, in your testimony, Secretary Bronson, you discussed the review of the CTR program which was completed in August to ensure that it effectively addresses new threats associated with the global war on terror. From a programmatic perspective, what does this mean? Were programs cancelled, postponed, transferred, or created? Is the CTR program going to shift its focus to support other administration initiatives?

Can you fill us in on the programmatic effect of this review?

Ms. BRONSON. The programmatic effect with respect to Russia was that we revalidated all of the project areas that we are currently working on. This includes the project areas on liquid fuel missiles, solid fuel missiles, SSBN dismantlement, spent nuclear fuel, and nuclear weapons security and transportation.

While we revalidated these project areas we rescoped certain specific aspects of them to make sure that the CTR money was used specifically to reduce the threat. For example, in the area of SLBM and ICBM elimination, we used to pay for the regrading of the silos after the dismantlement took place. For the most part, this is not an activity that contributes to actual threat reduction. So our judgment was, number one, that does not contribute to actual threat reduction; number two, it is a task that can be taken on by the Russians; number three, it is relatively inexpensive and within the Russians' capabilities. That is a more appropriate task for the Russians to do and we keep our money focused on the actual reduction of the threat.

The same kind of rationale was in effect when we looked at the solid fuel missiles. For example, we are only going to dismantle the number of missiles that are related to the actual launchers that are also turned over for destruction, or the actual SSBN launch compartments that are turned over for destruction. That is because we want to be sure that we do not inadvertently contribute to the modernization of the Russian force. If we get launchers and missiles together, then we can be sure that we are actually contributing to the reduction of the threat, and this is another type of activity that was revalidated in our review.

Another example is with the——

Senator REED. Excuse me for interrupting, but the thrust of my question was more about how this new focus on the global war on terrorism affects programmatic issues.

Ms. BRONSON. I misunderstood the question. I thought you were asking more about the rescoping. With respect to the global war on terrorism, what we have done over the last 2 years is to look at two projects in specific. One is the WMD Proliferation Prevention Initiative (PPI). This is the initiative to go ahead and create infrastructure, training, and capabilities in countries like Azerbaijan and Kazakhstan so that they can be partners in the global war against terrorism by doing a better job of policing their own borders.

So what we have done in the last 2 years is gone ahead and complete implementing agreements with a number of countries in the regions. We have made in the area of five specific visits to the region for the purpose of assessing how we can improve their border security, how we can improve their training, and what kinds of equipment that these countries in the region would need to increase their ability to police their borders.

Similarly, in the area of biological weapons proliferation, we have been working with a number of countries to enhance their ability to better detect either unusual outbreaks of disease or events that could be precipitated by biological weapons terrorism, so that they can be part of the overall network in combatting potential bioterrorism.

Senator REED. Thank you.

Let me just follow up with two specific questions about dismantling of SSBNs in the FSU. Recently there were some changes you made in these arrangements. Will that affect the overall number of submarines that we will propose to or will be able to dismantle? I understand also there has been a recent decision not to build a

spent fuel storage facility. Will that impact the number of these submarines that can be dismantled?

Ms. BRONSON. The overall number of submarines that can be dismantled will not be affected by what we have done. The key rate-limiting step in the number of submarines that we can dismantle is the number of submarines that Russia is prepared to turn over to us.

Senator REED. But is there a relationship between what we do and their willingness to turn submarines over to us?

Ms. BRONSON. We have found no relationship between the two, Senator.

Senator REED. So even though we have made changes in terms of—as I understand it, previously there was a complete dismantlement of the submarine into scrap and now the proposal is just to remove the nuclear components, but not funding or allowing the dismantling, leaving basically the remaining part of the ship. That will not inhibit the willingness of the Russians to turn these ships over to us?

Ms. BRONSON. We briefed the Russians on this and when we briefed them they had no objection.

Senator REED [presiding]. Thank you.

One final question and then I would like to recognize, on behalf of the chairman, Senator Akaka. I understand, Mr. Longworth, that you recently announced a program to work with Iraqi scientists. Can you just describe in general details how this program will be structured? Are these nuclear weapons scientists or just scientists in general, and how will you address the perennial issue of liability?

Mr. LONGSWORTH. Let me start at the tail end of your question. It is interesting that with other countries we have not had the same liability roadblocks that we have had with Russia. Other countries are willing to accept the liability standard that we have asked for, again to protect U.S. workers and companies.

Senator REED. Can I just interject? It is my understanding that there are arrangements with Russia that have liability protections that are already up and running. But we are asking for more expansive protections in general now. I guess it begs the question, if we can get some programs up and running with one form of liability, why do we have to change the score?

Mr. LONGSWORTH. We have suspended several programs that had separate liability provisions in them, most notably the 1998 Plutonium Disposition Agreement and the NCI agreement. The rest of our programs are attached to the CTR umbrella agreement, which has not expired yet, and Ms. Bronson can talk more about that.

Today, our programs use CTR liability protections as their umbrella agreement.

Senator REED. Again, I diverted you for a moment. Just a quick point on Iraq and then I am going to cease work.

Mr. LONGSWORTH. Yes. This is a cooperative effort we are doing with the nations in the Persian Gulf region. This is not a U.S. initiative. This will not have a U.S. face on it. It will have an Arab face on it. We are cooperating with the other nations. They have formed an organization that will go into Iraq and, much the opposite of what we are trying to do in Russia—in Russia we are trying

to make sure that scientists that leave the lab have some soft landing so that they do not go work for a rogue element. In Iraq it is the opposite. We are trying to bring the scientists back and give them legitimate work. So it is the inverse of what we are trying to do in Russia.

But we will provide some funding. Regional partners will provide additional funding. The intent is to employ scientists that could support WMD programs. It is WMD across the board. It is not just nuclear, because you need physicists, you need chemists, you need engineers in all of those types of weapons programs. So this is something that will address WMD generally. Obviously, our principal interest parochially for our program is nuclear, but the people that we will employ could work in a broad range of WMD programs.

Senator REED. Thank you very much.

Thank you, Mr. Chairman.

Senator ROBERTS [presiding]. Senator Akaka.

Senator AKAKA. Thank you very much, Mr. Chairman.

Mr. Longworth, I want to tell you that I am pleased that the Off-Site Source Recovery Program is receiving more support. I am pleased about that. I have been urging this for a while, and I want to thank you for taking this on and bringing it to this point.

You said in your testimony that, given recent threats to the United States, it has become increasingly clear that protecting and securing nuclear materials and detecting nuclear and radioactive materials at foreign ports, airports, and border crossings is a very high priority.

Mr. LONGSWORTH. Yes, sir.

Senator AKAKA. Yet, the fiscal year 2005 budget request is \$238 million, while the budget request for fiscal year 2004 was \$249.5 million. So my question to you is, what part of the program will have to be sacrificed due to these cuts?

Mr. LONGSWORTH. Actually, it is an anomaly of the way budgets are presented. There was a significant add-on to our request in fiscal year 2004. So it looks as though the budget is decreasing. It is actually increasing if you normalize that. I believe we got almost a \$90 million plus-up for Megaports.

Our ability to absorb that funding is limited. We have to sign agreements with the host countries, we have to go do site surveys. All of these activities take time. Now, I will say we cannot engage in negotiations with a government unless we, with these foreign governments, have the obligational authority. So we do have to have the money in our account before we can sign an agreement with a foreign government.

But I think we are spending at about the rate we can spend. I do not know that we can spend much more than we have already. Again, the reason it looks like it is a decrease is simply that we got a very large additional plus-up from Congress in fiscal year 2004. So fiscal year 2005 looks like it is decreasing, but the trend line is certainly up.

So I guess the short answer to your question is nothing will not be done. In fact, we are able to accelerate because of that plus-up. Again, the people that work in this program—there is one woman who I think she has been home 1 week out of the last 10, and she

is traveling all over the world getting in place these agreements with the governments. So we are accelerating that work significantly.

Senator AKAKA. Mr. Longworth, I am pleased that NNSA is working to stop Russia from producing more weapons-grade plutonium. But I am concerned about the budget cuts in this program as well. You know better than I the risk to Americans should terrorists obtain this nuclear weapons-grade material. I am certain you share my sense of urgency in this area, and my concern about what may happen in the event of thefts.

I was just reading an account where in 1993, back there in Russia, some of the material was stolen. The person stole it because the person wanted money and sold it. So we are very concerned about this.

So could you explain to me how the program can stay on target, considering the proposed reduction in fiscal year 2005 funding?

Mr. LONGSWORTH. Again, I think the reduction—you think you are referring to the MPCA program. The Second Line of Defense program is actually embedded in that number. So when you hear about that budget line item, it includes not only securing material but also it includes the programs that will detect whether that security has failed so that you can detect any, as you said, any individual who is trying to steal and traffic the material.

One of the reasons it looks like a decrease is what I mentioned before, that because that Second Line of Defense budget is embedded in that broader MPCA budget, it looks like it is decreasing.

In addition to that, we have accelerated our warhead security work with the Russian navy, and that work is beginning to decrease because we are finishing. We are actually going to complete most of that work this year and probably completely done by the end of 2005.

Those are major capital projects that we are just finishing. We are ramping up, and there is an increase for SRF sites that we will be adding. Again, I noted we added three sites. We hope to add some additional sites later this year.

Overall I think we are working at a pace that is as fast as last year, and last year was three times faster than the year before. So we are working at a pretty good pace. We are about what Russia can absorb at this point in terms of funding.

Again, I have often said, and the Secretary and Ambassador Brooks have said, we are not limited by funding right now; we are limited by Russia's ability to absorb the funding that we provide. Some of the challenges I mentioned, like access, liability and other things, affect Russia's ability to absorb funding.

Senator AKAKA. Thank you.

Ms. Bronson, the CTR is an important program to prevent weapons and weapons-usable materials and expertise from falling into the wrong hands. Experts are calling for an acceleration of the program. Yesterday, DCI Tenet emphasized to us in testimony before the full committee his concern that terrorists are trying to obtain WMD, including nuclear material from Russia.

I understand from your testimony that your fiscal year 2005 budget of \$409.2 million does not represent a decrease in overall funding for the program, and yet in your testimony it is noted that

in fiscal year 2004 it was at \$450.8 million. I am concerned that there is not enough money to accelerate the program in the way that is needed and the experts say that is needed.

If these threats are real, Madam Secretary, why are we not accelerating this program?

Ms. BRONSON. I have spent many hours looking at how one could go ahead and accelerate this program. If I were to walk through each area, I can walk you through where we have looked at that and we have not been able to find places where we can accelerate.

For example, in the area of the destruction of ICBMs and the destruction of ICBM silos, we can only destroy those as fast as the Russians will turn them over to us. In the area of SLBM launchers and in the area of SSBNs, we can only destroy them as fast as the Russians will turn them over to us.

I would point out that in our budget the amount of money for strategic offensive elimination is the same as it was for last year. In the area of nuclear weapons storage security, we are asking for a little bit more than we asked for last year. Here there is an important problem, and the problem with nuclear weapons safety and security is that we cannot make any more progress until Russia signs the additional legal commitment that we asked them to sign so that we can protect the taxpayers' money.

We gave the Russians that document in December 2002 and we still do not have it signed yet, and that is despite a tremendous amount of pressure that we have put on the Russian government. So we cannot accelerate that because the Russians will not go ahead and sign the agreement.

In the area of nuclear weapons transportation security, last year we asked for \$23.2 million. This year we have asked for more, \$26.3 million. In that area as well, Senator, we have a commitment agreement that we provided to Russia in December 2002 that they still have not signed. That commitment agreement is a commitment that they will only use the new cargo cars to support consolidation or dismantlement of nuclear weapons. We have to get a legal agreement that they will not use those cargo cars to modernize their force or for purposes that have nothing to do with threat reduction. So we cannot accelerate that until the Russians go ahead and sign that agreement.

In the area of biological weapons proliferation, we have asked the Russians to go ahead and sign with us a specific biological weapons implementing agreement. The biological weapons area is the only area where we do not have a specific implementing agreement. To date the Russians have been intransigent and will not go ahead and sign that agreement.

We are unable to go ahead and pursue additional funding to biological weapons proliferation issues with Russia until we get better assurances concerning their biological weapons compliance.

Now, in the area of chemical weapons destruction I am pleased to report that, after we lost 4 years, in large part because of Russian behavior, we have been able to accelerate that schedule and gain back 29 of the months of the 4 years that we lost. So we are accelerating there, and in fact part of the money that we had for last year's budget is being used to accelerate the Shchuch'ye chemi-

cal weapons destruction facility in accordance with the specific direction that we have from the President.

In the areas of WMD proliferation prevention, we have two agreements signed, we have two more we hope to have signed in the next few months, and we are looking to go ahead and accelerate, consistent with good spending of money, the projects to go ahead and make those porous borders in the Caucasus and in Central Asia more safe.

Senator AKAKA. Well, I am glad to hear about those accelerations. I was just worried also about the remarks that were made by DCI Tenet that terrorists are trying to obtain WMD, including nuclear material, from Russia at the present time, and looked upon this as part of the possible acceleration.

Also, what are we doing, and are we doing everything we can, to prevent fissile material from getting out of Russia; and also these other nuclear materials, as well as WMD?

Ms. BRONSON. Well, in December 2003 the fissile material storage facility in Mayak was finally completed. This facility will store securely more than 25 metric tons of Russia's weapons-origin plutonium. In addition, in 2003 we agreed on the principles to monitor the material that will be stored in that facility. We have been negotiating now for some 7 years a transparency agreement with Russia. It is our hope that we will complete that transparency agreement in the first half of this year.

With respect to nuclear weapons security, we signed protocols in February of 2003. We visited six major storage sites to work on the security of those sites, and we will visit four more of those sites this year.

Senator AKAKA. Thank you very much for your responses.

Thank you very much, Mr. Chairman.

Senator ROBERTS. Thank you, Senator.

I know each of your departments has taken steps to improve the effectiveness and the efficiency of the CTR programs, as you have just gone into in answer to the Senator's question. The DOD, for instance, has instituted a program to have semi-annual executive reviews with its Russian counterparts to identify and rectify the potential problems. As you have indicated, some of these issues have proved very persistent and difficult to resolve.

Is there anything we might do in legislation that would help strengthen your position as you negotiate with the Russians on matters that continue to prove difficult in regards to access and liability, not to mention fungibility? What could we do to help you in that regard? Let me go back to the not so thrilling days of yesteryear, when the House had determined to pretty well cut this program out, and we put forth in this subcommittee basically some mandatory steps that the Russians had to fulfill, and in doing so convinced our House counterparts that it was a worthwhile program. Senator Lugar personally did a great job in terms of making that point and, as chairman of the subcommittee at that particular time, we thought we had made some real steps forward. But I know that there are a lot of problems that continue.

As a result of putting in these contingencies or these mandatory requirements, we had a Russian delegation, several of them, come to Washington and thank us for doing that and saying that they

would work certainly toward these goals and basically thanking us for saving the program.

I must confess that my service on the Intelligence Committee has prevented me from doing the homework that I need to do, and I apologize for that, despite able staff, in regards to some of the more difficult issues. But I am perfectly willing and open to suggestion in regards to any legislation that might be helpful.

Would you like to comment?

Mr. LONGSWORTH. Actually, I would—

Senator ROBERTS. Or should we leave well enough alone?

Mr. LONGSWORTH. Well, no. Let me start with some of the problems that we face. I think we are concerned by a number of developments in Russia, and Russia today is not the Russia it was 5 years ago or 10 years ago.

Senator ROBERTS. No, they are in a lot better shape.

Mr. LONGSWORTH. They are, and we are seeing their economy is doing fairly well. It is primarily resource-based, oil and gas exports. It is not robust, but it is growing. They have an ability to pick up some of these burdens, and in fact are in many cases in our programs, picking up some of the burdens of the efforts that we do on a cooperative basis.

I think we are also concerned by the rise and the increased influence of the Federal security services with regard to programs that we carry out in Russia. Many of our access problems were laid to denials that come from the Federal Security Services.

I think continuing to emphasize the importance of this work—

Senator ROBERTS. Pardon me for interrupting. Where do we have programs where we do not have access?

Mr. LONGSWORTH. We have secured a large percentage of the material in Russia. We have secured a larger percentage of sites. The most sensitive sites are what we refer to as the serial production enterprises. These are their most sensitive sites. They have ongoing national security and nuclear weapons missions. Just as we would be very sensitive about allowing foreigners into our sites, those are the sites where we have the most difficult access. There are ways to work around it, but there are tedious details and it is very—there are tough negotiations on how to get in there.

Senator ROBERTS. Well, we are not in closed session, but it seems to me that my memory comes somewhere in the neighborhood of bigger than about an 18-site bread box. I went to Obelinsk. I have been to one other so-called “Secret City” that was opened up through the NCI and other programs. I did not get over to see the Shchuch’ye chemical plant. Senator Lugar does that and has posed for a very powerful picture of, I think, a suitcase and some things that you could put in the suitcase if you were of a mind to do that, and it indicated the importance of the Shchuch’ye project, despite a General Accounting Office (GAO) report, by the way, that was very critical. That will be a question of mine down the road if you want to respond to it.

But we simply could not get access. Of course, on the other side of it, we had a lot of problems in regards to transportation—how much the transportation would cost, who would get access, who would go, if you had to use a pole vault to get over the damn fence. That was not the case, but it almost was.

So I guess what I am asking you is, just generally in terms of access, has it gotten better, worse? Where are we?

Mr. LONGSWORTH. For us it is about the same. It is always difficult. We do have a pilot at one of their most sensitive cities, just one, and it is going fairly well. We have a commitment that once that pilot is under way, about halfway through, they will identify the second site.

This is a large breakthrough because these sensitive facilities have the greatest volume of material—a fewer number of buildings, but there is more material in those buildings. It is what I would refer to as kind of the last bastion of fissile material that we need and want to secure.

So it is about the same. We do have a pilot that is successful, but even that has lots of fits and starts in that work.

Senator ROBERTS. I basically interrupted you to answer my question in terms of legislation. We did put into legislation these requirements. I do not know whether we need to take another look at that under the current situation and get your advice and counsel. You could probably provide that for the record or if you had any, just any comments that you would like to make now.

Mr. LONGSWORTH. I would prefer to provide that for the record, sir.

[The information referred to follows:]

The administration's support for addressing the global threat of proliferation of WMD, both in states of the FSU and around the world, is reflected in the President's fiscal year 2005 budget submission, which requests \$1.35 billion for this work. For more than a decade, the DOE, and now through its NNSA, has played a central role in the United States' effort to improve the security of under-secured nuclear warheads and weapon-useable nuclear materials in the Russian Federation and other independent states of the FSU. But the security of the United States, including the war on terrorism, urgently requires reducing the proliferation risk of nuclear, chemical, biological, and radiological weapons and materials, warheads, technology, and expertise in countries beyond the borders of the FSU.

Senator ROBERTS. All right, that is fine.

They have not met two of the six congressional conditions for assistance, although, as you have indicated, they are close, "they" meaning Russia, to meeting the one that requires the submission of a practical plan for the chemical weapons destruction. I understand the administration will be seeking permanent waiver authority for Shchuch'ye in the fiscal year 2005 request.

I go back again to the GAO report, which was not exactly glowing in regards to Shchuch'ye. I remember going over that in some detail and thinking that we needed to provide security more than we needed to commit the funding, with all the problems that were connected with that plant.

If all that is correct, would you please provide the administration's rationale for seeking permanent waiver authority? Is it in any way problematic when Congress grants only annual waiver authority rather than the permanent waiver authority that the administration has requested previously?

Ms. BRONSON. Senator, you ask an excellent question. Let me begin by underscoring the absolutely critical role this subcommittee played in the development of those six conditions. Those six conditions in my view allowed us to get off of square one. They put sufficient pressure on the Russians, they put Russia on sufficient no-

tice, and they were absolutely invaluable in our being able to move forward in this area.

We do believe that we are going to receive a practical plan from the Russians later this spring, and that leaves us with the final condition which has not yet been met, which is to satisfy our questions about the actual numbers concerning the stockpile. I do not believe that we are going to be able to resolve those tough issues about the size of the stockpile down to the level of detail that is going to satisfy that condition this year. I am reminded of the opening comment that Senator Reed made this morning. The desire for a permanent waiver on Shchuch'ye is not to go ahead and remove the pressure from the Russians, but the desire for the permanent waiver for Shchuch'ye is designed, as Senator Reed mentioned, to help us keep the program running smoothly from year to year.

Senator ROBERTS. So it is the consistency issue that you are talking about?

Ms. BRONSON. Yes, Senator.

Senator ROBERTS. With all the questions that we have about access, liability, fungibility, the heptyl plant, and the Votkinsk—help me with that pronunciation?

Ms. BRONSON. "Vot-kinsk."

Senator ROBERTS. All right. It is \$206 million that went down the drain. If the American people know about \$206 million that ended up in a very futile situation—and you have gone over that in your testimony—a \$106 million loss suffered by CTR in the so-called "heptyl situation," in which Russia did not tell us that the liquid rocket fuel destined for a CTR-constructed facility had been diverted to commercial use. In other words, we build this facility, we think that we are going to be housing the liquid rocket fuel, which of course was the entire intent, and then we got into a big whoops—okay, we have this facility; bring us the rocket fuel; well, we do not know how to tell you this, but we do not have any; we have used it for commercial purposes.

What in the hell are we doing with that facility now? Do we have a flag on it? What I am saying is that if you get into these kind of things and we do not have enough cooperation and we get into basically a screw-up like that, that becomes the headline in regards to CTR, despite all of the goodwill and the wishes and the speeches that we have made down through the years. Then you add in another \$100 million, that is a \$206 million whoops. If you are a taxpayer you are going to say: I do not understand this, more especially with an improved economic situation in Russia.

I am being the devil's advocate. What did we do with that facility? Did we paint it, or what did we do with it?

Ms. BRONSON. First of all, your comments are exactly right, Senator. What Russia did with respect to the heptyl situation was inexcusable. What we have gone ahead and done with the facility is we have made a decision to go ahead and take those parts of it that we can salvage and reuse for other parts of the program, so that we are going to try to get back as much from that investment as we can.

But I am not going to kid you, Senator. We are not going to get that much back. So our goal has been to ensure that in every single

project area that we are undertaking now or that we will ever undertake, we will not get ourselves into the situation where we rely on good faith assurances by Russia. Anything that we are relying on Russia to do or any assumption about their behavior must be turned into a legal agreement before we will go ahead and spend taxpayers' money in the future.

Senator ROBERTS. I am concerned that, on the waiver authority, if we grant the permanent authority—explain to me again how that works? You have the permanent authority, but annually you come to Congress and say, yes? What are you telling us if you have the permanent authority as opposed to annual authority that we would grant?

Ms. BRONSON. If we have the permanent authority, each year as an independent determination, we would have to go ahead and assess how the Russians are doing on their six conditions that were laid out.

Senator ROBERTS. Yes.

Ms. BRONSON. We would have an obligation to come and tell you whether or not we thought those conditions were met, and if the conditions were not met—including the one that I believe will not be met by the end of this year, which is the final accounting of the amounts. Then we would have the ability to each year make an independent judgment as to whether or not failure to meet that condition outweighs our security interests in going ahead and continuing to get that facility to a position—and I am talking about the Shchuch'ye facility—so that we can destroy the nerve agent, which is in a most proliferable form.

The nerve agent that Shchuch'ye will destroy is in rocket form. It is in artillery shells. It is in our national security interest not to slow down the progress on getting that facility up and running so that we can destroy it.

But each year the administration would have to go ahead and decide whether or not the value we would get from destroying those, the proliferation value from destroying those shells filled with nerve agent, outweighed the fact that the condition had not been met.

Senator ROBERTS. Other than the funding for this program, what is it that this subcommittee, full committee, both the House and Senate, would have as a peg to hang our hat on in regards to the waiver authority and exactly what you are talking about, separating the wheat from the chaff? Okay, here is one requirement they have not met, but we do not want to shut down the whole thing because we are making progress in other areas.

I am not sure about our decisionmaking in that process, which in my view should be mandatory. It was this subcommittee's effort that, first, saved the program from the House again; and second, that the Russians said, yes, we agree with this, we want to do it. It is my understanding that there has been very considerable contribution to the project, both from Russia and from international donors. So we see the value of it. But in terms of certification, I do not think you can certify a lot of this. I do not think it is possible.

Ms. BRONSON. Well, the one condition out of the six that I believe we are not going to be able to certify this year is the condition that

calls for us to reconcile the books on the amounts of chemical weapons. You are correct, we are not going to be able to certify that that condition is met, and I do not see a clear way to resolving that.

Now, there are a couple of things that I would just point out. Last year the authority for the presidential waiver ran out on September 30. The only way we were able to continue to spend money toward the acceleration of the construction of the CWDF was because we had a continuing resolution that allowed us to do that. We relied on the continuing resolution authority to continue to spend money up until the middle of November, when we finally obtained the waiver authority.

The situation we are in right now is we can continue to spend money under the current presidential waiver authority up until September 30. If we do not get a permanent waiver or we do not get a renewal of the waiver, then you run the risk that everything will have to stop in terms of expenditure of funds on September 30.

So there are two ways that this could work. If we had some kind of sense that the yearly waiver authority would be granted on time, that is not an unreasonable way to go. What would be better from a business standpoint would be to have the permanent waiver authority with the understanding that there is a clear obligation on the part of the administration to go ahead and make this determination and to report to Congress on the status of the conditions.

Senator ROBERTS. We will take a hard look at it. I think probably the permanent waiver authority is the best way to go, but you can now certainly report back to your Russian counterparts that the pleasantly irascible chairman who put in the requirements to begin with is not very happy with their cooperation, and we might just yank this back on an annual basis and give you that authority.

I am not sure that is the best approach, but you can at least send up some fireworks on that and see what happens.

I understand the state of the art facility at Mayak is completed and ready to accept the fissile material for long-term safe and secure storage. The Inspector General, back in 2003, expressed concern that the Russians had not really committed to storing a specific quantity or type of fissile material on the facility and that we had not reached an agreement on the transparency measures so that the United States can monitor the use of this facility.

Any new information on that?

Ms. BRONSON. We have not finished the transparency agreement. We are going to send back our response to the latest Russian comments on the current draft of the transparency agreement. That will be done by the end of March. We will then send a team to go ahead and enter into the next round of discussions with the Russians on the transparency agreement this April.

I am hopeful that by the end of the first half of this year we will have completed that transparency agreement with the Russians.

Senator ROBERTS. Last year the project to refurbish or build two fossil fuel plants in Russia to enable eventual shutdown of three old Russian weapons-grade plutonium production reactors was transferred from DOD to DOE. Has that gone smoothly, and what steps has the DOE taken to ensure that once these alternative heat sources are up and running the Russians will actually shut down the reactors?

In other words, are these projects actually proceeding on schedule and on cost?

Mr. LONGSWORTH. The transfer went fairly well. We just transferred the last \$17 million from DOD to the DOE. As I noted in my oral statement, we hope to have a validated cost estimate for both new fossil plants by the end of calendar year 2004, in December. Those will be the first validated numbers.

The numbers that we received, the cost of the facilities that the Russians estimated, have never been validated. We have just completed a bottoms-up assessment. We are trying to interpret those numbers. But by the end of this calendar year we will know what it costs to build both of those facilities.

In terms of the Russians' commitment to shut down, it is encompassed in an agreement that the Secretary signed with his counterpart in Russia that once the replacement plants are operational, the Russians have committed to shut down those reactors. We also, as soon as we begin work on the fossil plant itself, they have to begin implementing a shutdown plan. So once construction begins, that triggers the initiation of shutdown planning.

I might also note that in the interim we have actually de-rated the power of those reactors such that they are not producing as much fissile material now. We have powered them down to about the lowest level we think that they can operate at and still provide steam and electricity. They are rated to produce one and a half metric tons a year. We have de-rated them so they are producing about 1.2 metric tons a year.

All of these steps are positive, but we do want to move forward very quickly in getting those fossil plants built.

Senator ROBERTS. Senator Reed asked a good question in regards to activities outside the FSU, and that sort of ties in with the President's speech before the NDU. Do you anticipate any circumstances under which the annual limit of \$50 million for this purpose would be too restrictive?

Mr. LONGSWORTH. Yes, sir, I do. I can see a circumstance. Libya is a very good example. In Libya, we had a window of opportunity. We had to move very quickly, again cooperatively working with the Libyans, to implement their commitment to rid their country of WMD. Any inhibitor, that we would have to jump through a hoop or get a waiver, that just slows us down.

When we first went in there, we were not sure that the door would be open for very long, so speed was of the essence. We did that work with the Libyans very quickly. I do worry, Mr. Chairman, in the future that if an opportunity came up such as that was presented by Libya that the inhibitors might slow us down and we might miss that opportunity.

So I do worry about it.

Senator ROBERTS. Where would you get the money from if in fact an opportunity actually occurred? I will use an example that is a non-starter, but say North Korea.

Mr. LONGSWORTH. Well, we hope North Korea is a starter.

Senator ROBERTS. Well, I hope so, too. But, Kim Jong Il is not exactly the most cooperative person to be working with.

Mr. LONGSWORTH. Again, assuming in the future that we were invited in to begin the complete and verifiable, irreversible dis-

mantlement of their programs, that would be a significant undertaking.

Senator ROBERTS. You would just simply ask for a supplemental or to take the cap off, or what?

Mr. LONGSWORTH. Either of those things, yes, sir. The cap only applies to things that are not specifically authorized and appropriated. So if there is a specific authorization for work or a specific appropriation, then I believe our lawyers have determined that the cap does not—and I think your staff has agreed—that the cap does not inhibit those activities. It would only inhibit those activities that were initiated during a fiscal year.

But again, I do worry about the cap, our losing an opportunity to do something quickly because we had to get a waiver or because we had to go through some approval process.

Senator ROBERTS. I am through with my questions. Paul, do you have anything that you would like to sum up with? Or Lisa, do you have anything else to add before we move to the closed session?

Mr. LONGSWORTH. I would like to follow up one thing to summarize what our programs do, related to Senator Akaka's comments about what we are doing to stop the potential for fissile material to leave Russia. We have a comprehensive set of programs that not only secure HEU, plutonium, and RDD sources at the locations where they are, we then put detectors in place to detect whether they leave. We also have technologies that detect whether someone is violating treaties or to remotely detect proliferation.

We view our program as a meshwork of programs that are self-supporting and provide defense in depth. All of our programs are geared toward stopping threats to the U.S. before they get to our borders. So just, to answer his question—he asked what we are doing—I think our entire program is focused on securing, detecting trafficking, and then eliminating through HEU blend-down programs, plutonium disposition, getting rid of permanently those materials that are useful for nuclear weapons.

So I wanted to summarize. I think that is what our program does at the DOE.

Senator ROBERTS. I appreciate that. Thank you both, and we will now move to a closed session.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR DANIEL K. AKAKA

COOPERATIVE THREAT REDUCTION

1. Senator AKAKA. Ms. Bronson, as I stated at the hearing, I am concerned that the Cooperative Threat Reduction (CTR) program needs to be accelerated. I understand that getting cooperation from Russia is a key obstacle. However, I would like the program to continue looking for ways to accelerate in a responsible way. What would you do more of if you had the money to do so, including hiring additional staff to manage activities?

Ms. BRONSON. The President's fiscal year 2005 budget request for the CTR program coupled with prior year unobligated balances permits the elimination of strategic systems as rapidly as the Russian Federation authorizes their elimination. Since the hearing, agreements that the Ministry of Defense of the Russian Federation had been reviewing for over 12 months have been signed. Their signature permits security upgrades to continue for all nuclear weapons storage sites thus far identified by the MOD and we are urging the MOD to identify additional sites. The DOD security enhancement effort is carefully coordinated with the DOE nuclear weapons site security enhancement effort. Our joint efforts have permitted the schedule to be accelerated. The department has reprogrammed funds to maximize the acceleration of

the construction of the Chemical Weapons Destruction Facility at Shchuch'ye. We are continuing efforts to secure dangerous pathogen collections at all locations where the USG has been granted access by the Russian Federation. The CTR program has sufficient staff and has a Systems Engineering and Technical Assistance (SETA) contractor with SAIC to support the DOD staff. DOD also has contracted with U.S. integrating contractors to expeditiously implement the program.

BIOLOGICAL WEAPONS PROLIFERATION PREVENTION (BWPP)

2. Senator AKAKA. Ms. Bronson, I am especially concerned with the proliferation risks associated with Russia's collection of pathogens and biological infrastructure. Infectious disease knows no boundaries. Do you have the resources you need, both in terms of budget and personnel to combat this problem in the most expeditious way?

Ms. BRONSON. Yes. I believe that we now have in place the necessary personnel and that funding is sufficient to combat this problem in the most expeditious way possible, consistent with the access that we have to sites in Russia.

ASSISTANCE TO COUNTRIES OUTSIDE THE FORMER SOVIET UNION

3. Senator AKAKA. Ms. Bronson, we are providing more and more assistance to countries outside the former Soviet Union (FSU), yet the total budget is not increasing. I am concerned that initiatives in Russia are being short-changed. How are these things being prioritized?

Ms. BRONSON. Programs in Russia are not being short-changed. Our funding requests are based on our projected needs. The need is directed related to the rate the Russian Federation decides to remove strategic systems from the operational force and eliminate them and decides to grant access to nuclear weapons storage sites and dangerous pathogen collections. As I stated during the hearing, we had a heavy infrastructure construction bump for the Shchuch'ye CWDF in 2003 and 2004. We are not going to have that same sort of up front costs in 2005 and 2006. The funding for SOAE remains the same because the Russian Federation is removing strategic systems from the operational force at a uniform rate per year. Since my testimony, we have signed new agreements with the Ministry of Defense that permit security upgrades to continue for all nuclear weapons storage sites thus far identified by the MOD and we are urging the MOD to identify additional sites. The DOD security enhancement effort is carefully coordinated with the DOE nuclear weapons site security enhancement effort. Our joint efforts have permitted the schedule to be accelerated. We are continuing efforts to secure dangerous pathogen collections at all locations where the USG has been granted access by the Russian Federation.

The funding for CTR activities in Russia relative to other countries has remained fairly constant. Prior to September 11, 2001, after which we increased our funding for BWPP and requested funding for WMD-PPI in Central Asia, we had been active in other countries eliminating their legacy nuclear systems, specifically in Ukraine, Kazakhstan and Belarus. Also, the CTR budget in the early years of the program was smaller than it is today.

4. Senator AKAKA. Ms. Bronson, what Russian programs will have to be cut in order to provide assistance to the other countries?

Ms. BRONSON. We have always requested sufficient funding to take care of all requirements we have in Russia and in other states of the FSU. As a result, we do not anticipate cutting any programs in Russia in order to provide assistance to the other countries.

MATERIAL PROTECTION CONTROL AND ACCOUNTING

5. Senator AKAKA. Mr. Longworth, I am concerned that the \$238 million budgeted for the Material Protection Control and Accounting (MPCA) program is being spread too thin. Last years budget for this same program was \$249.5 million. The budget includes \$15 million for the Megaports program, which is currently focusing on ports in Greece and the Netherlands. What Russian programs will have to be cut to accommodate both the decrease in overall funding and the funding of programs outside the former Soviet Union and how are these priorities being set?

Mr. LONGSWORTH. The core mission of the MPCA program remains upgrading the security of nuclear materials. The fiscal year 2005 budget request supports this priority mission. The core mission's portion of the request is \$174 million, an \$8 million

increase over the fiscal year 2004 request, and a \$4 million increase over the fiscal year 2004 appropriation. This budget request reflects plans for major expansion of efforts to secure sites in the Russian Strategic Rocket Forces (SRF) warhead sites, as well as accelerated efforts to secure weapons usable nuclear materials at sensitive Weapons Complex sites of Russia's Ministry of Atomic Energy (MinAtom). The request also accounts for scope reductions due to completion of upgrades at several MinAtom facilities and the Kurchatov Institute in fiscal year 2004. The request also includes funds for critical security activities in countries outside the FSU.

The \$238 million fiscal year 2005 budget request for MPCA is an increase over the fiscal year 2004 request of \$226 million. The budget allocation in fiscal year 2004 was increased to \$260 million primarily because Congress increased funding for the Second Line of Defense program. This increase provided additional resources for the Megaports initiative and the acceleration of Second Line of Defense activities in Russia and the FSU. Due to a large (\$84 million) supplemental appropriation received for Megaports in fiscal year 2003, and because negotiations for implementation of Megaports are still underway in most countries, the fiscal year 2005 budget request only includes funding for one additional Megaport.

OFF-SITE SOURCE RECOVERY PROJECT

6. Senator AKAKA. Mr. Longworth, as I said in my statement at the hearing, I am pleased that the funding for the Off-Site Source Recovery Program (OSRP) has been increased. However, I am concerned that more could be done to recover radioactive materials. The University of Hawaii is trying to decommission an irradiator facility that they no longer need for research. This irradiator contains cobalt-60 sources which belong to the Department of Energy (DOE). The DOE has agreed to recover these sources and dispose of them, but funding will have to be re-prioritized first. Other universities find themselves in the same position. I am concerned that these universities may not have the security and trained personnel necessary to maintain these facilities in a safe manner until the sources are removed. Would more funding speed up this process and what would you do to move this along, if you could, without cutting other key activities?

Mr. LONGSWORTH. The OSRP under the Nuclear and Radiological Threat Reduction Task Force is the National Nuclear Security Administration's (NNSA) program to address U.S. sealed sources. The OSRP has recovered over 8,000 sources since 1997, many of these from academic institutions. The OSRP identifies excess and unwanted sources, and recovers those sources placing them in secure storage at specific DOE sites. The OSRP works closely with the U.S. Nuclear Regulatory Commission to establish the recovery prioritization for excess and unwanted sources which are of concern for use in a radiological dispersal device. The OSRP continues to aggressively pursue the recovery of sources, and the program is planning to expand its scope and address additional isotopes of concern.

Sources which are to remain in use at academic institutions and other locations, and require security in place fall under the purview of the U.S. Nuclear Regulatory Commission and the Department of Homeland Security (DHS). The DOE stands ready to provide technical assistance as well as share the expertise that we have developed internationally for providing enhanced secure storage of in use radiological materials.

ELIMINATION OF WEAPONS-GRADE PLUTONIUM PRODUCTION PROGRAM

7. Senator AKAKA. Mr. Longworth, I am pleased to see that the NNSA is working to stop plutonium production in Russia, but I am concerned about what seems to be a budget cut for the program. Your statement to the subcommittee said that you expect to have detailed designs and a cost estimate to Congress by the end of calendar year 2004. Will the program be able to stay on target with this reduced funding?

Mr. LONGSWORTH. The Elimination of Weapons Grade Plutonium Production (EWGPP) program's relative decrease from fiscal year 2004 to fiscal year 2005 reflects a +\$15.3 million adjustment in fiscal year 2004 associated with the reappropriation of unobligated prior-year balances that were transferred with the program from the DOD. Please see page 405 of the Fiscal Year 2005 Defense Nuclear Non-proliferation Congressional Budget Request for this adjustment, that page is also attached here as reference and for insert to the record.

The reappropriation occurred because part of the funds transferred from DOD expired for additional obligation on September 30, 2003, based on the original appropriation of these funds. However, the National Defense Authorization Act for Fiscal

Year 2003 providing for the transfer of the program from DOD to the DOE also entitled the transferred unobligated appropriations to be available for 3 fiscal years after and including fiscal year 2003.

Without this adjustment reflecting reappropriation of EWGGP funds transfer from DOD, the fiscal year 2005 request is actually a slight increase over fiscal year 2004.

No substantial fiscal year 2005 programmatic increase was requested as the program has sufficient funds for execution of all planned program and project efforts through fiscal year 2005, when including the \$50.1 million fiscal year 2005 congressional request for the program.

PREVENTING FISSILE MATERIAL FROM GETTING OUT OF RUSSIA

8. Senator AKAKA. Mr. Longworth, when we discussed fissile material leaving Russia at the hearing, you stated that NNSA concentrates on a program that approaches this problem with a defense-in-depth strategy. This program includes, among other things, securing the materials at their current location and detecting trafficking. I have noticed what seems to be a trend to devoting increased emphasis to border protection rather than securing materials at their location. Can you explain to me why we are emphasizing border protection to a greater degree?

Mr. LONGSWORTH. Our efforts to secure material in place have not dwindled in any way. We continue to make good progress in our efforts to secure contracts for implementation of upgrades at Russian sites. We recognize, however, that we can never provide total assurance that our improvements will prevent material from being removed from a site. Our Second Line of Defense program provides another opportunity to detect illegal movement across Russian borders and beyond. In applying our defense in depth strategy, we are expanding the Second Line of Defense program beyond the borders of Russia to provide additional opportunities to stop such efforts.

The \$238 million fiscal year 2005 budget request for the Office of International Material Protection and Cooperation is actually an increase over the fiscal year 2004 request of \$226 million. The budget allocation in fiscal year 2004 was increased to \$260 million primarily because Congress increased funding for the Second Line of Defense program. This increase provided additional resources for the Megaport initiative and the acceleration of Second Line of Defense activities in Russia and the FSU. Due to a large (\$84 million) supplemental appropriation received for Megaports in fiscal year 2003, and because negotiations for implementation of Megaports are still underway in most countries, the fiscal year 2005 budget request only includes funding for one additional Megaport.

The MPCA budget request in fiscal year 2005 (excluding Radiological Threat Reduction and Second Line of Defense) is \$174 million, an \$8 million increase over the fiscal year 2004 request, and a \$4 million increase over the fiscal year 2004 appropriation. This budget request reflects plans for major expansion of efforts to secure sites in the Russian SRF warhead sites, as well as accelerated efforts to secure weapons usable nuclear materials at sensitive MinAtom Weapons Complex sites. The request also accounts for scope reductions due to completion of upgrades at several MinAtom facilities and the Kurchatov Institute in fiscal year 2004. The request also includes funds for critical security activities in countries outside the FSU.

9. Senator AKAKA. Mr. Longworth, please explain to me how these priorities are being set. Has a study been done to show that this approach is more effective?

Mr. LONGSWORTH. Given our understanding that no one approach will provide 100 percent effective protection of material or prevention of illicit trafficking, we do not prioritize between the two approaches, but rely on the strengths of each to provide a more comprehensive protective strategy.

With respect to the Second Line of Defense program, our primary efforts have focused on securing the borders of Russia with the understanding that the most significant stockpiles of vulnerable nuclear materials are stored within it. As we expand the Second Line of Defense program, we are focusing on those countries bordering Russia to create the next layer of defense. Our priorities are also influenced by our relationship with these countries and our ability to realistically implement our programs in cooperation with the host governments. In the future, we anticipate the program will expand beyond eastern Europe and the Caucasus region as we try to address smuggling pathways to countries with known terrorist networks that want to obtain nuclear material for use in their activities.

COORDINATION WITH OTHER AGENCIES

10. Senator AKAKA. Mr. Longworth, since NNSA, the Department of State (DOS), and DOD all have a role in providing border control, I would like to know about your interagency coordination in this area. Can you provide me with your plan to assure coordination with the other agencies?

Mr. LONGSWORTH. The DOE/NNSA works closely with the DOD and the DOS and other agencies to coordinate programs and issues associated with threat reduction programs at all levels, ranging from project management working groups to White House policy coordinating committees to ensure our threat reduction activities complement and reinforce as opposed to duplicating efforts.

In order to more clearly outline roles and responsibilities among the agencies, two Strategic Plans were recently adopted. The first, for Nonproliferation Export Control and Related Border Security Assistance in Eurasia, was largely driven by the National Security Counsel (NSC) to address coordination among all relevant stakeholders (DOD, NNSA, Department of Commerce (DOC), and DHS. The NSC, particularly the Proliferation Strategy Sub-PCC, will provide broad policy oversight of agency efforts to implement this strategic plan and overarching guidance to ensure that assistance supports the U.S. National Security Strategy in a non-duplicative, mutually reinforcing manner consistent with agency strengths. The NSC approved this plan in early February.

The second plan, on Interagency Coordination of Nuclear Detection Assistance Overseas, was coordinated by DOS and is being finalized. Subject to the guidance of the NSC, global export control and related border security assistance will continue to be coordinated through the State/Nonproliferation-chaired Interagency Working Group (IWG) on Nonproliferation Export Control Assistance. The DOS, DOD, DOC, DHS, and the Intelligence Community participate in this IWG. Given the increased funding for this type of assistance, it is even more important to use this coordination mechanism.

All U.S. Government agencies that fund and/or implement export control and related border security assistance will coordinate their annual program plans with other agencies through this IWG. The State/Nonproliferation-chaired IWG performs a coordination and advisory role, but exercises no authority over agency programs. Any disagreements over agency efforts to implement this strategic plan through assistance programs that cannot be resolved at the IWG or by relevant agency members will be forwarded to the Proliferation Strategy Sub-PCC. The IWG will coordinate periodic reviews of the strategic plan to ensure its effectiveness and coordinated implementation and report its results to the NSC.

[Whereupon, at 11:09 a.m., the subcommittee adjourned.]

**DEPARTMENT OF DEFENSE AUTHORIZATION
FOR APPROPRIATIONS FOR FISCAL YEAR
2005**

FRIDAY, APRIL 2, 2004

U.S. SENATE,
SUBCOMMITTEE ON EMERGING THREATS
AND CAPABILITIES,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

COUNTERNARCOTICS PROGRAM

The subcommittee met, pursuant to notice, at 9:34 a.m. in room SR-222, Russell Senate Office Building, Senator Pat Roberts (chairman of the subcommittee) presiding.

Committee members present: Senators Roberts, Warner, Allard, Dole, and Reed.

Committee staff member present: Judith A. Ansley, staff director.

Majority staff members present: Charles W. Alsup, professional staff member; Paula J. Philbin, professional staff member; and Lynn F. Rusten, professional staff member.

Minority staff members present: Evelyn N. Farkas, professional staff member; Richard W. Fieldhouse, professional staff member; and Arun A. Seraphin, professional staff member.

Staff assistants present: Bridget E. Ward and Nicholas W. West.

Committee members' assistants present: Darren Dick, assistant to Senator Roberts; Derek J. Maurer, assistant to Senator Collins; Christine O. Hill, assistant to Senator Dole; Mieke Y. Eoyang, assistant to Senator Kennedy; and Elizabeth King, assistant to Senator Reed.

OPENING STATEMENT OF SENATOR PAT ROBERTS, CHAIRMAN

Senator ROBERTS. The subcommittee will come to order. The subcommittee meets today, on a Friday—and thank you for being here—to receive testimony on the status of Department of Defense (DOD) drug interdiction and counterdrug activities, in review of the fiscal year 2005 Defense Authorization Request and Future Years Defense Program.

I want to especially welcome our witnesses: the Honorable Thomas W. O'Connell, the Assistant Secretary of Defense (Special Operations and Low-Intensity Conflict (ASD SOLIC)); Brigadier General Benjamin R. Mixon, the Director of Operations for J-3 within the U.S. Southern Command (SOUTHCOM); and Rear Admiral Bruce

Clingan of the United States Navy. He is the Deputy Director of Operations for U.S. Central Command (CENTCOM).

When the subcommittee last held a comprehensive counterdrug hearing, clear back in April of 2000, narcotics were basically emanating from South America and were a significant and growing national problem. The damage to the health and the welfare of our Nation was enormous. At the time, Congress was debating support for Plan Colombia. As we meet today, narcotics do remain a significant problem, not only because of the harm they cause to our citizens, but because of the nexus between drug money and funding of terrorist activities all around the world.

I believe we will hear from our witnesses today that Plan Colombia was a wise investment, a visionary step. Coca cultivation and cocaine production in Colombia is down significantly. The government is reasserting its authority all throughout the country and I believe is winning the war against the narcoterrorists.

Unfortunately, narcotics cultivation, production, and trafficking is on the rise elsewhere, not only in South America but in Southeast, South, and Central Asia as well. The potential danger of these drugs in funding terrorist organizations and their activities cannot be overstated. It is a threat which must be effectively fought and confronted.

It is important to note that the DOD counternarcotics efforts are part of the larger and comprehensive U.S. Government and allied partners effort to reduce the demand at home, interdict the movement of illegal drugs across our borders or in transit, and discourage any production abroad. Each of these areas are equally important and a coordinated effort is essential.

Most attention of late has been focused on the global war on terrorism and continued military operations in Iraq and Afghanistan. Clearly these are the highest priority. But we must remember that effective counternarcotics activities do contribute to the war on terrorism, improve our national security, enhance our relations with other nations, and improve the readiness of our Armed Forces.

The President's budget request for fiscal year 2005 includes \$852.7 million for counternarcotics activities. Now, this is approximately \$57 million less than the appropriated amount for fiscal year 2004, and I do look forward to Secretary O'Connell's explanation for this decline. The DOD has had success in its counternarcotics efforts. Additionally, the DOD has been proactive in extending its efforts to areas of increasing concern.

At the request of the administration, this subcommittee led efforts to provide new authorities to the DOD to assist countries in the Andean region as well as Central and South Asian nations in their efforts to eliminate or reduce narcotics production and traffic. Additionally, responsibility and authority to support the Department of Homeland Security (DHS) and domestic law enforcement agencies in their counternarcotics efforts has been assumed by the U.S. Northern Command (NORTHCOM). We look forward to our witnesses' testimony on how these authorities will be used and what progress has been achieved.

General Mixon, we are all anxious to hear your testimony on the situation in Colombia. General Hill testified before the Senate Armed Services Committee yesterday and reported that great

progress has been made by the Colombian armed forces. He also said that more planning and training assistance is needed to sustain this momentum and that a modest increase of U.S. Armed Forces above the current cap of 400 is required. We certainly look forward to your views on the Colombian military operations, exactly why the additional U.S. military assistance is necessary, and what challenges lie ahead.

Admiral Clingan, CENTCOM has had its hands full with the military operations in Iraq, Afghanistan, and the Horn of Africa. We have all been troubled by reports of increased poppy cultivation and opium production in Afghanistan. The Joint U.S.-British counternarcotics effort does not appear to have been successful in discouraging the narcotics production and trafficking.

The fiscal year 2004 supplemental appropriation provided \$73 million to support the counternarcotics efforts in Afghanistan and the surrounding nations. Your testimony on the effectiveness of efforts to date and what more needs to be done will be very helpful to this subcommittee.

I thank our witnesses for your service, your leadership, and your perseverance, and I look forward to your testimony. Following statements and questions, we will move to room SR-232A for a brief closed session.

I will now turn to my distinguished colleague and friend, the ranking member or vice chairman, if you will, of the subcommittee, Senator Reed.

STATEMENT OF SENATOR JACK REED

Senator REED. Thank you very much, Mr. Chairman. I want to join you in welcoming Secretary O'Connell, General Mixon, and Admiral Clingan.

Secretary O'Connell is here with a huge burden since Secretary Rumsfeld has not yet replaced the Principal Deputy ASD (SOLIC)—that individual left the office last year—and the position of Deputy Assistant Secretary of Defense for Counternarcotics Policy has remained vacant since October 2003. Therefore, Secretary O'Connell is doing yeoman's work without all the assistance he needs. We hope he can communicate again our concern to Secretary Rumsfeld about filling these positions. We know he is going to do a great job since he is a graduate of the University of Rhode Island, but there is no need to have him doing three jobs.

The purpose of our hearing today is to review the DOD request for funding and authority for counternarcotics programs in fiscal year 2005. This includes international programs, especially in the Western Hemisphere and Southwest Asia, and military efforts to support the domestic counterdrug work of other Federal, State, and local agencies.

We are also here to learn about how resources and authorities are currently being used in two of the geographic commands with a critical role to play in reducing illicit drug activities internationally, SOUTHCOM and CENTCOM.

On the domestic side, the DOD has been providing valuable intelligence, surveillance, and other support to the other agencies manning our borders, ports, and shores. The National Guard, on

top of their other duties, plays a critical role in such drug interdiction efforts.

Outside of the United States, the DOD provides international support to stop illicit drug production and trafficking. Two areas of particular interest to this committee are Colombia and Afghanistan. In Colombia, some progress appears to have been made. In 2003 the air bridge denial aerial interdiction program in Colombia resumed, 2 years after the tragic shutdown of U.S. missionaries in Peru. We heard yesterday at a full committee hearing from General Hill, Commander of SOUTHCOM, that in the last year the Colombian military has successfully captured or killed narcoterrorist leaders, is increasing the territory controlled by the central government, and denying that territory to the narcoterrorists.

Also in 2003, as the Department of State's (DOS) recently released international narcotics control strategy report notes, the government eradicated illicit crops at a record-setting pace. Unfortunately, the same report points out that Colombia remains a major producing country. Indeed, the Office of National Drug Control Policy in its January 2004 pulse report on trends in domestic drug abuse found that in 2003 crack and powder cocaine availability remained relatively stable across the United States and prices remained stable or declined in some cities.

There are of course any number of factors to explain this. However, I hope that Secretary O'Connell and General Mixon can address these facts and the challenges of reducing coca cultivation and drug trafficking in Colombia and the Andean region, especially in the context of the DOD's request for authority to raise the cap on military and civilian personnel from 400 to greater numbers.

In the meantime, we face an urgent and potentially worsening situation in Afghanistan. According to the DOS's recently released international narcotics control strategy report and the United Nations' (U.N.) latest global illicit drug trade report, Afghanistan has produced its highest amount of opium since 1999, about three-quarters of the world's illicit opium.

Moreover, the U.N. report indicates that poppy cultivation could expand further in 2004. The U.N. Office on Drugs and Crimes estimates that the revenue from opium in Afghanistan is about \$2.3 billion, equivalent to more than 50 percent of Afghanistan's estimated gross domestic product (GDP). The potential impact on security and President Karzai's control over the country is clearly jeopardized by this type of illicit activity. Indeed, just 2 days ago President Karzai told a donors conference in Berlin, in his words: "Drugs in Afghanistan are undermining the very existence of the Afghan state."

The British have had the lead in counternarcotics activities in Afghanistan but obviously they need help. In recognition of these facts, the 2003 Iraq supplemental included \$73 million for counterdrug efforts in Afghanistan. I look forward to hearing from Secretary O'Connell and Admiral Clingan—about the DOD's strategy and CENTCOM's plans for employing these counterdrug resources.

Thank you, Mr. Chairman.

Senator ROBERTS. I thank the Senator for his comments.

We have been joined by the distinguished chairman of the full committee, which obviously gives evidence of the importance of this subcommittee hearing.

I would repeat again what I said in my opening statement. We have all been troubled, as seconded by Senator Reed, by reports of increased poppy cultivation and opium production in Afghanistan and the fact that the joint U.S. and British counternarcotics efforts do not appear to have been successful in discouraging narcotics production and trafficking.

The distinguished chairman has just returned from that area. The chairman is a great believer in going out and talking to the troops in regards to our various, very difficult mission areas that we have all over the world. Mr. Chairman, I think you have been to Iraq and to Afghanistan and Pakistan at least three times and perhaps more. I joined you on a couple of those trips. But I would ask if you had anything that you would wish to say prior to the witnesses giving their testimony. Welcome, sir.

Senator WARNER. I thank you, Chairman Roberts and Ranking Member Reed, for the opportunity just to say a few words.

I was in the area of responsibility (AOR) in Iraq and Afghanistan, just a few weeks ago and you are quite correct in your mentioning of President Karzai. Both you and the distinguished Senator from Rhode Island addressed that he personally is injecting himself into this. He told us he used to figure, Senator Reed, that opium makes up 60 percent of the gross national product (GNP) estimated in Afghanistan.

But he also told us—and we are not here to fault the British, but clearly the initial efforts in Afghanistan have gone in the wrong direction. Apparently they offered a program by which if farmers would cease and desist and stop raising poppies they would get a payment. Well, as your lifetime of experience in agriculture—

Senator ROBERTS. Similar to the U.S. farm program, right.

Senator WARNER. The farmer down the road said: Wait a minute; I will start growing them, then get in line for the payments. Yes, it has a note of humor, but it has a tragic note of seriousness. These moneys are funding, as my distinguished colleague Senator Allard and I have discussed, the jihadists worldwide. Al Qaeda, Hamas, and Hezbollah are profiting from the enormity of this sum of money.

Also overlaying this, Mr. Chairman, we learned from General Jones, the North Atlantic Treaty Organization (NATO) commander of forces, that he personally, together with others, is looking toward expanding NATO's role in Afghanistan, and that is not the role of NATO, to deal with that drug situation. Until that situation is contained and is subject to a program which can lead to the cessation of this growth and production, I think NATO is not likely to further involve itself in Afghanistan. That concerns me a great deal, because I think it is important not only for NATO, but for the world to have larger participation in helping Afghanistan secure its freedom.

Therefore, I did want to hear the admiral's testimony and will listen to it. As you said, yesterday General Hill, in discussing the troop cap request before Congress, now said there is a direct correlation between our additional participation and hoped-for addi-

tional curtailment of drugs from that area into our country. It is to the benefit of the United States to do everything we can to continue to choke off the flow from Central America and most particularly from Colombia.

So I thank the chairman and the distinguished ranking member for holding this hearing, and I appreciate the opportunity to say a word or two.

Senator ROBERTS. Well, we thank you, Mr. Chairman. Let the record show that it was through your leadership that this subcommittee was formed up quite a few years ago—I was going to say several years. I have had the opportunity and the privilege of being the chairman for quite some time.

It is called the Emerging Threats and Capabilities Subcommittee. I think we had better change the name, because most of the threats have emerged. But we want to thank you for your leadership in that respect.

Senator Allard, would you have anything to say at this time?

Senator ALLARD. Mr. Chairman, I do have a brief comment. I was also on a trip in this last break to Iraq and Afghanistan and had an opportunity to visit with President Karzai. He expressed to me the very same concerns that the chairman of the Armed Services Committee expressed.

I think this particular hearing is very timely and I would join you in welcoming our distinguished panel here this morning. I look forward to hearing what their insights and recommendations might be.

Yesterday we heard related testimony from our combatant commanders and the testimony highlighted the increasing participation of terrorist organizations like al Qaeda, Hezbollah, and Hamas in the drug trafficking trade. Their involvement is not limited to the Middle East. Hamas and Hezbollah are now conducting business in our own back yard, in General Mixon's Latin America AOR. Indeed, profits from the illegal drug market are now funding jihadist political and military activities on a truly global scale.

Two weeks ago I had the opportunity to visit with President Karzai and discuss specific drug-related concerns across Afghanistan. He emphasized the immediate problem of combating both the exploding poppy cultivation and drug trade as well as the profiteering by the narcoterrorists that directed the subversive and destabilization actions against President Karzai's government. Over the long term, however, we need to assist Afghanistan with establishing broad-based economic and agricultural alternatives to growing poppies and producing opium.

Mr. Chairman, again I appreciate your calling this hearing so that we can better understand the risks surrounding the illegal drug trade and their relationship to terrorist activities throughout the world. Thank you.

Senator ROBERTS. Senator Dole, would you have any comments you would like to make?

Senator DOLE. Yes, thank you, Mr. Chairman, Senator Reed. I appreciate this opportunity to review a critical aspect of our homeland defense. The links between international narcotics trafficking and international terrorism have become increasingly clear and in the last years Congress has also recognized this connection. The

granting of expanded authority to use counterdrug funds for counterterrorism missions in Colombia recognizes that there is no useful distinction between the narcotrafficker and his terrorist activity.

I look forward to hearing about your priorities and operations. The war on drugs is often buried in the back pages and many of your successes will never be covered with much fanfare. But I applaud your dedication and particularly want to commend the men and women in your operation, who are meeting the challenges of this mission with a courage that makes us all proud.

I would just add that during the 1980s, as Secretary of Transportation, I was privileged to serve as the first female departmental head of a branch of the armed services, the United States Coast Guard, and I was very proud of the work that the young men and women did there in drug interdiction. So I certainly look forward to hearing your testimony and continuing to work closely with you in the months and years to come.

Senator ROBERTS. We thank the Senator.

Secretary O'Connell, would you please proceed. Let me say that all of your statement, every golden word, will be made part of the record and you can certainly feel free to summarize, either through bullet points or the things that you really want to emphasize, if you so choose.

STATEMENT OF HON. THOMAS W. O'CONNELL, ASSISTANT SECRETARY OF DEFENSE FOR SPECIAL OPERATIONS AND LOW-INTENSITY CONFLICT

Mr. O'CONNELL. Thank you, Chairman Roberts. I would like to thank the distinguished chairman, Senator Warner, for joining us this morning. Senator Reed, distinguished members of the subcommittee: It is my pleasure to appear before you today to discuss the DOD programs and policies that assist nations around the world in their battle against narcoterrorism. I will place my longer statement in the record, Chairman Roberts.

Fighting narcotics is a complex process that requires coordination and funding from all levels of government agencies, local and State law enforcement, and the foreign countries we assist. We are increasingly aware of the linkages between terrorist organizations, narcotics trafficking, weapons smuggling, kidnapping rings, and other transnational networks. Terrorist groups such as the Revolutionary Armed Forces of Colombia (FARC) in Colombia, al Qaeda in Afghanistan, and groups around the world can finance key operations with drug money.

The DOD, with our counterparts in the DOS and other government agencies, seeks to systematically dismantle drug trafficking networks, both to halt the flow of drugs into the United States and to bolster the broader war on terrorism.

We thank you for the \$73 million in funding added in this year's emergency supplemental to support our efforts in Afghanistan and neighboring nations. Our fiscal year 2005 counternarcotics budget requests resources to sustain these efforts. To support similar efforts in Colombia, the DOD will soon be forwarding to Congress a request for reprogramming \$50 million during this fiscal year. I am pleased to report that the DOD will maintain this emphasis on Co-

lombia by increasing our efforts in Colombia in fiscal year 2005 by \$43 million.

Our international counternarcotics support is predominantly in response to requests from our principal partners, the DOS, the Drug Enforcement Administration (DEA), and includes deployments and programs to train and furnish intelligence and operational support for drug detection, monitoring, and provide equipment to partner counterdrug forces.

Domestically, the DOD continues to work through NORTHCOM and the National Guard, with the DHS and law enforcement agencies, to coordinate the counternarcotics effort. The National Guard is an exceptional partner to law enforcement in domestic counternarcotics missions requiring militarily unique skills, including air-ground reconnaissance, intelligence analysis and analysts, and training for law enforcement agencies.

The DOD is maintaining our National Guard support for law enforcement along the southwest border and adding linguist centers in California and Washington for additional support.

In terms of the DOD's demand reduction efforts, our view is that illegal drug use is, of course, incompatible with a service member's sensitive and dangerous duties. The DOD's demand reduction policy sets minimum standards of testing rates at 100 percent, meaning each service member is tested at an average of once per year. Increased testing begins in fiscal year 2005, with a goal of reaching 100 percent testing by fiscal year 2006. This cost-effective drug testing, along with punitive consequences for members who are identified as drug users, will continue to deter drug use among military personnel.

I would like to thank you, Chairman Roberts, Senator Reed, members of the subcommittee, for the tremendous support you have provided, and I look forward to answering your questions.

[The prepared statement of Mr. O'Connell follows:]

PREPARED STATEMENT BY THOMAS W. O'CONNELL

Chairman Roberts, Senator Reed, distinguished members of the subcommittee, it is my pleasure to appear before you today to discuss the Department of Defense (DOD) programs and policy that assist nations around the world in their battle against narcoterrorism. I value the work that you do and congratulate you on your continued leadership.

Each year, my office expends a great deal of time, effort, and resources to keep drugs from crossing our borders. This is a complex process that requires coordination and funding from all levels of government agencies, local and State law enforcement, and the foreign countries which we assist. We recognize that a portion of the profits from drug sales either directly or indirectly support terrorist organizations—another reason we are working hard to reduce the supply of drugs around the world.

Illegal drug use exacts a heavy toll on American society every year. It accounts for billions of dollars in direct and indirect costs including health care, lost revenue due to crime, social welfare costs, and lost productivity. While cocaine continues to be the single most serious drug threat, heroin, synthetic drugs, methamphetamines, and marijuana are also serious, and in some cases, increasing problems. Global and regional terrorists threatening United States interests can finance their activities with the proceeds from narcotics trafficking. Terrorist groups such as the Revolutionary Armed Forces of Colombia (FARC), al Qaeda in Afghanistan, and groups around the world partially finance key operations with drug money. The DOD, with our counterparts in the Department of State (DOS) and other government agencies, seeks to systematically dismantle drug trafficking networks, both to halt the flow of drugs into the United States, and to bolster the broader war on terrorism effort.

Domestically, the DOD continues to work through U.S. Northern Command (NORTHCOM) and the National Guard with the Department of Homeland Security

(DHS) and law enforcement agencies to coordinate counternarcotics efforts. The National Guard is an exceptional partner to law enforcement in domestic counternarcotics missions requiring military-unique skills, including air/ground reconnaissance, intelligence analysts, and training for law enforcement agencies. The DOD is maintaining our National Guard support to law enforcement along the southwest border, and adding linguist centers in California and Washington.

THE COUNTERNARCOTICS BUDGET

In accordance with statutory authorities, we use counternarcotics resources as effectively and efficiently as possible to achieve national and DOD counternarcotics priorities. We focus on programs that fulfill statutory responsibilities and use military-unique resources and capabilities, and continue to advance the national priorities of the National Drug Control Strategy. Our counternarcotics authorities and funding are an effective combination that supports war on terrorism efforts and the implementation of the DOD's Security Cooperation Guidance.

The DOD's July 31, 2002, counternarcotics policy guidance states that the DOD will execute drug detection and monitoring and other programs using military command, control, communications, and intelligence resources, as well as military operational planning capabilities. This year we have issued new Demand Reduction, Domestic Support, and International Support counternarcoterrorism policies have expanded upon this definition. We focus on counternarcotics activities that will contribute to:

- The war on terrorism;
- Security Cooperation Guidance;
- Military readiness; and
- National Security.

In order to best characterize and describe the support DOD provides, the DOD defined four missions areas to encompass the scope of the DOD's program. These mission areas are:

- Demand Reduction: Drug testing, treatment, and outreach;
- Domestic Support: Active duty counternarcotics support, National Guard State Plans, National Guard schools, Aerostat radars;
- Intelligence and Technology Support: Signals Intelligence (SIGINT) collection and processing, intelligence support and analysis, research and development; and
- International Support: Detection and monitoring, intelligence support and analysis, equipment, training, and infrastructure.

The DOD provides, through combatant commands, the military departments, and the defense agencies, unique military personnel, systems, and capabilities that support domestic law enforcement agencies and foreign security forces involved in counternarcotics activities, including efforts to counter activities that aid, benefit from, or are related to narcotics trafficking. This broad-scope support is provided primarily under the authorities contained in 10 U.S. Code §§ 124, 371–374, 379–381, 2576, 2576a, Title 32 U.S. Code, § 112, Section 1004, National Defense Authorization Act for 1991, as amended; and section 1033 of the National Defense Authorization Act for 1998, as amended.

With finite funds and resources, multiple missions to address, and numerous requests for assistance, the DOD must establish priorities for its support mission. The areas that receive resources must be where DOD capabilities will provide the highest impact on the drug threat while at the same time contributing to the war on terrorism and enhancing national security. DOD's efforts will be continually evaluated based on the changing drug threat and participating nations' need.

The Department's Central Transfer Account (CTA) program request of \$852.7 million for fiscal year 2005 for the CTA reflects price growth of \$11.4 million and a program decrease of \$67.3 million over the fiscal year 2004 level of \$908.6 million, which primarily reflects the fiscal year 2004 congressional increases to the DOD's counternarcoterrorism program. The DOD's fiscal year 2005 counternarcotics budget will continue to fund, within fiscal constraints, an array of unique and effective programs that support the National Drug Control Strategy and Department goals.

DEMAND REDUCTION

Illegal drugs are readily available to DOD members and their use is incompatible with a service member's security-sensitive and dangerous duties. During the past decade, use of prohibited drugs in the United States civilian community, especially by young citizens, has increased, prompting the President to establish a goal of reducing drug use by 25 percent over each 3-year period.

The DOD has assimilated the President's goal of a 25 percent reduction in drug use over 3 years into its strategic plan. The approach emphasizes prevention of drug use through pre-accession, random drug testing, anti-drug education, and treatment. Emphasis is placed on deterring drug use through cost effective drug testing with punitive consequences for members who are identified as drug users.

In accordance with the DOD Demand Reduction policy, we plan to increase drug testing for all military members to a minimum average testing rate for each Service, the Army National Guard, and the Air National Guard of one test per member per year. This increase will be incrementally phased in through the out years. We also plan to increase drug testing for civilian employees in testing designated positions to a minimum average testing rate for each agency or component of one test per testing designated employee per year.

A total of \$19.4 million is for the National Guard State Plans and Service outreach programs, and the young marines outreach program, and \$102.7 million is for the continued support of the DOD Demand Reduction Programs.

DOMESTIC SUPPORT

Since 1989, domestic law enforcement agencies at the State, local, and Federal levels have requested military support for their respective counternarcoterrorism operations. Domestic counternarcoterrorism operations have historically included support for interdiction of cocaine, marijuana, and methamphetamines coming into the United States; interdiction of illegal drugs transiting the United States; identification of domestic marijuana grows and methamphetamine labs; identification and arrest of drug manufacturers, traffickers and distributors; and the prevention of drug use among America's youth.

We work closely with NORTHCOM and the Assistant Secretary of Defense for Homeland Defense on counternarcotics support to domestic law enforcement. The focus of this support is managed through Joint Task Force-Six in El Paso, Texas, which provides active duty and Reserve missions in areas of engineering support, aerial and ground reconnaissance, transportation, and logistics support and intelligence. These counternarcotics missions provide excellent training in real world situations and enhance domestic security.

Additionally, the DOD is committed to improving information sharing between DOD and law enforcement agencies in support of counternarcoterrorism objectives. DOD is installing classified computer systems and networks in High Intensity Drug Trafficking Area intelligence centers operated by National Guard intelligence analysts. Active duty and Reserve members are playing an integral role in arrival-zone detection and monitoring, cross-agency intelligence fusion, and the development of actionable intelligence.

A total of \$219.5 million supports Federal, State, and local drug law enforcement agencies (DLEAs) requests for domestic operational and logistical support, and will assist the DLEAs in their efforts to reduce drug-related crime. Of this amount, \$151.1 million is for a portion of the total National Guard State Plans that supports domestic law enforcement efforts and the counternarcoterrorism schools; \$20.3 million is for Domestic Operational Support, such as NORTHCOM counternarcoterrorism support to DLEAs and Title 10 National Guard translation efforts; \$32.3 million is for domestic detection and monitoring efforts (Tethered Aerostats); and \$15.8 million is for command, control, communication, computers, and intelligence support, such as ADNET.

INTELLIGENCE AND TECHNOLOGY SUPPORT

The basic nature of the smuggling threat mandates the need for explicit intelligence if the DOD is to be effective in detection, monitoring, and interdiction operations. The DOD will continue to provide critical intelligence support to national policies designed to dismantle narcotics trafficking and international terrorist organizations benefiting from drug trafficking. These intelligence support programs make use of unique DOD capabilities, systems, skills, and expertise, and directly support the National Drug Control Strategy.

Use of new technology continues to be instrumental in combating narcoterrorist activities. The DOD will continue to test, evaluate, develop, and deploy technologies that are used to collect and survey suspect narcoterrorist smuggling operations in air, land, or sea. Wide area surveillance will be a technology challenge as legacy systems such as Relocatable Over-the-Horizon Radar have surpassed lifecycle expectations and will require major hardware and software replacement to lower the risk of system failure. The program will pursue merging disparate data and sensor feeds into a common operating picture, to provide worldwide counternarcotics elements with counternarcoterrorism intelligence and operational awareness.

Ringold translation support will be expanded to include additional languages critical to the global war on terrorism. Throttle Car is a critical data warehousing effort jointly funded by the DOD and the Drug Enforcement Agency (DEA). Capabilities will be increased to accommodate capacity increases and ensure readiness.

A total of \$103.3 million will be used for intelligence programs to collect, process, analyze, and disseminate information required for counternarcoterrorism operations. Technology programs increase the DOD's abilities to target narcoterrorist activity. A total of \$58.6 million is for counternarcoterrorism intelligence support and analysis; \$21.1 million is for SIGINT collection and processing; \$10.0 million is for Service and U.S. Special Operations Command (SOCOM) command and control programs; and \$13.7 million is for counternarcotics technology efforts.

INTERNATIONAL SUPPORT

Financial, political, and operational linkages exist among narcotics trafficking, smuggling, and the global expansion of terrorism. Since September 11, 2001, the DOD has expanded its counternarcoterrorism mission to include targeting those terrorists groups worldwide that use narcotics trafficking to support terrorist activities. In order to support the war on terrorism, DOD counternarcoterrorism uses its resources in regions where terrorists benefit from illicit drug revenue and know-how, and is working to bolster already well-established counternarcoterrorism efforts in U.S. Pacific Command (PACOM), particularly in Southeast Asia where the U.S. and its Asian partners face a challenging combination of terrorism/extremism, drug trafficking, and the serious need for increased maritime security.

In the CENTCOM area of operation, terrorists/extremists in Afghanistan and its neighboring countries exploit the abundance of illicit drugs to support their activities. The DOD is working to break the links between terrorism and drug trafficking. In Afghanistan, where drug traffickers have extensive links to terrorists/extremists, the DOD will provide substantial counternarcoterrorism support to the United Kingdom (U.K.)-led counternarcoterrorism efforts in Afghanistan, as well as developing Afghan border infrastructure and border police capabilities. In other countries in Central Asia and the Middle East, CENTCOM is currently expanding its counternarcoterrorism efforts to curb the transit of illicit drugs through international smuggling corridors. We thank you, therefore for the \$73 million in funding added in this year's emergency supplemental to support our efforts in Afghanistan and neighboring nations. Our fiscal year 2005 counternarcotics budget requests resources to sustain these efforts.

A total of \$40.8 million will be used for emerging threats support efforts in the CENTCOM, PACOM, and U.S. European Command (EUCOM) AORs to detect, interdict, disrupt, or curtail activities related to substances, material, weapons, or resources used to finance, support, secure, cultivate, process, or transport illegal drugs. \$29.0 million supports operations in those AORs, including section 1033 support; \$11.8 million is for AOR command and control support.

Cocaine is the primary drug threat in the United States due to its high demand, availability, and expanding distribution to new markets, high rate of overdose, and its relation to violence. In 2002, there was an estimated 250 metric tons of cocaine consumed in the U.S. There were approximately 2 million people age 12 and older using cocaine in the U.S. in 2002. Each user consumed approximately 34 grams of cocaine a year.

Cocaine consumed in the United States originates from coca plants grown in South America. The average potential production of cocaine produced in South America in 2002 was over 1,200 metric tons. Of this amount, approximately 879 metric tons of export quality cocaine departed South America. Approximately 540 metric tons of cocaine were exported to the U.S. and another 230 metric tons went to Europe. After cocaine seizures and consumption throughout the transit zone en route to the U.S., some 350 metric tons of export-quality cocaine were available in U.S. markets in 2002.

Colombia produced approximately 680 metric tons of 100 percent pure cocaine in 2002. Coca leaf produced in other countries, primarily Peru and Bolivia, is transported across the border into Colombia to be processed into hydrochloride cocaine. The processed cocaine is then shipped/exported through other bordering countries or through the Caribbean and Eastern Pacific to the final destination. Over 500 maritime shipments depart Colombia annually, equating to almost two shipments a day. Of the cocaine that enters the United States, 72 percent passes through the Mexico/Central America corridor, another 27 percent moves through the Caribbean, and 1 percent comes directly from South America.

Colombia offers a unique window of opportunity with congressional approval of expanded authority and the aggressive leadership of President Uribe. The administra-

tion continues to support President Uribe in seeking a secure and democratic Colombia, including providing resources in support of Colombia's Plan Patriota.

Supplemental funding (\$34 million) in fiscal year 2003 was provided by Congress for DOD support to Colombia initiatives. With existing funds and the additional supplemental funding, SOUTHCOM increased support to the Colombian military, adding to their capability through a variety of programs. These programs provided critical support in logistics, mobility, light infantry operations, riverine operations, command, control and communications, at-sea interception, maintenance, security, base operations support, and intelligence collection and dissemination. Congress extended expanded authority to support Colombia's counternarcotics and counterterrorist efforts for fiscal year 2004.

Interagency principals have planned to increase assistance for the Colombian military during fiscal years 2004 and 2005. SOUTHCOM developed a support package to provide needed assistance to the Colombian military. This funding will continue to support and expand upon programs already established during fiscal year 2003 and will focus on increasing the Colombian military's capability in mobility, logistics, operationalizing intelligence, planning assistance, medical evacuation and care, secure communications, and security. To support these efforts in Colombia, the DOD will soon be forwarding to Congress a request for reprogramming \$50 million during this fiscal year. I am pleased to report that the DOD will maintain this emphasis on Colombia by increasing our efforts in Colombia in fiscal year 2005 by \$43 million.

A total of \$366.9 million will support efforts in the SOUTHCOM AOR, including detection and monitoring operations to assist U.S. law enforcement agencies to counter the flow of drugs in transit into the United States, and supporting nations (such as Colombia) in their fight against narcoterrorism. A total of \$173.0 million is for detection and monitoring platforms and assets; \$142.5 million is for operational support; and \$51.4 million is for AOR command and control support, including Joint Interagency Task Force South (JIATF-S).

The current troop cap limits the U.S. presence in Colombia to 400 military personnel and 400 contractors. SOUTHCOM manages this on a daily basis, often canceling or postponing personnel travel to Colombia. To date, the impact has been small. However, in the coming year as the Colombian military will be conducting full-scale operations across the country, the personnel cap will begin to have a deleterious effect on the mission. While U.S. personnel will not be directly on the front lines, more training and planning assistance will be required for the Colombian military, since they will be directly engaged on a broader front to defeat the narcoterrorists. We should support this effort with manning that reflects the current and future situation on the ground. Consequently, the administration has requested an increase of the personnel cap to 800 military and 600 contractor personnel.

CONCLUSION

The DOD appreciates Congress' continued support of the counternarcotics program. I thank you, Chairman Roberts, Senator Reed, and the members of the subcommittee for the tremendous support you have provided. I look forward to answering your questions.

Senator ROBERTS. We thank you for your statement and we thank you for summarizing. Without objection, your full statement will be made a part of the record.

Admiral Clingan, would you please proceed.

STATEMENT OF REAR ADM. BRUCE W. CLINGAN, USN, DEPUTY DIRECTOR OF OPERATIONS, U.S. CENTRAL COMMAND

Admiral CLINGAN. Chairman Roberts, Chairman Warner, Senator Reed, members of the subcommittee: Thank you for this opportunity to join you today to discuss CENTCOM's role in the DOD drug program, and in particular our efforts in Afghanistan to curtail narcotics production and trafficking.

As many of you are aware, currently in Afghanistan there are more than 10,000 soldiers, sailors, airmen, and others conducting counterinsurgency operations and promoting stability and security. That 10,000 represents a small number of the service members currently deployed to our AOR, conducting counterinsurgency oper-

ations in Iraq, looking hard in the Horn of Africa to determine what kind of international terrorist networks are functioning there, and prosecuting the greater global war on terrorism in the 25 countries that comprise our AOR. Although the 10,000 soldiers in Afghanistan represent a small percentage of the Armed Forces we have in the AOR, clearly their contributions and the importance of their efforts are hard to overstate.

We have a couple of objectives that we are after in Afghanistan. Not the least among them are setting conditions for economic reconstruction and for the ongoing political process. Countering the growing narcotics trade, which contributes to the criminal and terrorist activities that undermine efforts to achieve that stability, are important and a priority for CENTCOM and the coalition.

In fiscal year 2004, Congress made available to CENTCOM \$73 million to further our counternarcoterrorism efforts in Afghanistan and the bordering countries. For CENTCOM, that represented a 300-fold increase in our budget for this effort—not 300 percent, 300-fold. So since October we have invested ourselves in concentrating on developing a comprehensive plan that will address the narcotics problem in Afghanistan, along with our partners in the United Kingdom (U.K.) and the other interagency units.

This plan, which I have outlined in my prepared statement, is in execution now and on track to achieve some tangible effects in this realm in the third and fourth quarter of this year.

Thank you again for the opportunity to address this subcommittee and I look forward to your questions, sir.

[The prepared statement of Admiral Clingan follows:]

PREPARED STATEMENT BY REAR ADM. BRUCE CLINGAN, USN

Chairman Roberts, Senator Reed, distinguished members of the subcommittee, it is an honor to appear before you today to discuss illegal narcotics trafficking in Afghanistan, its relation to narcoterrorism, and the programs we are developing to help counter this problem in collaboration with other agencies and governments. We appreciate Congress' support of the Department of Defense (DOD) counternarcotics program in last year's supplemental appropriations bill, particularly in regard to our efforts related to Afghanistan.

U.S. Central Command (CENTCOM) is currently focused on defeating transnational terrorism and creating secure and stable environments in Iraq and Afghanistan. However, the broader CENTCOM area of responsibility (AOR) encompasses the geographic and ideological heart of the global war on terror, a war without borders that spans all 25 countries in the region. The overt war on terror began in Afghanistan. A stable, democratic, economically viable state there will provide an alternative to the terrorist vision of a future characterized by oppression and prolonged conflict.

The narcotics problem in Afghanistan presents a special challenge. The international community and Afghan leadership, with the support of the United States and other coalition allies, is addressing this challenge. The United Kingdom (U.K.) has the international lead in Afghanistan and with key Afghan leaders, including President Karzai and Minister of Interior Jalali, is beginning to take action against the narcotics trade. This problem requires a comprehensive, sustained effort championed by the Afghan Government. Technical help and resources from the U.K., U.S., and the international community will greatly enhance the Afghan Government's effectiveness in combating this destructive trade.

The CENTCOM counternarcotics program for Afghanistan and the surrounding Central Asian states is being developed in coordination with the Department of State's (DOS) efforts to improve law enforcement in Afghanistan and complement the programs developed by the U.K. In the short term, we will focus our efforts on direct assistance to the Afghan Government that establishes a more effective counternarcotics capability.

CENTCOM will focus the \$73 million made available in the fiscal year 2004 supplemental for Afghanistan's counternarcoterrorism program to disrupt the illicit drug trafficking that supports terrorist elements in Afghanistan. These groups include Taliban remnants, al Qaeda operatives and leaders, other extremist elements like Gulbuddin Hekmatyar's Hizb-I-Islami, as well as Afghan criminal gangs and transnational criminal elements.

The supplemental funding that Congress has approved will assist coalition, host nation, contractor, and other governmental agencies to:

- Monitor traditional overland smuggling routes from Afghanistan to the bordering nations through the construction of border control checkpoints and the employment of sensor technology;
- Equip Afghan counternarcotics units and law enforcement agencies to conduct interdiction operations against narcotraffickers;
- Provide Afghanistan with the communications connectivity necessary to rapidly respond to narcoterrorist threats with synchronized interagency operations;
- Establish an interagency counternarcotics Intelligence Fusion Center to gather, collect, process, and disseminate information leading to actionable intelligence. This will enhance operations by U.S. law enforcement officers, Provincial Reconstruction Team law enforcement liaison cells, coalition forces, the Drug Enforcement Administration (DEA), the Crimes and Narcotics Center, U.K. law enforcement and intelligence agencies, and other governmental agencies represented in the region;
- Conduct an Afghan counternarcoterrorism public awareness program in concert with the DOS that helps the Afghan interior ministry develop a public affairs capability;
- Provide equipment and other support in concert with U.K. operations against narcoterrorist activities in Afghanistan; and
- Conduct Maritime Interception Operations and monitor vessels suspected of transporting narcotics and/or terrorists based on actionable intelligence.

CENTCOM views narcotrafficking as a significant obstacle to the political and economic reconstruction of Afghanistan. The revenue generated from poppy cultivation provides resources for extremists and the smuggling infrastructure that supports narcotics trafficking facilitates terrorist transportation and logistics. Local terrorist and criminal leaders have a vested interest in using the profits from narcotics to oppose the central government and undermine the security and stability of Afghanistan. As a result, the DOD counternarcotics program in Afghanistan is a key element of our campaign against terrorism.

As important as our contribution to the DOD counternarcotics program is, the underlying causes for the growth of narcotrafficking must be addressed. Farmers are hard pressed to cultivate cash crops that can provide revenue for their families and villages. Poppies are notoriously easy to grow, and their market value makes it difficult for legitimate crops to compete. Additionally, narcoterrorists prey upon farmers who do not produce, contributing to a lack of confidence at the local level in the capability of the central government to provide adequate security. We must not only target poppy production and trafficking, we must also implement holistic initiatives that enhance the economy and agriculture to provide alternatives to the opium growers if we are to be ultimately successful in eliminating narcotics proliferation in Afghanistan and the region.

Thank you for the opportunity to share CENTCOM's strategy, objectives, and plans.

Senator ROBERTS. We are going to set a record, Mr. Chairman, for summarized statements.

Senator WARNER. You know how to run a show.

Senator ROBERTS. This is outstanding.

We would now like to hear from General Mixon. Would you please proceed.

**STATEMENT OF BRIG. GEN. BENJAMIN R. MIXON, USA,
DIRECTOR OF OPERATIONS, J-3, U.S. SOUTHERN COMMAND**

General MIXON. Yes, sir. It is good to see you again, sir, and Senator Warner, after spending a very long day with you last year in Bagram, Afghanistan, and Kabul, if you recall that evening where we loaded you on a C-130 aircraft late at night. You may not recall

that. I certainly do, and it was an honor for me to escort you in Afghanistan.

Senator ROBERTS. I remember that lunch.

Senator WARNER. Thank you for that recollection. I remember that.

Senator ROBERTS. I am not sure I want to remember it again, but I remember that lunch. [Laughter.]

Senator WARNER. As a matter of fact, we had the same meal that you were providing the training of the Afghanistan army; is that not correct?

General MIXON. Yes, sir.

Senator ROBERTS. Yes, and they were very proud of that meal. It was a true Afghan meal.

Senator WARNER. That is right.

Senator ROBERTS. I would recommend it for anybody who wants to—

Senator WARNER. Steady as we go. Thank you very much. [Laughter.]

Senator ROBERTS.—enjoy Afghan cuisine.

Please proceed, General.

General MIXON. Sir, I am in a different environment now than I was in Afghanistan, but an equally important environment, as you pointed out.

My statement is a little bit longer. If you would indulge me, I think it is important to outline for you what we are doing.

Senator ROBERTS. Please proceed.

General MIXON. Mr. Chairman, Senator Reed, distinguished members of the subcommittee: Thank you for allowing me a few minutes to make some opening comments. We at SOUTHCOM are fully committed to meeting DOD's responsibilities in the fight against drugs and narcoterrorists. We fulfil these responsibilities through detection and monitoring programs, close interagency coordination, and military support to partner nations. Our programs cover the entire SOUTHCOM AOR, including Central and South America and the Caribbean Basin.

Our principal agent for the planning and execution is the National Joint Interagency Task Force-South (JIATF-S) located in Key West, Florida. JIATF-S is a one of a kind premier organization of excellence for multi-service, multi-agency, and multi-national support to the counterdrug mission. Their operations, in conjunction with SOUTHCOM, deliver an integrated approach to meeting DOD mission sets in the war against drugs and narcoterrorists.

Our cooperation with the Central American countries continues to strengthen. During the last year, besides our daily interdiction efforts, we conducted 18 major surge drug counteroperations. The most significant narcotrafficking pattern centers on suspect air traffic transitting the Central American corridor. Using the Cooperating Nations Information Exchange System, we continue to make great strides in regionalizing the effort to identify, monitor, and respond to suspect air and maritime tracks in Central America.

Through numerous maritime professional exchanges and our Joint Task Force (JTF) Bravo helicopter deployment, SOUTHCOM and JIATF-S continue to develop the Central American partner

nation abilities to accept, hand off, and effect interdiction and apprehension of illicit trafficking activities.

We also remain strong partners with our Caribbean friends. Besides periodic multinational and bilateral counterdrug operations, we also remain committed to assisting in the maintenance, logistics, and training of their counterdrug and maritime forces.

We continue our robust military cooperation with our South American allies, focusing on improving their capabilities to deal with the narcoterrorists and war on terrorism threats. We have deployed counterterrorist and counterdrug training teams to Ecuador, Bolivia, Peru, Chile, and Paraguay. Brazil, Ecuador, and Peru have recognized the threat of Colombia's narcoterrorists to their stability and are taking concrete steps to curtail it.

Assisting Colombia in their fight continues to be in the United States' best interest and a top priority for SOUTHCOM. In close coordination with the DOS, we continue to provide a full range of support to the Colombian government, its security forces, and its people. This includes training and equipping both the military and police, assisting the ministry of defense in the development of modern budget and logistics organizations, assisting them in their narcoterrorist demobilization programs, and providing humanitarian assistance to populations that are most dramatically affected by this narcoterrorist war.

Two of our most successful equipment and sustaining programs remain the extensive support we have provided to the Colombian army's counternarcotics brigade and the infrastructure security strategy program, which has dramatically reduced the number of narcoterrorist attacks on Colombia's northeastern rural infrastructure. We are also extensively involved in supporting the Colombian military's campaign plan.

I would like to emphasize that all of our training and advising programs operate under strict rules of engagement that prohibit U.S. service members from participating in combat operations.

The continuation of expanded authority is the single most important factor for us to continue building success in Colombia. This legislation has allowed us to use funds available for counterdrug activities to provide assistance to the government of Colombia for a coordinated campaign against the terrorist activities of its illegal armed groups. Granting of expanded authority was an important recognition that no meaningful distinction can be made between terrorists and drug traffickers in our region. All three of the terrorist groups operating in Colombia are deep into the illicit narcotics business.

Another key legislative priority we support is the raising of the force ceiling, or cap, currently at 400 military and 400 civilian contractors. We at SOUTHCOM seek authorization to increase the military numbers to 800. In fiscal years 2003 and 2004 we have repeatedly had to curtail training missions to both the Colombian military and police, cancel intelligence and reconnaissance missions, staff visits, and limit other programs, ranging from medical exchanges to officer development programs.

If granted this authority, we do not envision an immediate increase in military personnel. This increase will simply allow us the

flexibility to enhance support as required while still complying with the rules of engagement.

We have continued to support Colombia's air bridge denial program since its resumption in August 2003. Since the program restarted, there have been 14 aircraft forced down, 11 of those destroyed, and 7.9 metric tons of drugs seized. We are prepared to support the DOS's nonlethal program in Peru upon its resumption.

Measures of effectiveness in this war are difficult to gauge. Using calendar year 2002 and 2003 data, which roughly corresponds to the inception of expanded authorities, the Colombian security forces have experienced dramatic successes on all fronts. I would like to cite a few of these examples. The 2003 homicide rate is the lowest since 1987, pegged at approximately 52 per 100,000 population. We are also proud of the capture of over a dozen mid-level members and one senior-level member of the FARC leadership, and the restoration of Colombian government presence in all of Colombia's 1,098 municipalities.

In conclusion, we are at a critical point in Colombia's history. Under the leadership of President Uribe, who enjoys a very high approval rating, the military and police have regained areas long held by the narcoterrorists. They have also dealt serious blows to the leadership of these groups and have embarked on a strategic offensive to dismantle the FARC. Colombia's citizens have regained hope and the security forces are imbued with a renewed sense of momentum and commitment. Our continued support to them at this point is critical.

Thank you for the opportunity, and I would like to highlight the great work the men and women do in SOUTHCOM every day, and I appreciate the opportunity to make this statement and I look forward to your questions.

[The prepared statement of General Mixon follows:]

PREPARED STATEMENT BY BRIG. GEN. BENJAMIN R. MIXON, USA

Mr. Chairman, Ranking Member Reed, and distinguished members of the subcommittee, it is a pleasure to appear before you today to discuss the United States Southern Command's (SOUTHCOM) role in assisting Colombia with its battle against narcoterrorism. Every day your soldiers, sailors, airmen, marines, coast guardsmen, and civilians at SOUTHCOM are working hard and employing their skills to accomplish our missions in this vital endeavor. We are shoring up our own national security by addressing this challenge at this time and in this place. Simultaneously, we are laying the groundwork to promote and maintain future security and stability.

Colombia is at a decisive point in its fight. We are seeing steady progress toward establishing security and stability in Colombia and we are confident the Government of Colombia will continue to do so under President Uribe. President Uribe is a man of vision, principle, and substance. He is inculcating his government and his Armed Forces with an aggressive spirit and belief they can win the war against the narcoterrorists and end the violence. But the momentum he has built and the progress Colombia has shown is reversible. Consequently, we must maintain our steady, patient support in order to reinforce the successes we have seen and to guarantee a tangible return on the significant investment our country has made to our democratic neighbor.

To outline SOUTHCOM's efforts in this endeavor, I will discuss the status of SOUTHCOM's support of Plan Colombia, the progress we are seeing in Colombia, our activities with the Andean Ridge countries, and the way ahead. Assisting Colombia in their fight continues to be in our own best interest. A secure Colombia will benefit fully from democratic processes and economic growth, prevent narcoterrorist spillover, and serve as a regional example. Conversely, a failed Colombia, serving as a safe haven for narcoterrorists and international terrorists, would be a

most unwelcome regional model. The center of gravity right now is in Colombia, and the future health of the region hinges upon what happens there. While this is Colombia's fight to win, we have the opportunity to tip the balance by augmenting their efforts decisively with our unwavering support.

SOUTHCOM'S SUPPORT TO PLAN COLOMBIA

Plan Colombia is a 6-year plan designed to defeat the threat the Colombians face. This threat continues to come from the three largest illegal armed groups in Colombia, all named on the Department of State's (DOS) list of foreign terrorist organizations and two named on the President's list of drug kingpins: the Revolutionary Armed Forces of Colombia (FARC), the National Liberation Army (ELN), and the United Self-Defense Forces (AUC). While these groups may retain fragments of their founding philosophies, they appear to have jettisoned ideology in favor of terrorist methods and narcotrafficking.

Narcoterrorism threatens the stability of several nations in Latin America and the Caribbean and erodes the very fabric of democracy by spawning terrorism, corrupting public institutions, promoting criminal activity, undermining legitimate economies, and disrupting social order. The violence and corruption not only threatens our neighbors, it poses a direct national security threat to our homeland. Illicit drug abuse is certainly a multi-faceted problem, but our support to Plan Colombia is effectively addressing one of its most critical components.

Our role at SOUTHCOM is to support implementation of the military aspects of the plan. The plan addresses the entire depth of Colombia's complex problem, however, and is by no means envisioned as a simple military solution. Various other U.S. Government agencies and departments received funding to support both military and non-military aspects of Plan Colombia.

Colombia is just completing the fourth year of this 6-year plan. The first phase of their three-phased plan focused on the Putumayo and Caqueta Departments of southern Colombia, where approximately half of Colombia's coca cultivation took place and lasted from December 2000 until December 2002. That phase consisted of challenging illegal armed groups, finding and destroying cocaine laboratories, and providing security for intensive aerial eradication of coca, the principal bill payer for narcoterrorism in Colombia. SOUTHCOM was responsible primarily for training and equipping a Counternarcotics (CN) Brigade, fielding Blackhawk and Huey II helicopters, and also training pilots and crews during the first phase. Secondary efforts provided for infrastructure upgrades, riverine training, and counterdrug intelligence support. In Phase II, the Colombians are expanding the size of the Armed Forces, working with neighboring countries for combined operations, building forests where coca once grew, and creating units comprised of campesino soldiers to help guard towns where government presence was formerly lacking. These initiatives support continued drug eradication and interdiction. Phase III of Plan Colombia culminates the entire plan by expanding the government presence and control nationwide. While it is still too early to predict the exact end state of Plan Colombia, the progress we are seeing is a positive development that promises to complete that plan and institutionalize its successes.

CN BRIGADE

The CN Brigade headquarters and its three battalions are the best-trained and equipped conventional units in the Colombian Army. Its mission is to conduct ground, riverine, and air assault offensive operations against narcoterrorist organizations and provide ground security for aerial eradications. U.S. military personnel conducted staff and light infantry training for almost 2,300 troops. In accordance with Plan Colombia, the CN Brigade was originally designed to operate in southern Colombia. The CN Brigade has had impressive results during drug interdiction operations in that part of the country by destroying coca processing labs, providing security to eradication operations, and seizing chemical precursors and coca leaf. Most recently, the CN Brigade captured Nayibe Rojas Valdarrama, aka "Sonia," Chief of Finances and Logistics for the FARC Southern Bloc. Her capture has led to numerous other related arrests and has degraded the FARC's ability to conduct narcotrafficking.

The Colombian military synchronized the deployments of the CN Brigade in Phase I with Colombian National Police and DOS eradication efforts. The Office of National Drug Control Policy found that Colombia's coca cultivation decreased by 21 percent in 2003 from 2002. Because of its success in the Putumayo and Caqueta Departments, this brigade is now also being used beyond its original scope in other parts of the country, most notably the Nariño Department. We continue to provide sustainment training to the CN Brigade. In 2003, this unit transformed its organi-

zational structure to become more flexible and deployable to plan and conduct offensive operations throughout the entire country.

HELICOPTERS

Since December 2000, the United States has provided air mobility to the first CN Brigade using a company of 28 UH-1Ns with a combination of Colombian and DOS contracted pilots. The UH-1N aircraft are based in Tolimaida with the Colombian Army Aviation Battalion and are forward deployed to Larandia for operations. The current operational focus remains providing air mobility support for counterdrug operations as well as selected counternarcoterrorism operations. Delivery of the 25 Plan Colombia Huey IIs was completed in September 2002. These helicopters are also based at Tolimaida and currently focused on supporting pilot training and infrastructure security. All 14 UH-60L Blackhawk helicopters procured under Plan Colombia for the Colombian military began operations in January 2003 after a thorough program of pilot training. These helicopters also support the CN Brigade, pilot training, and infrastructure security. While the DOS is responsible for program oversight and funding for operations and contract maintenance for all of these helicopters, quality control is provided by a U.S. Army Technical Assistance Field Team. The Department of Defense (DOD) retains responsibility for training Colombian Army pilots, crew chiefs and aviation unit maintenance personnel to fly and maintain Blackhawk and Huey II helicopters. The maintenance programs are supplemented by a safety initiative that integrates risk management planning into air operations. Overall, these helicopters have given the Colombian military unprecedented mobility. This mobility allows an increasingly well-trained Colombian Army to maneuver across a rugged landscape, in parts of the country they have not operated in for years, resulting in greater operational effectiveness against the narcoterrorists.

ENGINEER AND INFRASTRUCTURE SUPPORT

The Plan Colombia supplemental appropriation allowed us to complete large-scale infrastructure improvements that greatly accelerated the development of increased operational capabilities for Colombia's forces. In subsequent years, we have continued to provide necessary facilities to support our training and equipping programs. Among our more significant engineer projects were the expansion of both fixed-wing and helicopter facilities at Tres Esquinas, the establishment of a comprehensive helicopter pilot training school at Melgar and Tolimaida, improved port facilities at Buenaventura, development of riverine support and maintenance facilities at Tres Esquinas and La Tagua, and the development of helicopter operational and support facilities at Larandia. We are moving now to develop the logistics infrastructure needed to support Colombian forces as they move outward to re-establish government control throughout Colombia. We just completed and turned over a hangar that will improve the operational rate of the Colombian C-130 fleet by improving their maintenance program. Additionally, in September 2003, we awarded contracts to establish logistics support centers, motorpools, and maintenance facilities. As a direct result of the completion of these facilities, Colombian forces will be better able to conduct and sustain forward operations.

PROFESSIONALISM AND HUMAN RIGHTS

Embedded within the training SOUTHCOM and U.S. forces provide under Plan Colombia is the institutionalization of human rights and the respect for law by the Colombian military. We have helped the Colombian Ministry of Defense institute legal reforms through the creation of a Military Penal Justice Corps, similar to the U.S. military's Judge Advocate General's corps. On July 29, 2003, the permanent facility for Colombia's new Armed Forces School of International Humanitarian Law, Human Rights, and Military Justice opened. This school teaches human rights and international humanitarian law to attorneys, commanders, officers, and sergeants. Additionally, hundreds of military, police, and civilian lawyers have received continued professional legal education beyond that provided at the school. The Colombian military legal corps, similar to the method used by our Armed Forces, is also becoming embedded with the field units of the Army in order to provide on the spot legal advice to commanders during operations.

SOUTHCOM continues to support Colombian efforts to extend human rights training throughout its ranks. Colombia is fighting its illegal armed groups justly, in accordance with democratic values and human rights. This is instrumental in what we are collectively striving to achieve.

Under President Uribe's "Democratic Security Policy," extrajudicial executions in 2003 were down 48 percent, assassinations were down 41 percent, homicides of

trade unionists were down 68 percent, and forced displacements were down 68 percent. Further, none of the units U.S. forces trained have been accused of human rights abuses. I am confident that President Uribe and the Colombian military have taken human rights to heart, unlike their adversaries, who commit the vast majority of human rights abuses. Alleged human rights abuses by Colombian security forces are now less than 2 percent of those reported and the institutionalization of respect for human rights continues.

In 2003, as members of the illegal armed groups demobilized, over 77 percent turned themselves into government forces. If they suspected that they would be subject to torture and abuse, they would have turned themselves into nongovernmental organizations and the Church as they did in years past, before human rights became an integral part of the Colombian military's ethos. The Colombian Government is not resorting to rural concentration camps, peasant roundups, massacres, disappearances or other tactics used by their enemies. Their professional ethos is also reflected in public opinion that lists the Colombian military as the second most respected institution in the country just behind the Catholic Church.

THE URIBE ADMINISTRATION'S PROGRESS

Plan Colombia predates President Uribe by 2 years and will end coincidentally when he leaves office in 2006. While he has firmly embraced the plan, he has also brought to office new initiatives and a long-term vision that extends well beyond that 6-year plan. President Uribe won a landslide victory by running on a platform of aggressively defeating and neutralizing the terrorists in his country while asserting government control of national territory. After years of failed attempts to negotiate with illegal armed groups, to include a bold experiment that gave the FARC a safe haven in the southern part of the country, the people of Colombia had finally had enough of terrorist groups, especially after seeing how the FARC had used their safe haven to plot terrorist acts and establish drug base camps instead of developing their notional politics into a concrete reality.

President Uribe faces enormous challenges, but he is using his mandate to put deeds behind his words. He has been in office for 19 months, and turning the government from a conciliatory posture to an aggressively focused one has not been an easy task. We need to be steadfast in our support of him now to set the conditions for his longer-term success. The signs of his progress, which have built upon our support to Plan Colombia, are already becoming evident. Colombia developed a comprehensive national security strategy that directs all the tools at the government's disposal toward a common end of defeating the terrorists. The Colombians now spend nearly 4 percent of their gross domestic product (GDP) on defense. President Uribe has levied a war tax on the country's wealthiest citizens. He is increasing police end-strength to supplement those already planned for the military. The government has developed a plan to protect travelers along the major roadways. He is pushing the military and the police to gain control of areas and neighborhoods dominated by the narcoterrorists.

The military has had growing operational success against the narcoterrorist organizations across the country, particularly against the mid-level leadership, and all indications are that they will continue to take the fight to the illegal armed groups over the next year. The firm resolve of the Uribe administration, backed by aggressive military operations, has resulted in increased desertions by enemies of the state. These desertions are promising, especially since the government provides a program under which those who leave the FARC voluntarily are put in protected housing and receive health care, education, and work training.

Our Special Operations Forces (SOF) have trained the staff and soldiers of Colombia's best units, giving these units an added edge of operational effectiveness that is paying dividends. The Colombian Army has established its own Special Operations Command to coordinate and oversee difficult and complex operations against the most sensitive targets. The establishment and training of Commando and Lancero Battalions, modeled on our own Ranger battalions, has given the Colombians a unit that can strike high-value targets including enemy leadership. The Colombian military is also in the process of establishing a Joint Special Operations Command that will synchronize special operations among all branches of the Colombian military. SOUTHCOM's special forces component, Special Operations Command South, will provide training to this new unit. Currently, U.S. military forces are conducting deployments in 14 different locations in Colombia, providing training to 9 major Colombian military units. Additionally, Planning Assistance Training Teams are assisting the Colombian army's mobile brigades in operational planning. We have also trained the Colombian urban counterterrorist unit and continue to upgrade their capabilities and equipment.

Our SOF also trained Colombian Armed Forces in Arauca to protect a portion of the 772-kilometer oil pipeline that had been a frequent target of FARC and ELN attacks. Pipeline attacks are down significantly. This training was just one part of a nationwide Infrastructure Security Strategy that protects critical facilities and re-establishes control in narcoterrorist influenced areas of the country.

We continue to train Colombia's helicopter pilots, providing their forces a growing ability to perform air assaults that are key in the battle against dispersed enemies. We deploy intelligence, surveillance, and reconnaissance assets in-country that have provided timely, actionable intelligence to Colombian units. We are training their staffs with Planning Assistance Training Teams that increase their ability to plan and execute intelligence driven operations against illegal armed groups. We are working with Colombian Marines to establish a third Colombian Training Team that will work with units of the Riverine Brigade to increase the operational readiness and proficiency of Colombia's extensive riverine forces. We contracted logistics to help the Colombians maintain their own C-130 fleet and provided maintenance trainers to improve the operational readiness of their helicopter fleet. Toward that end, we are looking forward to establishing long-term solutions to readiness issues with the establishment of a National Maintenance Point for Colombia's helicopters, and a Logistical Automation System that will integrate supply and fiscal management for parts and materials for the Colombian military and National Police. We also are assisting in the training of the Colombian National Police Carabineros (Rural), who have recently established presence throughout the country.

We continue to provide medical training and assistance to the Colombian military to improve their health services support to their combat troops. With our support, the Colombian military now has a well-established "Combat Life Saver" training course. Additionally, they have adopted our Forward Surgical Team concepts and doctrine and have moved ahead by establishing four deployable surgical teams.

In civil-military relations, we are helping the Colombians to build a civil affairs capability that will enhance the communications between the Colombian military and government with the populace in previously ungoverned spaces. In the past year, with our support, the Colombian military has written and adopted a civil affairs doctrine that allows them to minimize the impact of their military operations on the civilian population, while at the same time synchronizing humanitarian assistance with their operations. In the departments of Arauca, Cudinamarca, Caqueta, and Guaviera—portions of the last three are in the former despeje—the Colombian military has provided basic medical care to over 20,000 civilians and rehabilitated a number of educational and medical facilities. In the next 6 months, they will conduct 39 similar events in conjunction with other Colombian ministries. In addition, our civil affairs forces have worked with the office of the Minister of Defense to develop mechanisms that synchronize the interagency planning requirements needed to re-establish governance in previously ungoverned spaces. To this end, the Government of Colombia has established a Coordination Center for Integrated Action. This interagency body—consisting of representatives from the office of President Uribe, the Ministries of Defense, Interior, Education, and others—develops policies and plans to ensure that as the Colombian military successfully reclaims terrorist controlled areas that the other bodies of government rapidly respond, establish presence, and provide the population with the government services they did not have while under control of the illegally armed groups.

Beyond our coordinated military efforts, President Uribe has sponsored political, economic, and judicial reforms. These measures will assist the Colombian economy as well as free up resources for increased security measures. President Uribe aims to reduce the government bureaucracy, eliminate corruption, and enact fiscal reform. Economically, President Uribe's stance and the promised reforms have buoyed the country's confidence. The Government of Colombia has collected 18 percent more taxes compared to last year. Further, tax collection (as a percentage of GDP) rose from 16 percent in 2002 to 19 percent in 2003. Colombia has raised over \$1 billion via bonds since the new administration took office, and its stock market has increased by 50 percent this year. Likewise, President Uribe has sought to stamp out corruption and bolster judicial reform.

This list is just a partial highlight of the coordinated effort the Colombian Government is making to solve its own problems. President Uribe has infused his government with energy, organization, and a sense of purpose. He is getting results now, and will continue to direct all his resources toward making Colombia a safe, prosperous, democratic nation.

Under President Uribe, our country's significant investment in Plan Colombia is beginning to show substantial results. He is fully adhering to Plan Colombia and already looking well beyond it. Most notably a subsidiary campaign plan provides a long-term strategy and has been coordinated across the Colombian services, and

the interagency. This campaign plan details the systematic defeat of Colombia's narcoterrorists. He is also building the systems that will eventually return Colombia to the ranks of peaceful and prosperous nations. President Uribe has only 2½ more years in office. Consequently, it is critical—especially this year and next—that he gets our unwavering support to set all his long-term initiatives firmly into place.

WAY AHEAD

We are seeing the pendulum swing in Colombia, and we will continue all of our planned training and support as well as seeking new opportunities to increase that support at this critical moment. Colombia is the linchpin in the narcoterrorist battle, but we must be careful not to win the battle in Colombia and lose the war in the region. As the Colombians make progress, their success will push narcoterrorists to seek safer areas in which to operate. Already, the FARC, ELN, and AUC operate across the porous borders of Colombia's neighbors, and the remote nature of many of these areas makes them ever more attractive as safe havens. While we are seeing increased coordination and cooperation among most of Colombia's neighbors, some of those countries also lack the resources to maintain territorial sovereignty in these ungoverned spaces. Thus, across the Andean Ridge, we are working with the bordering nations to increase cooperation further, fortify borders and strengthen capabilities.

In an ongoing series of multinational exercises (UNITAS, Amphibious, and Panamax), we are training with the Colombian Navy in a combined operation. In Peru, we continue to sustain their riverine interdiction ability, as well as work with the interagency to support their eradication program and counternarcotics aviation. In Ecuador, we have supported their riverine capability and worked closely with them to complete the essential forward operating location at Manta. We are seeing a welcome acknowledgment of the Colombian border concern by Ecuador. In Bolivia, we have worked on their riverine capabilities as well and supported their eradication efforts. Additionally, we have already seen the Brazilians take up active patrolling on their own border with Colombia.

As the lead DOD agent for implementing military aspects of U.S. policy in Colombia, SOUTHCOM will continue to maintain a priority effort against narcoterrorism. Key in most of our recent endeavors has been approval by the U.S. Congress of expanded authority legislation. This legislation has allowed us to use funds available for counterdrug activities to provide assistance to the Government of Colombia for a coordinated campaign against the terrorist activities of its illegal armed groups. The granting of expanded authority was an important recognition that no meaningful distinction can be made between the terrorists and drug traffickers in our region. The country's two largest terrorist groups—the FARC and AUC—are deep into the narcotics business; the smaller ELN also participates to an extent. Trying to decide whether a mission against a FARC unit was a counterdrug or counterterrorist one was an exercise in futility and hampered operational effectiveness on the ground. Expanded authority has eliminated the time-consuming step of first evaluating the mission based on its probable funding source and now allows us to bring to bear all our assets more rapidly. As just one example, it will allow assets controlled by Joint Interagency Task Force South (JIATF-S) to continue being used to their full potential to provide real-time, actionable intelligence that is key in conducting effective operations against the narcoterrorists. Additionally, JIATF-S will take an increased role in counterillicit trafficking, as many materials other than narcotics use the same transit routes through our area of responsibility (AOR). Expanded authority for fiscal years 2005 and 2006, coupled with increasing the personnel cap, are the single most important factors for us to continue building success in Colombia. While our efforts are, for good reason, Colombia-centric, we are not letting others fall behind to become the next targets for terrorist groups. The cooperative counter narcoterrorist groundwork we are laying today will further our national security for decades to come.

CONCLUSION

We are at a critical time in Colombia's history. The elected government of President Uribe enjoys unparalleled approval ratings over 75 percent. Under his leadership, the military and police are helping to regain control of areas long held by narcoterrorists. Colombia's citizens are taking a more active role in their nation's defense and providing actionable intelligence to the Colombian Armed Forces. There is a renewed sense of momentum, commitment, and hope as the Colombian people struggle to save their country, but there is also a finite window of opportunity beyond which public opinion and support will wane without significant progress.

We are optimistic about the progress we are seeing in Colombia, though there remains an enormous amount of work to be done. We are at a critical point where the progress in eliminating conflict, reducing tension, and establishing democracy throughout the region could be at risk if we are not steadfast in our efforts. While our attention is drawn to another region of the world, we must keep in mind that we live in this hemisphere, and its continued progress as a region of democracy and prosperity is paramount to our national security.

I would like to thank the chairman, ranking member, and the members of the subcommittee for this opportunity and for your continued support. The men and women of SOUTHCOM are working to their utmost to accomplish their missions for our great country.

Senator ROBERTS. We thank you very much, General.

Mr. Chairman, would you like to start off with any questions you might have?

Senator WARNER. I thank the distinguished chairman, but I think I would like to follow your subcommittee and perhaps do a little wrap-up here toward the end. So you and Senator Reed and your other two members should go ahead. I am privileged to come in on these meetings, but I do not mean to preempt your normal sequence of recognition.

Senator ROBERTS. We will hand you the mop and the broom to get things cleaned up at the end.

Secretary O'Connell, we have heard a great deal about all of the problems and the challenges in regards to our counternarcotics activities, both from the standpoint of the harm that it does, not only to our country but to those countries where the narcotics are grown, but more especially what this does in regards to financing terrorism around the world.

I indicated in my opening statement that the President's budget has \$852 million for counternarcotics activities. That is \$56 million less than the appropriated amount for fiscal year 2004. Why?

Mr. O'CONNELL. The central reason, sir, is that, as you correctly stated, the fiscal year 2005 request is at \$852.7 million. That is an increase over our fiscal year 2004 request and the primary reason for the two differences are: first, the congressional add-on that took place last year, which I believe was at \$18.2 million; and then the \$73 million supplemental which was added primarily for Afghanistan.

Senator ROBERTS. Would you anticipate another request in the supplemental?

Mr. O'CONNELL. Sir, I am on very dangerous ground. That is not my area. I do not—I make recommendations to the Secretary, which I have done, and where the supplementals go—

Senator ROBERTS. We will not ask you to skate on that important but thin ice.

Mr. O'CONNELL. Sir, I have to skate on that. I think you understand.

Senator ROBERTS. All right. Let me ask a question, if I might, for Secretary O'Connell and Admiral Clingan. As has been stated by the chairman and Senator Allard and everybody that has been over there to talk to President Karzai, there was a big mistake made 2 years ago when farmers who were planting poppies were paid to destroy their crops. I did not mean to make a joke, but we used to have a farm program in this country where you paid farmers not to grow anything, but you did have acreage restrictions. I am not

sure that was the case this time by any means. This obviously encouraged other farmers to plant poppies so that they would be paid.

Could you give me an indication of what the current focus of the counternarcotics activities is in Afghanistan and what alternatives are being considered to curtail the poppy cultivation that can be offered to Afghan farmers?

Mr. O'CONNELL. Chairman Roberts, your comments are exactly on the mark. We were witness to a mistake. Making alternative offers to the poppy growers was perhaps not a wise move.

In response to your question as to what we are doing now, when we look at the \$73 million—

Senator ROBERTS. That was a British plan, was it not?

Mr. O'CONNELL. Exactly, sir.

Senator ROBERTS. Right.

Mr. O'CONNELL. In fact, sir, the British do have the lead. I have been fortunate enough to have four very extended and frank exchanges with British officials. Some of them express displeasure at how we were holding up our end of the bargain and vice versa. But I think we are at a consensus now that, in conjunction with the Afghan government, the clearly delineated responsibilities of the Brits and the inclusion of efforts such as the Germans on the police side, the Italians on the judicial side, that we do have a coordinated effort under Karzai's decision that he will lead the eradication through his governors.

We are going to take our funds, in conjunction with CENTCOM and, of course, the task force there, and try to put this counternarcotics effort into the context of the stability operations that are ongoing in the country. We are not going to go out and raid the farmers or raid the poppy growers. We are looking at how we: one, train law enforcement to do this job themselves; two, how we increase border security and cut down on the smuggling routes; three, how we can provide intelligence fusion as well as specialized intelligence support, identifying the labs and some selective signal intelligence support; and four, how we can provide increased transportation for the Afghan forces that are going to be conducting and are conducting raids on various labs.

We put these together in conjunction with the stability operations and try to do these things concurrently. Is it a perfect plan? Will it work? I cannot answer those things. But I can say, Senator, that I am extremely hopeful that, one, we have a plan; two, the Brits are on board; three, we are working together; and four, I think CENTCOM has put together a solid first crack at this effort against poppies in Afghanistan.

Senator ROBERTS. Let me change subjects and go to the troop cap. This is for General Mixon. We are now currently limited to 800 personnel, that is my understanding, 400 military, 400 contractors. Obviously, the administration is asking for an increase in this cap. You have indicated that that would be the case in regard to flexibility to respond if in fact that was needed for some new development.

My question: Why do you not just sort of summarize why you think you need the additional U.S. military forces in Colombia? Many Members of the Senate, I can recall when this first started, had a lot of concern about this. Can you tell me for what purpose

and length of time these forces will be used? Basically, in light of the heavy deployments elsewhere, are there sufficient forces, especially in regard to Special Operations Command (SOCOM) and the Army, available for this purpose?

General MIXON. Yes, sir. If we break it down into broad categories of support provided, we would see this support being directed as required at planning and assistance teams that would work with their units that are participating in the military campaign that supports Plan Colombia; logistics and intelligence assistance that would be provided to them. As we become more involved in assisting the Colombians and the reestablishment of governments in their areas, particularly in the civil-military operations, assistance in that area.

I would tell you that I would not see this going on immediately, as I said in my statement, but it would allow us the flexibility to increase that.

In reference to your question on the current strain on the military forces, you are exactly right and we fully recognize that. Most of the support that we would provide would not be unit specific, i.e., organic units that are participating in combat, with the exception of some potential additional support that may be required with Special Operations Forces (SOF)-unique capabilities.

Most of these are individuals who are qualified in the intelligence, logistics, and operational fields that we put together on an individual basis and form teams. We bring them to SOUTHCOM, form a cohesive team, and link them up with a unit that is participating in military operations.

Senator ROBERTS. I am going to beg the indulgence of the subcommittee, and I apologize for this, but I want to add in that my daughter, whose name is Ashley, who works in Rome with the World Food Program, told me she was going to travel to Afghanistan to determine the criteria being met in regards to the World Food Program, the McGovern-Dole program where you set up a school, allow young women to attend the school, and then they are being fed various lunches.

I said that she was not going to Afghanistan, being her father and a Senator. She indicated that she did not know why that was the case, and we went into quite a discussion. It ended with me saying that I would have her fired. That perhaps was a little strong, but I was very concerned. She said: "Well, okay, daddy; it is okay; I did not go to Afghanistan; I went to Colombia instead."

She was in an area 3 days after the FARC was there and 2 days prior to the paramilitary being there. During those 5 days they continued that program on a hill under a tree with a ramshackle building and were able to continue that schooling and the nutritional supplements that the World Food Program does provide.

Are we doing any better with stability in regards to those areas so that those programs can work and we can make some progress, especially with the education of women, which I think is one of the biggest answers to terrorism that we can accomplish?

General MIXON. Yes, sir, we are doing better, and we are seeing results as far as the local population and their acceptance of the Colombian military and their approval ratings. This was mentioned in General Hill's testimony yesterday.

Also, for the first time in many years the Colombian civilian population is able to move around the countryside and around the roads and visit their families and their farms that are out in the countryside. So yes, sir, we are seeing progress in that area.

Senator ROBERTS. I appreciate hearing that.

Senator REED.

Senator REED. Thank you very much, Mr. Chairman. Thank you, gentlemen, for your testimony.

Chairman Roberts has raised the issue of the effect of the operation tempo (OPTEMPO) on activities throughout DOD. Secretary O'Connell, could you comment on whether this OPTEMPO increase has affected your ability to discharge your counterdrug responsibilities?

Mr. O'CONNELL. Thank you for the question, Senator Reed. I agree with General Mixon. Certainly the forces are under strain. But looking at my responsibility for the oversight of the 48, 49,000 United States SOF, it does not appear so at this time. In fact, we have been able to use forces that had been in Colombia previously in other operational areas. General Brown and I testified the other day before the Senate Armed Services Committee on posture, and I agree with General Brown that the force is not overextended at this point.

In terms of the specific counternarcotics work done on the Special Operations side, we look primarily to SOUTHCOM, of course, and the Seventh Special Forces Group. I would just like to point out that the ability of the Colombian military, sir, to follow the advice and guidance of these wonderful Green Berets has made a difference of enormous proportions down there. The Colombian military is now going out into areas which were previously off limits. They are conducting ambushes, long-range reconnaissance, and direct strikes against the FARC, and I think we have all seen that that has had an unbelievable effect on the morale of the people of Colombia.

To move back to one point that Chairman Roberts made in terms of increases on the cap, I would like to point out that because the Seventh Special Forces Group has been able to push the Colombian military out farther—and, Senator Reed, you certainly recognize this in view of your military service—we are talking now about considerably more terrain to cover. So the helicopter routes are longer, the medical evacuation requirements, the rearm, refuel, equip, the maintenance requirements, go up as you obviously have to address more territory. So that would go to the question of Chairman Roberts.

But to answer your question, sir, the answer at this time is no.

Senator REED. Let me ask another variation on the question. Are you declining requests for assistance that previously you would entertain, requests from the Colombians, requests from the Afghani government through CENTCOM?

Mr. O'CONNELL. Sir, not to my knowledge. I would defer of course to the combatant commanders, General Hill and General Abizaid. I will say, with respect to General Hill, we meet and talk very often. He is very much into not only the counternarcotics business, but also stability operations throughout his hemisphere. He is an astute leader. He understands very carefully his responsibil-

ities. I think he is looking to the future, and he will apply our military force and training any place that it can be beneficial throughout the hemisphere.

Senator REED. Thank you.

General MIXON. I would like to comment on that, sir.

Senator REED. Yes, sir. Go ahead, General Mixon and Admiral.

General MIXON. We have never turned down a request from support since I have been there last July. However, the cap has caused us to have to shift support to make sure we did not go over the 400 cap. I would just like to make that point.

Senator REED. Thank you, sir.

General MIXON. Senator Reed, if I could just add, sir. I think at least in the press there has been some misperception that this requested cap increase would be consistent with a deployment order, and that is not the case. I would hope that that message was delivered by General Hill yesterday.

Senator REED. Can I raise another question, General Mixon, about the cap since you brought it up. You want to go up to 800, but do you have an estimate of what your sort of average, steady state deployment in country would be?

General MIXON. Sir, today as we speak the number that we count against the Plan Colombia cap is 332. We had a high about 30 to 45 days ago of 392, and we were making some adjustments.

Senator REED. Let us assume that the permission is granted. Do you think you will have close to 800 people on the ground at all times?

General MIXON. I do not.

Senator REED. What is your estimate?

General MIXON. We did a best case analysis of this before we went forward of if we were able to provide all of the support that we can envision over the life cycle of Plan Patriota, which is the military campaign plan, and we found it to be at 726.

Senator REED. Thank you.

Admiral, you have a comment?

Admiral CLINGAN. Sir, in Afghanistan to my knowledge we have not denied any request for support specifically from President Karzai nor the minister of interior.

Senator REED. Thank you very much.

Secretary O'Connell, in October 2003, Secretary Wolfowitz promulgated a new international counternarcotics policy which essentially made a link explicitly between counternarcotics and counterterrorism. In his words, "the Department's counternarcotics support should be oriented to the greatest extent feasible toward supporting the war on terrorism and Department security cooperation guidance." It seems terribly logical to me.

We have given explicit authority in the case of Colombia for the DOD to use counterdrug funds to support Colombian efforts to fight a unified counterdrug, counterterrorism campaign. That is one case. To your knowledge, does the DOD plan to ask for additional authority to use counterdrug funds for overlapping counterdrug, counterterrorism?

Mr. O'CONNELL. Sir, I am not aware of any. The combatant commanders may have specific commands.

But if I could comment on the mechanism that has been provided for generally the central transfer account, which is the way we handle certainly the bulk of these counternarcotics activities—

Senator REED. I would like you to do that, Mr. Secretary. But Congress has funded this central transfer account counterdrug to fight drugs.

Mr. O'CONNELL. Yes, sir, exactly.

Senator REED. Is this now being used in other ways which we should be at least aware of?

Mr. O'CONNELL. Sir, it is my belief that it has not been. Sir, it is extremely difficult to draw that precise line. But in our planning, in the reporting that we do back to Congress on what we spend this money for, we specifically aim at the counterdrug, counternarcotics areas.

The point is, sir, that the central transfer account, the way it is structured, although it has been under increasing pressure due to things like inflation and other aspects such as closing down Roosevelt Roads, which has increased our maritime patrol costs, allows extraordinary flexibility. I think that the DOD has been very candid and very honest in how it has handled and allocated those funds.

We, of course, look very carefully at any reprogramming. I would be happy to go into some of the bloodier specifics perhaps during our closed session when we get into contentious issues. But you have provided very flexible authorities and to the best of my ability, and I think certainly the combatant commanders realize and certainly the Secretary, we will focus that on the intended focus, the intended aim of the money, sir.

Senator REED. Thank you, Mr. Secretary.

I listened to the exchange between Senator Roberts and the panel with respect to Afghanistan, the drug policy. The initial approach was a British focus on labs and trafficking. We, with our strategy, have come in to strengthen security along the Afghan-Pakistan border. There is one sort of issue, though, that we have not spoken about directly. That is eradication. Is that going to play a role? Is that too contentious an issue within the context of the politics?

Mr. O'CONNELL. No, I do not believe so, sir, because obviously eradication has to be part of a strategy. President Karzai has said he will lead the eradication through his governors and out into the provincial regions. We do not, in DOD, specifically do eradication, per se. There may be some support for eradication in terms of, let us say, provision of security while eradication is taking place.

But no, sir; it has to be part of the strategy. I would ask Admiral Clingan if he had a comment on that.

Senator REED. Admiral.

Admiral CLINGAN. The Secretary has it exactly right. We do not participate in any way, shape, or form with regard to eradication. But many of our efforts complement that process, in particular the law enforcement capabilities that we endeavor to enhance and those intelligence efforts can promote success in the eradication effort.

Senator REED. Thank you, gentlemen. My time has expired.

Senator ROBERTS. Senator Dole.

Senator DOLE. General Mixon, counternarcotics operations rely heavily on SOF and National Guard assets. Are your operations requirements receiving adequate focus and are you being consulted in the Army's plan to rebalance its forces? What changes would you like to see in the force mix available to you?

General MIXON. We are receiving the adequate focus that we need, Senator Dole, for our activities there. As the military is looking at its restructuring program, we have been sent those working papers and provided comment as a combatant commander on the organization of both the Guard and the Active Forces. So I feel very comfortable that we are in sync with DOD on their restructuring programs.

Senator DOLE. One other question. The military training of Colombian units that are vetted for human rights abuses is a key enabler, I understand, in the success of Plan Colombia. What role, if any, does the Western Hemisphere Institute for Security Cooperation (WHINSEC) play in the training? If a role is being played, in your opinion is this institute producing the caliber of military professional needed to achieve security and stability in Latin America?

General MIXON. I am glad you brought up the human rights aspects of the support and the vetting. The vetting process is viewed very strictly at SOUTHCOM. In fact, we are the only combatant command that has an organization in our headquarters that focuses on vetting.

As it pertains to WHINSEC, they primarily train individuals rather than units, and their training that they give individuals we believe has a heavy focus on the human rights aspects of military operations.

Senator DOLE. Thank you.

Thank you, Mr. Chairman.

Senator ROBERTS. Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman.

General Mixon, your testimony today is indicating that as far as the Colombia plan is concerned, you see real and tangible results. We heard similar testimony from your superior yesterday. You have partly answered this question, but from an operational standpoint what part of that plan do you attribute the greatest success to, and then what part of that plan has been a disappointment? For what part would you consider some modification if you had to do it over again?

General MIXON. Yes, sir. The part of the plan in my opinion that has been the greatest success is the close cooperation between the Colombian military and the Colombian civil agencies, such as the police and other agencies, to have a combined and joint effort. They full well know that in order to win victory for them in Colombia they must reestablish governance in these areas once the military actions are over. This is the first time in their history, at least to my knowledge, that they have worked closely together with all governmental agencies throughout Colombia to ensure that this goal is achieved.

That is buttressed by President Uribe's leadership and all those agencies have his support, not only from the standpoint of the raising of taxes in Colombia and increased military and police structure, but also just his physical presence and his leadership.

Disappointment? I have been in this job since last July. I have not seen a disappointment per se, but I would like to see the Colombian military become more joint in the way they use their capabilities, and they are doing that.

Senator ALLARD. Do they have various branches like we do?

General MIXON. They do have various branches. With our advice and assistance, their most recent campaign that is ongoing in what is literally the heartland of the FARC, they have established a joint task force with all of their components—army, navy, marine, and air force—under one single commander. This is the first time in their history that they have done that.

So as I say, the lack of jointness has been somewhat of a disappointment. We see steady progress in that area.

Senator ALLARD. So if we had another country emerge like Colombia, then what you would like to see happen is encourage more cooperation between the various law enforcement and military agencies, all of them coming together in a joint effort to implement their efforts against narcotics?

General MIXON. Yes, sir, that is correct. If I could elaborate on that, what you just said. What we have tried to encourage all the militaries in our region to do is the same thing we are doing in the U.S. military and take a 21st century approach: identify the threats within their organization, their country, and reorganize themselves accordingly.

Not all countries need a large military. They may need more police forces. For example, the gangs we are seeing forming in some of these countries; the police are the ones that need more force structure and more support versus the military. So we encourage them along those lines.

Senator ALLARD. Now, one of the things that I have noted, it seems like when you have success in one area the drug trade moves someplace else. I do not know whether you can comment on this in an open session like this, but in which areas of the world do you see a potential for, once you move them out of Colombia and move them out of some of the areas we have had success in, where do you think they may go to next? If you cannot give us a specific geographic area that you may see where they would head, perhaps you could share with this subcommittee certain factors that you look at that put certain parts of the world on your watch list for possible inclusion in the drug trade.

General MIXON. As far as growth in production, the two principal countries that we will continue to keep an eye on will be Peru and Bolivia. We know the history that Bolivia has had, and we also know the culture in Bolivia as far as coca is concerned. So we will continue to watch those countries in particular.

Senator ALLARD. Bolivia at one time had a drug trade. Then it was brought under control, the way I understand it, and you think it is still at risk?

General MIXON. It is still at risk. Particularly, the government, Senator, recently has experienced some turmoil in that area, and as we watch the various forces that are working there some of them have links to the Cocalera movement. We are very concerned about what is going on down there and we will keep a close eye on it.

Senator ALLARD. Peru is also a concern?

General MIXON. It is a concern. We will watch it.

Senator ALLARD. Mr. Chairman, I think those are the main things I wanted to pursue in my time. Thank you.

Senator ROBERTS. Senator Warner, would you like to make any comments at this time?

Senator WARNER. Thank you, Mr. Chairman and the ranking member. Mr. Chairman, we are fortunate, this subcommittee and indeed the full committee and Congress, that Secretary O'Connell accepted this post. It is a very important post. It was created and envisioned right in this room many years ago, and I participated in the deliberations and the legislation which established your office.

If I may say, you bring to this office an extraordinary record of accomplishments: in uniform, the 82nd Airborne, SOF, intelligence officer, liaison with the British intelligence in Great Britain. We are fortunate you relinquished other, perhaps more lucrative, opportunities and accepted this one. You have the strong support of this committee.

Mr. O'CONNELL. Thank you, Senator. That means a great deal coming from you.

Senator WARNER. Well, I appreciate that.

I also think there is a direct correlation between the drug trade, wherever it is in the world, and terrorism. Particularly I am going to address my questions here to Afghanistan momentarily. But it is ever so clear there. Perhaps you have knowledge of it, but there may be evidence you could share with us that Osama bin Laden and the current operation of al Qaeda could be receiving funds from the poppy trade in Afghanistan.

Before I proceed further, though, Mr. Chairman, members of the subcommittee, given the distinguished career of our Secretary, we should recognize our sympathies to the families of those members of the private sector contractors lost recently in Iraq. It was tragic. Many former U.S. military have gone on to really indirectly serve their country by working for private contractors. Those individuals are essential to the work that we are performing in Iraq, primarily the rebuilding of the infrastructure. It requires a certain amount of security and we are fortunate that these retired military people have stepped up.

Is there anything further you could tell us about that incident here this morning for the record?

Mr. O'CONNELL. Sir, not for the record, but I know we go to a closed session. We were talking with Senator Dole just recently. Of course, that company is home-based in her State. You are correct that many special operators go to work for firms like that.

Senator WARNER. When you say "special operators," those following this proceeding might not pick up on that. These are U.S. military SOF like yourself.

Mr. O'CONNELL. Many of them would have been Navy SEALs, would have been Army Rangers or marines or just people who were willing to go through the training and take on this type of job.

It is becoming more and more frequent in our society. There is a high demand for that type of trained person. They take a very high risk. Certainly I agree with you, Senator; our hearts go out

to not only all the military, but the civilian contractors that have lost their lives, not only in Afghanistan and Iraq but around the world. We have hostages in Colombia today, three Americans, that of course are on our minds all the time.

With respect to your issue in Afghanistan, sir, can that country move forward with the basis of the economy being so tightly tied to narcotics? I think the answer is no. I think we all realize that. If, in fact, the numbers that have been kicked around are correct, and 60 percent of the GNP is coming in some way, shape, or form from the narcotics trade, then I do not think we are going to be successful.

That is why I am encouraged by the approach that we have agreed to with the British government, with the Germans, with the Italians, and particularly the plan that CENTCOM I think will put into effect with good results. I am optimistic that this next year will be a signal change in how we approach the issue.

A lot of it—you just returned from talking with President Karzai and going out into the countryside—is going to depend on whether the Afghan people can step up to their own governance. Are they willing to take the risks to be policemen?

Senator WARNER. On that point, just days after we departed, one of his principal ministers was gunned down. Is there a linkage yet established, perhaps with the narcotics business?

Mr. O'CONNELL. Sir, quite frankly, I think the Intelligence Community has been less than precise on this issue. As we were talking about, coming over in the car, it is a bit like pickup sticks there. You pull one drug lord out or someone you feel is tied into the drug business and there are unintended consequences. You never know what militia that is tied into, if it is tied into the government, and what is going to be the net result.

There are longstanding tribal rivalries and frictions, as you well know, there, sir. But I think as our intelligence effort picks up we are going to be able to identify those people who are, in fact, involved with processing, in fact involved with shipping, and hopefully get better insight into what portion of that money goes into supporting groups as, not only al Qaeda, but the Taliban and potentially other spinoff groups. But there clearly is a linkage.

Senator WARNER. Well, let us take just a minute to focus on the background, the history of this. We fortunately have yourself—and General Mixon, I know you have been through this very country where these drug operations take place in your assignment over there.

You go back in history—the British Empire tried to conquer this region in the late 1800s and lost tens and tens of thousands of soldiers, and finally wrapped up and went home unsuccessful. That was followed by the Soviet Union that went in there and lost tens and tens of thousands of soldiers, and of course there was a very strong civil war in addition.

But this is mountainous country. It is prevalent with old, historic trails that only a donkey can crawl over. This is not going to be an easy job, shutting this down, because this poppy growing has been going on for centuries. Am I not correct?

Mr. O'CONNELL. Afghanistan, sir, is made by God for growing poppies.

Senator WARNER. I went into this in some detail. I have a modest interest in agriculture. This is the former chairman. But you can literally throw the poppy seeds on the ground and hardly scratch the earth and they take root, and they can survive under extraordinary drought conditions and produce a prolific crop.

So this is a daunting and challenging task, and particularly against the history of others who have tried to bring into this region some conformity with the laws of man.

But I congratulate General Abizaid. We are fortunate to have him as the combatant commander. He is an extraordinary man, and all of us here on the committee have dealt with him extensively.

In the course of our meeting, we met with General Hillier, who is the commander of the joint forces over there, and he expressed great concern about this situation. I want to once again reiterate, I think it is very important that NATO come into this AOR and begin to work in it, take up greater responsibilities, but I do not believe that they are equipped, trained, or otherwise, or should they be the primary outfit to tackle this question of the drug trade.

Now, looking through the testimony of the Admiral here, the U.K. has the international lead. Where was that established? What is the documentation? My recollection is it goes back into some U.N.—where was the authority for that derived, Admiral?

Admiral CLINGAN. Senator, the penultimate authority escapes me at this moment. I do know that we have an agreement at our level—

Senator WARNER. You mean CENTCOM?

Admiral CLINGAN. CENTCOM.

Senator WARNER. Has an agreement with?

Admiral CLINGAN. With regard to the U.K., signed by Mr. Rodman, that establishes our relationship in regard to the U.K. lead nation efforts in Afghanistan.

Senator WARNER. I think that is fine, and I am sure that they have learned by experience. One or two of the programs they have initiated, I mentioned are not working. They are ready to take new initiatives. But they will continue then in the lead, is that correct?

Admiral CLINGAN. Yes, they will.

Senator WARNER. The \$73 million which the Congress of the United States in its wisdom—and I think it was a very wise move—provided to fund this program, does that money flow then to the U.K. directly or how does it transfer?

Admiral CLINGAN. No, sir. That money will be obligated in accordance with a plan CENTCOM has developed in concert with ASD-SOLIC, in concert with the U.K., DOS, and DEA.

Senator WARNER. So it will be controlled entirely by us. But if they are in command and given the magnitude of that money, they have to have a voice in this matter. Was their voice listened to as this structure which you outline in your testimony—were they involved in this?

Admiral CLINGAN. Our plan has been coordinated with them, sir.

Senator WARNER. Coordinated.

Admiral CLINGAN. As it has been with the other interagency initiatives, to make sure that we do not duplicate efforts and that we in fact are moving ahead in complementary fashion.

Senator WARNER. All right. I am not in any way being critical. I am just trying to get a grasp of it. The U.K. is in charge. We have this program which you have outlined here, and it is in coordination with their leadership, and we are in support or working directly—or just how does it—

Admiral CLINGAN. Our support to the U.K. effort happens in some specific realms. For example, in the operational realm, we currently provide them intelligence support, we provide them en extremis close air support should some of their teams come into contact with an enemy force that exceeds their capabilities. We can extract them from that type of situation as well.

Senator WARNER. That is a good example. I want to press on. Do you know what budget they have allocated to their effort? Do you know, Mr. Secretary?

Mr. O'CONNELL. Yes, sir, I can answer that. I believe I got these figures at the end of calendar year 2003. It was our estimate—and their records—that they allocated \$114 million over the next 3 years for, among other things, alternative livelihoods, which we have already discussed, interdiction, institution building, and specific law enforcement.

They have trained what we think and hope is going to be a fairly effective enforcement and interdiction unit. We are providing limited aircraft support to that unit. The U.K. has indicated that they will shift efforts in terms of helping support on the eradication side. Even though that is primarily an Afghan effort, they will be assisting the government in putting that program together.

As I said, sir, I have met four times with British officials and I think we have a good way ahead in terms of intelligence sharing. I have reallocated funds from certain signals intelligence accounts and overhead imagery accounts that can assist the British as they are working against various labs.

Senator WARNER. But as old Harry Truman says, the buck stops on the British desk; is that correct?

Mr. O'CONNELL. They are the lead agency.

Senator WARNER. They are accountable for the overall operation of this program, in which we have a very significant supporting role?

Mr. O'CONNELL. Yes, sir.

Senator WARNER. Would you agree that that is correct?

Admiral CLINGAN. Yes, sir.

Senator WARNER. Now, do they employ just military or a combination of military and civilians?

Mr. O'CONNELL. A combination.

Senator WARNER. Since there is a reference in here to the DEA, which apparently are working with—

Mr. O'CONNELL. Excuse me, sir?

Senator WARNER. I beg your pardon. DEA is working with—you enumerate in here: “This will enhance operations by U.S. law enforcement officers, provincial reconstruction teams, law enforcement, coalition forces.” Everybody is, fortunately, pulling together to make this work. But the DEA is working as a part of our program?

Mr. O'CONNELL. Yes, sir, as part of our program. I met twice with DEA Administrator Karen Tandy and her intelligence oper-

ations and deputy chief specifically on operations in the Intelligence Fusion Center that we are setting up for better intelligence sharing. I wanted to give her complete visibility into our DOD intelligence capabilities that are going not only to support CENTCOM, but the British, to make sure she had full access.

Additionally, they can bring a very large amount of information to the table on routes out of Afghanistan and how they go into Russia, as an example, through Iran, and into the U.K. Those three countries in particular are perhaps most affected by the poppy coming out of Afghanistan.

So in terms of how the DEA works, they have been very forthcoming. I would also like to add, not only the DOS, but the Central Intelligence Agency's counternarcotics center has produced some very good products that I think will lay out for CENTCOM and the task force there the nature and scope of the problem, not only border issues, but cultivation issues, lab processing sites and terrorist financing.

So I think we have a good effort under way, sir.

Senator WARNER. Well, when we were there we were briefed by General Hillier that just within 48 hours of our being there they rolled up a very significant plant which was refining the raw material before it was exported. Am I not correct in that?

Mr. O'CONNELL. That is correct, sir, and we are hopeful for more in the future.

Senator WARNER. This momentum is now beginning to show clear results?

Mr. O'CONNELL. I hope so, sir. I will defer to Admiral Clingan. I think the first eradication actually is starting today, according to statements that I have seen out of the Afghan government. They are actually on the ground in certain areas, I think particularly in the southeast, where eradication will start.

Senator WARNER. Admiral, this is your portfolio. Pick up.

Admiral CLINGAN. Senator, momentum is building on two fronts. First is that the fielded forces have been given recently—as recently as early January and again this month—by CENTCOM clear direction on their role to play in regard to dealing with drugs, labs, and other things discovered in the course of their ongoing operations. So I think not only are they going to be unequivocally clear in their own mind what their obligations are when discovering those types of things, but we are going to enhance the reporting of it so that we get increased visibility. Specifically, discovery of drugs or a drug lab or paraphernalia associated with that drug trafficking trade is going to be a significant activity that gets reported immediately up the chain of command.

So on the tactical level, momentum is building. On the programmatic level, we are excited by the \$73 million made available to us by Congress and our efforts will span the eight items you have seen in my written testimony there. Importantly, those include stronger border control efforts and the Intelligence Fusion Center.

Senator WARNER. Any facts that you can share with us as to Osama bin Laden's linkage to this operation?

Admiral CLINGAN. Sir, there is clearly linkage between terrorist organizations and the narcotics trade .

Senator WARNER. But he is just over the mountain, presumably, from where much of this is taking place.

Admiral CLINGAN. Sir, there is no clear and specific linkage between bin Laden himself and the drug trade that I am aware of.

His organization clearly benefits. One funding stream for al Qaeda is narcotics.

Senator WARNER. Well then, to me that is a linkage. I am not presuming that the dollars actually get into his pocket, but it gets into his organization's pocket.

Admiral CLINGAN. Yes, sir.

Senator WARNER. That has been established?

Admiral CLINGAN. Yes.

Senator WARNER. This is very helpful, Mr. Chairman. I just want to make certain that Great Britain understands that the buck stops there. We are giving them every conceivable support that we can to make this work, because in my judgment this drug situation is a serious roadblock to progress in moving forward with developing our goals in Afghanistan.

To me, it could become a roadblock to further expansion of the NATO operation of responsibility. NATO envisions a plan where they are currently in that one quadrant up there, they are going to move to another quadrant and another and another, and perhaps in 18 months or so they will be taking over the majority of responsibility. Mr. Secretary, is that not the plan?

Mr. O'CONNELL. Yes, sir. There was a meeting that I believe terminated in Berlin yesterday where many of the NATO nations in the donors conference offered up various types of support, various accounts, various amounts. As that is sorted out—I think Lieutenant General Barno was there—we will be able to look at how those amounts are coming in, and I am sure the Afghan Government will look at what amounts can we integrate into our total counter-narcotics strategy and anti-poppy strategy in Afghanistan.

So there are positive developments, sir.

Senator WARNER. Do you share my view that this is a roadblock?

Mr. O'CONNELL. Absolutely, sir. A country—and I do not know that anybody has ever been able to pin down the GNP of Afghanistan. I think that would be an economist's nightmare, but it is someplace between \$4 and \$14 billion. Most experts agree that around 60 percent of that GNP has some way of being tied to narcotics cultivation, development, processing, sale, and transport.

Senator WARNER. The emerging Afghan Government, their security forces are taking up a responsible role in this?

Mr. O'CONNELL. Yes, sir. In fact, when you go back to the British efforts, they are training what we hope to be an effective police force that can go around the country.

Senator WARNER. Good. I thank you, Mr. Secretary.

Thank you, Mr. Chairman.

Senator ROBERTS. Mr. Chairman, I want to thank you for paying tribute on behalf of the subcommittee and the full committee to those who went through that very barbarous attack and the families of those who lost loved ones. That was a terrible tragedy, and I would certainly agree with Ambassador Bremer when he was addressing those who were still in the police training, that there was a choice for Iraq between barbarism like that—which is hard to un-

derstand, because it is hard to understand why people perform in such a manner, man's inhumanity to man—and individual freedom and stability.

But I want to thank you for those comments. Like yourself, I have no illusions. It was in 1921—I forced the chairman to watch “Lawrence of Arabia” on our way to Iraq.

Senator WARNER. On the way home, I think it was.

We had finished our trip through Iraq and Afghanistan. We were on the way home and you played it on the airplane. I remember it very well.

Senator ROBERTS. Three hours and 15 minutes.

Senator WARNER. Right, and what was the last scene?

Senator ROBERTS. Well, they rode to Damascus to achieve PanArabia, and it did not work out very well.

Senator WARNER. They turned it over to the Arabs, their own lands.

Senator ROBERTS. Basically, what happened was that the Brits sat there and the power went off and the water went off and the hospitals did not work, and the tribes got to arguing again, and they all got back on their camels and went back to their tribal lands, and everybody scratched their head and said: What the hell was that all about? Churchill said that the people of Mesopotamia, i.e., the new Iraq—the British do bear that responsibility for really creating that country—represented “an ungrateful volcano.” If you carry it a little bit further and you read the remarks by King Faisal, who was the king for 10 years—

Senator WARNER. Of Iraq.

Senator ROBERTS. —of Iraq, and you read his summation, which I will not because it is a rather negative summary of what he went through; it shows you the tremendous challenge that we have.

Senator WARNER. I just think that history should be the rear view mirror as we try and achieve our goals in both Iraq and Afghanistan. Remarkable chapters of history where these areas have been—people have tried to infuse some sort of democracy in them without success in years past.

Senator ROBERTS. The fiscal year emergency supplemental for the \$73 million, which has been referred to by the chairman and also by the Secretary, it is my understanding as of April 1 that very little of that funding has been obligated. So we will have an opportunity to do the things that you have talked about, to study how best to spend those funds. You have already gone over your plan to ensure the money is obligated in a timely and effective manner in conjunction with the British, but I think that is very important.

I just want to say one thing, and then I am going to turn it over to Senator Reed, and then we will go to the closed session. If you really look at SOUTHCOM and our neighbors to the south, the 31 nations under SOUTHCOM, if you look at how that area of the world affects our daily lives and pocketbooks in America; the immigration challenges that we have; the trade challenges that we have; the tremendous opportunity for bulk commodities and specialty crops here; the energy situation, with Mexico and Venezuela and people like Hugo Chavez—whose oil minister was the chairman of the Organization of Petroleum Exporting Countries two summers

ago and turned the valve back and we got into increased gas prices—look at the terrorism funding; and then also look at the drugs—I do not think you can make a list any more important in terms of our national security and the well-being of our people.

Yet it seems to me that, in an area with 360 million people, where the average age is 14, where the people are malnourished, that we were doing about the best job that we could. A lot of infrastructure was taken away during the Balkan conflicts, and then we have Afghanistan and Iraq and I do not think it has ever been put back. Talk about miles to cover and talk about things that we should be concerned with.

There is assistance under the National Defense Authorization Act, Section 1021, that provides for the DOD to provide counter-narcotics training, equipment, and assistance to seven additional countries in South America and South Central Asia, and also to renew the authority in Colombia which has been the subject of this hearing, and Peru.

I just went down on a delegation with Senator Cochran and learned for the first time about the three-border area, what we call the wild, wild South or the wild, wild West or something, where there is virtually no law, and the proceeds of activities there obviously go straight to financing terrorism.

I am still concerned that we—I do not want to call it benign neglect, but I think we ignore at our peril all of these problem areas that I have just gone into. I know all the rest of our missions around the world, more especially with the global war on terrorism, are extremely important and are of a high priority. But I worry about SOUTHCOM and what could develop.

That is not in the form of a question. That is just an observation. If any of you would like to comment on that, why, feel perfectly free.

Mr. O'CONNELL. I would agree, Senator.

General MIXON. Yes, sir, I would comment on that if you would allow me, please. First of all, this was my first assignment as a member of SOUTHCOM in my 29 years of service in the United States Army, and I found it to be very interesting as I became a little smarter on the importance of the region. I was not aware of it myself, to be perfectly frank with you.

Then as we did the analysis, as General Hill mentioned yesterday in his comments, we receive approximately 0.22 percent of the DOD budget for operations in that region, and we currently have deployed in the region a little over 7,000 U.S. military throughout 29 countries. If you count that dollar investment, as well as the investment in numbers of U.S. military, from a military perspective that is a very small investment for a very big return on what is a very important region, as you point out.

I have tried to study a little bit about Latin American history and what makes Latin America Latin America. It dawned on me as I studied that there are a lot of threats, and you mentioned them: the tri-border area, the financing of illegal groups, drugs, illegal gangs—you name it, they are all out there.

But it became apparent to me that the biggest threat we have in this region is endemic poverty, and until we can deal with that and assist these countries in trying to deal with that particular sit-

uation, all these other problems have room to grow and fester like a sore wound. So that is an area that requires a multi-agency perspective and action.

We focus on that in SOUTHCOM. We realize that there are not just military solutions to these challenges. It is an interagency effort. We work with the interagency group closely in all of these areas and see how we can best provide military support within our capabilities.

So that would be my overall comment on the situation that you just mentioned, sir.

Senator ROBERTS. Well, I point out that when General Wilhelm was the commander down there in SOUTHCOM, I think he counted Cuba and one other country, so maybe when I said 31 and you said 29 that there was some difference of opinion. But at that particular time they had just gone through a terrible hurricane and our National Guard folks were there in uniform building back bridges, building back infrastructure, helping to build schools, etcetera.

I do not think we can do that now, with all the stress and strain on the National Guard and our Reserves. As you have indicated, with only 7,000 people we are going to pay the price. We have seen recent elections, and I am not going to get into any judgment on that other than the fact that President Lula and President Kirchner of Argentina and Brazil and then the lame duck situation in Uruguay—I do not think we can afford to go back to the Nicaragua days of the early 1980s and find ourselves in that kind of a situation.

I see this thing tilting, for no better description, to not so much an anti-U.S. bias, but certainly a position independent of the United States. We see it in trade, where that whole trade round—why, Brazil and Argentina simply threw a monkey wrench into that. We have a lot of work to do. As I understand it, we have other priorities, but I worry about it.

Senator Reed.

Senator REED. Well, thank you very much, Mr. Chairman.

Chairman Warner has raised the issue and has expressed all of our outrage about the ghastly attack upon the contractors. It raises some questions, Admiral. First, do we have an idea of how many of these type of security contractors there are? These are people who are armed and much different than someone going in to give advice about a project, like an engineer. But these are armed individuals whose job is to protect vehicles and properties and engage if they have to.

Do we have an idea of how many of these we have in country?

Admiral CLINGAN. Senator, thank you for the question. We do have an idea. In fact, I would hazard to say that we know specifically how many contract security detachment personnel we have. The precise number I am not aware of, but I can certainly find out.

[The information referred to follows:]

There are approximately 20,000 personnel employed by Private Security Companies (PSC) in Iraq and the number is expected to grow as reconstruction efforts accelerate. PSCs provide three distinct security services including personal security details for senior civilian officials, nonmilitary site security (buildings and infrastructure), and nonmilitary convoy security. These services are defensive in nature.

The overwhelming majority of PSCs (approximately 60 PSCs employed in Iraq) are hired as subcontractors by companies engaged in the reconstruction efforts throughout Iraq. Each subcontracted PSC reports directly to their prime contractor, not the government. The prime contractors are directly responsible to the Chief of Mission for the performance of their contract. The exact number of PSC personnel is difficult to determine because such information is proprietary and may have privacy implications. Therefore, subcontracted PSCs and their parent companies generally do not make available details concerning the prices of their contracts, salaries, or number of employees.

The DOD, DOS, and the Interim Iraqi Government continue to coordinate to issue uniform guidance regarding PSCs employed in Iraq in order to have a better accounting of the numbers of individuals undertaking the security mission for both the United States Government and the Interim Iraqi Government.

Senator REED. Your notion would be on the order of some thousands?

Admiral CLINGAN. No, sir, significantly less. The contract Program Security Directive folks are primarily focused on providing security to the Coalition Provisional Authority and some other entities on a smaller scale than that.

Senator REED. The other issue the tragic incident this week raises is the coordination between military forces and these civilian security personnel, and also the standard operating procedures that both sides would follow. One of the questions that remains unanswered is that apparently this situation took several hours. It was an attack and then the crowd built up, etcetera. At no time did the American military units respond to try to recover the body or somehow disperse the crowds, or Iraqi security forces.

This whole issue of operations I think is important. Can you comment upon that, Admiral?

Admiral CLINGAN. Sir, in this forum I can say that we are continuing to investigate the circumstances surrounding that.

Senator REED. Thank you very much, Admiral.

Let me raise two other countries—

Senator ROBERTS. On that point, I had hoped we learned that lesson in Somalia.

Senator REED. I concur.

Two other countries. First, Pakistan. According to the International Narcotics Control Strategy report, Pakistan showed a remarkable rebound, unfortunately, in opium production, and it is a transit site for some of the opium leaving Afghanistan. Secretary O'Connell and Admiral Clingan, can you comment upon the situation in Pakistan with respect to this increased production, because it conjures up also the destabilizing effects of drug money getting into the hands of insurgents.

Admiral CLINGAN. Senator, thank you for the question. We are concerned in CENTCOM in regard to narcotrafficking throughout the AOR and particularly southern Asia, which includes Pakistan. Part of our plan addresses the bordering countries surrounding Afghanistan, and clearly watching the border area between Pakistan and Afghanistan is an area that we will pay attention to in regard to enhancing border controls. That and the Stans in the north, those two areas are of considerable interest to us because of the comment that you made.

Senator REED. Thank you.

General Mixon, we have forces in Haiti today and apparently Haiti also is at least a transshipment point, if not a production

point. Can you comment upon the situation in Haiti with respect to drugs?

General MIXON. Yes, sir, I can. First of all, it is a transshipment point. We do not have any indicators of production in that area.

I would just comment that at the present time we have approximately 3,700 total forces in there, including all the multinational forces in that area. During the first 30 days of the operations in Haiti, we saw absolutely no flights going into Haiti as we had tracked over the past. However, unfortunately, during the last week we have identified at least one unidentified flight going into the area, which indicates to us a resumption of it as a transshipment point.

It is our intention, it is General Hill's guidance to the JTF, that we will monitor that, working closely with JIATF-S, and we will do everything that we can do to shut it down as a transshipment point, given the fact that we are on the ground and present in Haiti. We will do that in conjunction with the other agencies that are involved.

It is important to note that as a part of the JTF in Haiti we have formed our naval component around the U.S. Coast Guard. As of about 3 days ago, they have done close to 100 boardings of private and small vessels to assure that Haiti does not operate again as an open transshipment point. So we are going to take aggressive action in that particular area, because it will destabilize our efforts.

Senator REED. I guess the question that that begs is, we can do that now with 3,000 international personnel on the ground and with the Coast Guard flotilla out. What happens or what are we going to do to ensure when we leave that it continues to not be a transshipment point?

General MIXON. We will continue to do operations, as we have done, in coordination with the DEA. JIATF-S, that is one of the areas that they monitor. Ideally, as we begin to reform the Haitian national police we can work with them to make them more effective, because really that is where we need to put our focus. In the past that has been part of the problem and, as we saw over the last year, there were strong indicators of Haitian national police involvement in the drug trade.

Senator REED. Thank you very much.

Now, let me follow up, General Mixon, because the request for increased personnel in Colombia raises some specific questions. I think you assured us that you will have sufficient support from DOD in terms of the individuals you need, so you are not going to be limited in terms of personnel available. That is correct, is it not?

General MIXON. There will be a consideration, of course, as we request those additional personnel, but I think we will get their support when we do ask for those people.

Senator REED. How do you envision using these increased forces? Will they accompany units in the field? If they do, how far down? How far will they go into the areas of contact?

General MIXON. Yes, sir. They will operate from secure bases. A specific level—the planning and assistance teams that we have operating in Colombia today, most of those team members came from within the components of SOUTHCOM that were not deployed and

have not been deployed. In other words, we did not go out to the broader DOD.

They operate at brigade level, with one exception. We have planning and assistance teams that operate in advice to the Lancero Battalion, which is a Ranger battalion equivalent. Even at that level, they stay in secure bases, providing planning and assistance.

If those headquarters move into an area, it is the responsibility of the military group commander to ensure that they are moving to a secure base and through his approval is the point in time when the planning and assistance team can move to that base. But they are not allowed to leave the secure base. They are not allowed to go on combat patrols or participate in combat operations.

Senator REED. Thank you.

Part of the dilemma in Colombia has been the size of the Colombian military force and its capabilities. Is this request made in recognition of the progress that the Colombians have made in terms of having effective units that can go out and essentially use the skill and the services of these planners?

General MIXON. Sir, that is exactly the point. Their military has grown and they are doing larger scale operations where more units are put in the field. Therefore, we see it as important to provide them the advice and assistance.

I would tell you, to echo what General Hill said yesterday, the Colombian military and the Colombian Government clearly see this as their war to win. Whenever we look at their units and how they are doing operations and the support they may need, we always go to them first and say: This is what we recommend where we can help you. Sometimes they say: Yes, we would like that help. Sometimes they say: No, give us some time until we are ready to receive that support.

My point is that they do not always come to us and rarely do come to us for the types of support we offer, but it is an effort done in conjunction with them and their military operations.

Senator REED. We discussed the situation in Iraq with contractors and Secretary O'Connell pointed out that there are contractors in Colombia. I will raise the same general question. What are the operating procedures to support these contractors, to know where they are in country, and to prevent a situation in Colombia like we saw in Iraq?

General MIXON. Yes, sir. They operate under similar rules of engagement. However, the contractors that work for the DOS, that actually participate in the flying of some of the spray aircraft, some of the intelligence aircraft that support military operations, obviously are flying over hostile territory. We have lost two aircraft in the last year, year and a half. One resulted in the capture of three Americans who are still held hostage by the FARC.

Senator REED. Thank you.

Thank you.

Senator ROBERTS. We thank you for your testimony and we will now, at your request, move to a closed session. Thank you very much.

[Whereupon, at 11:18 a.m., the subcommittee adjourned.]