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S. HRG. 107–696, PT. 5

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2003

HEARING

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

ON

S. 2225

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2003 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, TO PRESCRIBE MILITARY PERSONNEL STRENGTHS FOR FISCAL YEAR 2003, AND FOR OTHER PURPOSES

PART 5
EMERGING THREATS AND CAPABILITIES

MARCH 6, 12, APRIL 10, 2002

Printed for the use of the Committee on Armed Services

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2003

WEDNESDAY, MARCH 6, 2002

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

NONPROLIFERATION PROGRAMS OF THE DEPARTMENT OF ENERGY AND THE COOPERATIVE THREAT REDUCTION PROGRAM OF THE DEPARTMENT OF DEFENSE

The subcommittee met, pursuant to notice, at 2:40 p.m., in room SR–222, Russell Senate Office Building, Senator Mary L. Landrieu (chairman of the subcommittee) presiding.

Committee members present: Senators Landrieu, Carnahan, and Roberts.

Majority staff members present: Madelyn R. Creedon, counsel; Richard W. Fieldhouse, professional staff member; and Arun A. Seraphin, professional staff member.

Minority staff members present: L. David Cherington, minority counsel; Edward H. Edens IV, professional staff member; and Mary Alice A. Hayward, professional staff member.

Staff assistants present: Andrew Kent and Thomas C. Moore.

Committee members' assistants present: Menda S. Fife, assistant to Senator Kennedy; Marshall A. Hevron and Jeffrey S. Wiener, assistants to Senator Landrieu; Peter A. Contostavlos, assistant to Senator Bill Nelson; David Schanzer, assistant to Senator Carnahan; John Gastright, assistant to Senator Thurmond; Robert Alan McCurry, assistant to Senator Roberts; Kristine Fauser, assistant to Senator Collins; and Derek Maurer, assistant to Senator Bunning.

OPENING STATEMENT OF SENATOR MARY L. LANDRIEU, CHAIRMAN

Senator LANDRIEU. Good afternoon, everyone, and welcome to our hearing. This hearing will be on the Department of Energy's nonproliferation programs and the Department of Defense's Cooperative Threat Reduction (CTR) programs.

Senator Roberts and I are very pleased to have both of our witnesses with us today. I think in both cases, it is your first time be-

fore this subcommittee, but neither one of you is new to this very important work.

We have Ambassador Linton Brooks, now Deputy Administrator for Defense Nuclear Nonproliferation, National Nuclear Security Administration (NNSA). Ambassador, it is good to see you again. We look forward to your testimony. J.D. Crouch, Assistant Secretary of Defense for International Security Policy, welcome.

Today we are here because of the very real threat of nuclear, radiological, biological, or chemical weapons finding their way into the hands of our enemies. The evidence of such a threat has prompted this administration to set up shop for high level officials in weapons of mass destruction or WMD-proof facilities so that they can resume control of the Nation should an attack occur.

I think the public would want to know that Senators on this committee and throughout Congress are taking every possible step to neutralize this threat so as to ensure that America is safe from such a dire scenario.

Let me begin by referring to excerpts from this week's *Time* magazine. *Time* reports that "for a few harrowing weeks last fall, a group of U.S. officials believed that the worst nightmares of their lives—something even more horrific than September 11—was about to come true. In October, an intelligence alert went out to a small number of Government agencies, including the Energy Department's top-secret nuclear emergency search team (NEST), based in Nevada. The report said that terrorists were thought to have obtained a 10-kiloton nuclear weapon from the Russian arsenal and planned to smuggle it into New York City."

The report came from a very reliable field agent, and coincided with statements from a Russian general who said he might be missing a missile.

[The information referred to follows:]

TIME.com

NATION

Sunday, Mar. 03, 2002

Can We Stop the Next Attack?

A 10-kiloton nuclear weapon detonating in New York City? It didn't happen, but it could have. That knowledge keeps the CIA and FBI scrambling to fix a broken system before another strike comes

BY MASSIMO CALABRESI AND ROMESH RATNESAR

For a few harrowing weeks last fall, a group of U.S. officials believed that the worst nightmare of their lives—something even more horrific than 9/11—was about to come true. In October an intelligence alert went out to a small number of government agencies, including the Energy Department's top-secret Nuclear Emergency Search Team, based in Nevada. The report said that terrorists were thought to have obtained a 10-kiloton nuclear weapon from the Russian arsenal and planned to smuggle it into New York City. The source of the report was a mercurial agent code-named DRAGONFIRE, who intelligence officials believed was of "undetermined" reliability. But DRAGONFIRE's claim tracked with a report from a Russian general who believed his forces were missing a 10-kiloton device. Since the mid-'90s, proliferation experts have suspected that several portable nuclear devices might be missing from the Russian stockpile. That made the DRAGONFIRE report alarming. So did this: detonated in lower Manhattan, a 10-kiloton bomb would kill some 100,000 civilians and irradiate 700,000 more, flattening everything in a half-mile diameter. And so counterterrorist investigators went on their highest state of alert.

"It was brutal," a U.S. official told TIME. It was also highly classified and closely guarded. Under the aegis of the White House's Counterterrorism Security Group, part of the National Security Council, the suspected nuke was kept secret so as not to panic the people of New York. Senior FBI officials were not in the loop. Former mayor Rudolph Giuliani says he was never told about the threat. In the end, the investigators found nothing and concluded that DRAGONFIRE's information was false. But few of them slept better. They had made a chilling realization: if terrorists did manage to smuggle a nuclear weapon into the city, there was almost nothing anyone could do about it.

In the days after Sept. 11, doomsday scenarios like a nuclear attack on

Manhattan suddenly seemed plausible. But during the six months that followed, as the U.S. struck back and the anthrax scare petered out and the fires at Ground Zero finally died down, the national nightmare about another calamitous terrorist strike went away.

The terrorists did not. Counterterrorism experts and government officials interviewed by TIME say that for all the relative calm since Sept. 11, America's luck will probably run out again, sooner or later. "It's going to be worse, and a lot of people are going to die," warns a U.S. counterterrorism official. "I don't think there's a damn thing we're going to be able to do about it." The government is so certain of another attack that it has assigned 100 civilian government officials to 24-hour rotations in underground bunkers, in a program that became known last week as the "shadow government," ready to take the reins if the next megaterror target turns out to be Washington. Pentagon strategists say that even with al-Qaeda's ranks scattered and its leaders in hiding, operatives around the world are primed and preparing to strike again. "If you're throwing enough darts at a board, eventually you're going to get something through," says a Pentagon strategist. "That's the way al-Qaeda looks at it."

Thousands of al-Qaeda terrorists survived the U.S. military assault in Afghanistan and are beginning to regroup. Last weekend, U.S. forces attacked some 500 Taliban and al-Qaeda fighters holed up in the rugged, icy mountains outside the eastern town of Gardez, near the Pakistani border. The targets: four al-Qaeda training camps that were bombed last fall but, sources tell TIME, have since been reoccupied by al-Qaeda. Over the past month, locals say, groups of armed men have moved into the area from the Pakistani border town of Miren-Shah. The latest battle involved at least 1,000 Afghan troops and 60 U.S. Special Forces, who advanced on an al-Qaeda encampment by taking control of roads around Shah-e-Kot. The lead forces were rebuffed by heavily armed al-Qaeda and Taliban fighters. U.S. aircraft, including B-52s, F-15Es, F-18s and AC-130 gunships, were called in to fire at enemy positions. At least one American was killed by hostile fire. "This could go on for several days," a Pentagon official said.

As TIME reported in January, Western intelligence officials believe that al-Qaeda may now be under the control of Abu Zubaydah, a peripatetic aide of Osama bin Laden's who has run training camps in Afghanistan and coordinated terror cells in Europe and North America. A European terrorism expert says Zubaydah oversaw the training of 3,000 to 4,000 recruits in al-Qaeda terrorist camps, most of whom are "out there somewhere in the world right now." Zubaydah has instructed operatives to shave their beards, adopt Western clothing and "do whatever it takes to avoid detection and see their missions through," the expert says.

In the past six months, the Administration and Congress have mobilized massive amounts of government money, intelligence and personnel to track terrorists at home and abroad and tighten the country's protective net. But all nets have holes. A TIME investigation found some good news—notably that the CIA, FBI and other intelligence and law-enforcement agencies are finally starting to work as a team. But in other critical areas, such as gathering and

analyzing intelligence, strengthening homeland security and rounding up al-Qaeda, the U.S. has yet to solve its most grievous problems. Much of the more than $1 billion that Washington has poured into intelligence services since 9/11 is merely high-octane fuel flooding a leaky and misfiring engine. America's national security system is designed to fight Soviets rather than suicide bombers. Sources in the Pentagon, White House and Congress grumble that the CIA and the nation's other intelligence bureaucracy were caught flat-footed by the Sept. 11 attack—"It was an abject intelligence failure," a White House aide says—and many still doubt that the U.S. intelligence community is capable of seeing the next one coming.

Experts warn about mass contamination of the nation's food supply and nuclear attacks on major U.S. cities precisely because these remote threats are the ones for which adequate defenses are not yet in place. The Coast Guard is arming itself against a possible terrorist attempt to destroy a major U.S. coastal city by detonating a tanker loaded with liquefied natural gas. The Bush Administration is bracing for another disaster. "We're as vulnerable today as we were on 9/10 or 9/12," says presidential counselor Karen Hughes. "We just know more." Here is what TIME has learned about America's vulnerabilities—and how the U.S. is working to bolster its defenses on four crucial fronts.

Learning to Spy Again

Since Sept. 11, no criticism of the CIA has been more damning than the fact that the agency's legions of highly trained spooks were less successful at infiltrating al-Qaeda than was a Marin County, Calif., 19-year-old named John Walker Lindh. "They didn't see it; they didn't analyze it; they didn't locate it or disrupt it," says a U.S. official."It's just that simple." In Senate hearings last month, CIA Director George Tenet, a Clinton Administration holdover who managed to hold on to his job after 9/11 because he is close to Bush, stubbornly defended the agency's record. "It was not the result of the failure of attention and discipline and consistent effort," he insisted.

And yet intelligence officials acknowledge privately that Sept. 11 laid bare many of the agency's most crippling weaknesses. Six months later, the problems remain—buried under billions of dollars in post-9/11 funding and stubbornly resistant to change. Insiders agree that the CIA's failure to learn of the Sept. 11 plot stemmed in large part from the CIA's inability to gather human intelligence about foreign threats. The agency, a senior Administration official concedes, "got out of the human intelligence business in favor of technical collection" after the fall of the Soviet Union. Today the average overseas assignment for an agency spy-handler is three years, barely enough time to learn one's way around, let alone penetrate a terror cell. And with the passing of the Soviet threat, many CIA officials lost interest in doing dirty human espionage—which means recruiting dangerous characters who can act as spies and infiltrate terror networks such as al-Qaeda's. And even when informants were coaxed into cooperating, the CIA still required almost all "fully recruited" spies to take a polygraph test, something that scares off useful sources and in the past has failed to catch double agents. "We recruited a whole bunch of bad agents," admits a senior intelligence official. "We wasted a lot of taxpayer money that way."

The CIA is larded with Russian specialists left over from the cold war, even as the agency struggles to recruit and train officers with proficiency in other tongues. In last year's graduating class of case officers, just 20% had usable skills in non-Romance languages. When the war in Afghanistan began, the CIA had only one Afghan analyst. As TIME reported last month, American intelligence agents in Kabul almost blew the chance to question a top-ranking Taliban minister, who may have had information on the hiding place of Mullah Omar. The spooks had yet to hire a Dari translator.

In response to TIME's questions about these shortcomings, two senior intelligence officials said the agency has worked hard to close the language gap and improve recruitment of informants. Since 1998, Tenet has instructed the CIA's espionage arm, the Directorate of Operations, to push its officers to diversify their language skills, boost recruitment and take greater risks. But despite some progress, a senior official admits, "we're not there yet." Robert Baer, a former CIA field operative in India, Tajikistan, Lebanon and Iraq, says the reforms did nothing to "break the cold war mold—it's all about the culture." The Administration has recalled old CIA hands with experience in Central Asia. Says an Administration official: "You ended up going back to retirees because the bench was so light on Afghanistan. We're still trying to get up to speed."

The dearth of qualified intelligence officers on the ground in Afghanistan has forced the U.S. to count on unreliable sources, dramatically increasing the risk of military mistakes, impeding the hunt for al-Qaeda leaders and giving Omar, bin Laden and their henchmen time to slip away. "The U.S. is totally dependent on locals, who have their own agenda," says an expert in the region. A senior intelligence official disputes the scope of the problem, telling TIME that "this institution has never produced better human intelligence than it does today—but that doesn't mean that we don't need to do more."

Even when America sets its own agenda, there are serious problems. The U.S. spends more than 90% of its $35 billion annual intelligence budget on spying gadgetry rather than on gathering human intelligence, and most of that money goes not to the CIA but to spy agencies within the Department of Defense, such as the National Security Agency (which does eavesdropping and code breaking) and the National Reconnaissance Office (which flies imagery satellites). The priciest gadgets are not always the ones suited to fighting the terrorist threat. During the past five years, while the U.S. spent billions of dollars to build and launch about half a dozen radar-imaging spy satellites, the CIA and others built 60 Predator unmanned aerial vehicles (uavs) at about $3 million apiece. The Predators, not the satellites, killed terrorists in Afghanistan.

High-tech surveillance can do little to track adversaries like the Sept. 11 hijackers, especially if they are in the U.S. legally and careful about what they say on the phone. So why does the CIA persist in spying the wrong way? Part of the answer lies in the culture of secrecy that arose during the cold war and continues to rule the agency's hearts and minds. Today the secrets the CIA needs to pick up are often easily accessible—such as the travel plans of

the Sept. 11 hijackers, two of whom managed to pay for their airline tickets with credit cards in their own names, even though the CIA had placed them on the terrorist watch list weeks before. Exploiting such "open sources" by combining them with newly discovered secrets is critical to fighting terrorists and others who hide in plain sight. And yet for years the agency discounted the value of open sources and let slip the quality of the intelligence analysts charged with studying them.

U.S. intelligence officials remain blind to this deficiency. Tenet insists that the agency's proper focus remains "the relentless pursuit of the secret." As long as U.S. intelligence continues to peer only in dark corners, we may struggle to discover what terrorists are hatching right in our backyard.

Share and Share Alike

Here's how the war on terrorism is supposed to work. In January a U.S. soldier prowling through an al-Qaeda compound in Afghanistan came across a document that contained outlines of a possible plot against the U.S. embassy in Sanaa, Yemen. The document contained the name of Fawaz Yahya al-Rabeei, a Saudi-born Yemeni who belonged to al-Qaeda, and it was passed to the CIA and FBI. Working with foreign intelligence services, the agencies came up with the names of 16 Rabeei associates and photographs of 13 of them. Then an FBI investigator poring over the list realized that the brother of one of the men was in U.S. custody in Guantanamo Bay, Cuba. On Feb. 11 agents detailed to Camp X-Ray showed the prisoner the photos and persuaded him to talk. The prisoner told them that a terrorist attack—against U.S. installations in Yemen or even the U.S. itself—was planned for the next day.

At 9 that night—after consulting with intelligence officials, White House aides and Office of Homeland Security Director Tom Ridge—FBI Director Robert Mueller posted the names of the suspects and their mug shots on the FBI website and issued the government's most specific terror warning since Sept. 11. No attack took place, but two days later a suspected al-Qaeda operative named Sameer Muhammad Ahmed al-Hada blew himself up with a hand grenade in a suburb of Sanaa, while fleeing from police. Al-Hada was connected to trouble: his brother-in-law is wanted by Yemeni police for conspiring in the Sept. 11 hijackings, and another sister is married to Mustafa Abdul Kader al-Ansari, one of the 17 men the FBI believed had plans to attack America.

The Yemen case was a rare, real-time example of resourceful gumshoeing, timely intelligence and open communication among government agencies. The latter in particular went wanting in the days before Sept. 11. Most notable is the story of Khalid al-Midhar. In January 2000 a group of al-Qaeda operatives met in Kuala Lumpur, Malaysia, to plot the attack on the U.S.S. Cole. Malaysian authorities caught the meeting on a surveillance videotape and turned it over to the CIA. Last summer the agency identified one of the attendees as al-Midhar, a Saudi who intelligence officials thought had entered the U.S. shortly after the meeting in Malaysia and left six months later. The CIA put his name on a watch list and handed it over to the Immigration and Naturalization Service—but by then al-Midhar had slipped back into the U.S.

Within the next few days, the CIA briefed the FBI on al-Midhar. FBI officials say they initiated a frantic manhunt for al-Midhar but never found him. On Sept. 11, authorities believe, he flew American Airlines flight 77 into the Pentagon. Al-Midhar bought his Sept. 11 airline ticket under his own name, but American Airlines officials say no government authorities informed them he was on a terrorism watch list.

That Al-Midhar could elude three federal agencies, all of which knew his identity and the danger he posed, highlights the lack of coordination among U.S. intelligence agencies, whose biggest problem may be the intelligence system's splintered structure. The array of semiautonomous agencies—13 in all—share a secure computer network, but collaboration is not in their nature. Interaction between outsiders and CIA analysts or officials is difficult. Says a frustrated Administration official: "We don't have a place where it all comes together."

The broad ground rules that gave each intelligence bureaucracy its own role and swath of territory don't make much sense in the new war. The CIA has largely stayed out of domestic intelligence gathering, in part because of limits set by Congress in the '70s to protect citizens from the agency's excesses, such as dosing unwitting subjects with LSD. During the cold war and afterward, the Pentagon, FBI and CIA split the responsibility for tracking foreign threats, but each agency kept the others in the dark about what it was doing. That division of labor failed completely in spotting clues to Sept. 11, so it's good news that in the race to stop the next attack, the lines between fiefs have finally started to blur. The Sept. 11 terrorists crossed national boundaries at will. In response, more FBI agents are working overseas than ever before. The Patriot Act passed in October gives the CIA greater access to law-enforcement information and allows the nsa to obtain warrants more easily for domestic wiretaps. In Afghanistan, the CIA has unleashed its 150-man covert paramilitary force to conduct sabotage, collect intelligence and train Northern Alliance guerrillas.

The paragon of interagency cooperation is the CIA's Counterterrorism Center, which was created in 1986 as a way to get FBI and CIA agents working side by side. In the past three years, the ctc has broken up three planned attacks by the Hizbollah terror group outside the Middle East, all of them targeting locations where Americans could have been killed. The ctc is everything the rest of the intelligence community is not: coordinated, dynamic and designed for the post-cold war threat. As a result, its staff has doubled to 1,000 since Sept. 11, and the Administration has deluged the center with new funding.

But the CTC's staffers make up just 1% of the U.S. intelligence community. Some critics say the only sensible reform is for the ctc to become a model for the larger community—merging multiple intelligence agencies under the authority of the director of Central Intelligence. Congressional sources tell TIME that an advisory panel headed by former National Security Adviser Brent Scowcroft will recommend just such a reorganization later this year. But the idea probably won't go anywhere. Defense Secretary Donald Rumsfeld is expected to oppose any proposal to take away the Pentagon's control over the Defense Department's intelligence agencies, where most

intelligence dollars go. Tenet, who spent 10 years as a staffer on Capitol Hill, doesn't want to challenge Rumsfeld, who is at the height of his power. Those who know Tenet say he has little taste for taking on superiors. "[Tenet's] focus is always just going to be on getting the job done," says a source close to the Scowcroft panel.

A Better Shield

Once intelligence has been collected, analyzed and shared, it must be acted on—used to set priorities and bolster defenses. The government knows it can't wait. In the past six months, billions have already gone toward reinforcing cockpit doors, tightening the airline baggage-screening process and hiring 28,000 new federal employees at airports to replace the private security firms that let al-Qaeda through on Sept. 11. In October the Administration created a new Office of Homeland Security to deal exclusively with the job of preparing the country for future terrorist threats. Since he took the job of Homeland Security czar, former Pennsylvania Governor Tom Ridge has had some rough sledding; Bush gave him no authority over Cabinet members or agencies, which means he lacks the clout to win crucial bureaucratic fights. But Ridge has shown his skill in the Washington art of writing checks. The Administration's $38 billion homeland-security budget proposes a $380 million system to track the entry and exit of noncitizens and gives $282 million to the Coast Guard for protecting ports and coastal areas. This week, sources tell TIME, Ridge's office plans to announce a new color-coded alert system to warn local law enforcement and the public about threats within U.S. borders. Even the military is setting up a new bureaucracy, the U.S. Northern Command, dedicated to defending the homeland. By Oct. 1 the military hopes to put a four-star general in charge of a standing domestic military force devoted to flying combat air patrols, guarding the borders and responding to attacks on U.S. soil.

Terrorists aren't likely to be deterred. There's plenty of intelligence that al-Qaeda operatives want to bring down more airliners—witness Richard Reid—and the government is still trying to get serious about stopping them. As recently as last month, Transportation Department investigators succeeded in slipping weapons and explosives past screening personnel and onto an aircraft at Miami International Airport.

Thanks to the new airport-security bill passed in Congress last November, airline security has been taken out of the hands of the FAA and given to the newly created federal Transportation Security Administration. But many of the changes that were supposed to be carried out by the TSA either haven't been implemented or have been killed by compromise. Federal baggage screeners are in place at only 15 of the country's 429 airports, and the TSA has not yet bought the 2,000 large detection devices it aims to have operating within nine months to inspect checked baggage for explosives. Airlines still aren't required to match bags to passengers on every plane; on some aircraft, the improvements to cockpit doors amount to nothing but "a silly little bar," in the words of one pilot. "It's easy to imagine hundreds of horrific possibilities," says TSA deputy head Steven McHale. "We can become paralyzed if we start thinking about all possible threats."

In countless other areas as well, homeland security still needs an upgrade. The Administration plans to hire 800 more customs agents to police the borders but still lacks a system for tracking whether immigrants who enter legally overstay their visas, which three of the Sept. 11 hijackers did. Ridge, who will visit the U.S.-Mexican border this week, has proposed the sensible reform of getting the various border-control agencies—Customs, INS, Border Patrol and Coast Guard—to operate under a single command and work off the same technology. But he lacks the power to make it happen. Despite calls for the Federal Government to improve security at the country's nuclear power plants and weapons sites—and the chilling discovery in Afghanistan of evidence that al-Qaeda may try to target them—little has been done to lock down the sites or to clear the air corridors above them. In October the FAA briefly banned aircraft from flying below 18,000 ft. and within 10 miles of 86 sensitive sites, including several nuclear power plants, but the ban was lifted in November and has not been reinstated.

Government agencies are starting to prepare for other previously unimaginable threats. Experts meeting last week in Lenox, Mass., said hackers in the Middle East have probed the huge computers that control the nation's electric-power grid, and the government has received reports of possible physical reconnaissance of power plants by terrorists. Republican Senator Jon Kyl frets about explosives, such as the three substances found in Reid's shoes, which in small quantities might be missed by airport screening devices and some bomb-sniffing dogs. Small amounts of old-fashioned explosives are potent enough to blow a hole in a fuselage, and experts can't say for certain whether airport detectors can spot them. "I don't really want to talk about this publicly," Kyl says, "but it remains difficult to do something about."

The homeland-security budget is aimed at keeping casualties down; almost all of the $9.5 billion allocated to combat bioterrorism, for instance, goes toward training and equipping local public-health authorities to treat victims and haul out bodies in the event of an attack. The assumption, of course, is that an attack will come. "We need to accept that the possibility of terrorism is a permanent condition for the foreseeable future," Ridge told TIME. "We just have to accept it."

Catching Bad Guys

The single most effective strategy for pre-empting another attack is to hit the attackers first—to disrupt and root out the terrorists who are planning the next strike. That's hard but not impossible. The Sept. 11 hijackers kept low profiles, for example, but didn't plan the attacks in cloistered secrecy. Mohamed Atta and his crew received money from al-Qaeda paymasters through traceable banking channels. Nine of them were singled out for special airport-security screenings on the morning of the attacks, the Washington Post reported, yet managed to slip through. The two hijackers who were on the government terrorist watch list before Sept. 11 possessed valid driver's licenses under their own names and paid for their tickets with credit cards that the FBI could have easily tracked. In some cases, the FBI failed to share information it possessed on suspect individuals with other law-enforcement authorities; in others, the feds simply didn't pay close enough

attention.

They do now. Since Sept. 11, the number of FBI personnel working on counterterrorism has grown from 1,000 to 4,000. A new cybercrime division monitors credit-card-fraud schemes that terrorists use to fund their activities. Stung by criticism over its historic reluctance to share secret evidence with local cops, the FBI now sees it doesn't have a choice. Edward Flynn, the police chief in Arlington County, Va., says the FBI is giving local cops more leads than they can handle. "They feel compelled to tell us this stuff," he says.

Meanwhile, arrests of al-Qaeda suspects in the U.S. have dwindled. A handful of people in federal custody are still being investigated for possible links to terrorist activity. The worldwide dragnet has snared 600 alleged al-Qaeda operatives. And yet the bottom line is sobering: after six months of gumshoe work by just about every law-enforcement official in the U.S., the number of al-Qaeda sleeper cells that have been busted inside the country is precisely zero. Does that mean bin Laden's men have gone further underground? "We don't know," says an FBI official. "If you go back and look at the hijackers, they had zero contact with any known al-Qaeda people we were looking at. They didn't break laws. They didn't do anything to come to anybody's attention. Are there other people in the U.S. like that? We don't know."

As long as such uncertainty persists, so will the military assault on al-Qaeda abroad. The U.S. military campaign has removed bin Laden's sanctuary and degraded his infrastructure of terror. Pentagon sources say that the U.S. has killed as many as eight high-ranking al-Qaeda officials, but most of the 11,000 terrorists believed to have spent time in al-Qaeda camps are still on the loose. Efforts to apprehend al-Qaeda fighters in Afghanistan have slowed, as thousands have bought safe refuge in the hamlets and villages of the Afghan countryside. "The mission is to take al-Qaeda apart piece by piece," says Mohammed Anwar, the head of intelligence in Mazar-i-Sharif. "But it's very difficult work." CIA, FBI and military intelligence officials have spent eight weeks interviewing the 300 detainees in Cuba for information on the whereabouts of the al-Qaeda leadership, but defense sources told TIME that any prisoners now in U.S. custody know little, if anything, about bin Laden's coordinates. While there is a genuine debate inside the government about whether he is still alive, there is far less argument about what will happen after Washington is able to confirm that he is dead. A U.S. official told TIME last week that it is widely presumed that al-Qaeda sleeper cells will take retaliatory action once the terrorist leader is killed or proved dead.

With al-Qaeda sprinkled around the globe, it becomes harder to develop the intelligence needed to take the fight to the enemy. Last week the Administration gave its clearest signal yet that the war won't stop in Afghanistan or even the Philippines, when it announced plans to send special-ops troops to Yemen and the former Soviet republic of Georgia, both countries where al-Qaeda fighters are believed to be hiding.

By keeping the pressure up, the U.S. hopes to correct its biggest mistake of all. According to this view, the U.S.'s failure to retaliate massively after past

al-Qaeda attacks against U.S. military barracks, battleships and embassies tempted bin Laden to go after ever more outrageous targets—and finally the World Trade Center. Now the U.S. has destroyed al-Qaeda's training camps and undermined bin Laden's capacity to lead. And yet the Sept. 11 hijackings were years in the making—which means bin Laden could have ordered up another, more lethal attack before his world came apart. "We were overwhelmingly defensive in our orientation before Sept. 11," Admiral Dennis Blair, the head of the U.S.'s Pacific Command, told TIME. "Now we've gone on the offensive." The big question is whether we did so in time.

—With reporting by Matthew Cooper, John Dickerson, Sally Donnelly, Michael Duffy, Elaine Shannon, Mark Thompson and Douglas Waller/Washington, Bruce Crumley/Paris, Tim McGirk/Kabul and Alex Perry/Mazar-i-Sharif

Senator LANDRIEU. Fortunately, this information was not accurate, but the chance of such an event occurring in the future is certainly in the realm of possibility. A 10-kiloton weapon, according to *Time,* would have killed 100,000 New Yorkers and irradiated an additional 700,000.

For well over a decade now, Senators Nunn and Lugar and a few others have recognized the potential of the threat posed by the proliferation of weapons of mass destruction from Russia and the Former Soviet Union (FSU). Unfortunately, they faced, in some instances, powerful opposition, opposition unwilling to either recognize the threat or all too eager to characterize nonproliferation programs as foreign aid. Compared to the critics who claimed that these programs did not belong in the DOD budget, and did not appreciate the reality of this threat, Senators Nunn and Lugar may have been ahead of their time, but their assessment of this threat was, I think, 100 percent accurate.

In President Bush's State of the Union speech, the President stated, "Our Nation will continue to be steadfast and patient and persistent in the pursuit of two great objectives. First, we will shut down terrorist camps, disrupt terrorist plans, and bring terrorists to justice. Second, we must prevent the terrorist regimes who seek chemical, biological, or nuclear weapons from threatening the United States and the world."

I completely support these goals and agree with the President. I intend to lead this subcommittee in support of these endeavors.

The fiscal year 2003 request represents a 35 percent increase over last year's budget request for these programs, and it is 5 percent over what this Congress, in a bipartisan fashion, appropriated last year. We must sustain and enhance this level of funding for DOE and DOD nonproliferation programs in order to meet their worthy goals and objectives.

But adequate budget funding is only the first step. We must dedicate these additional resources and current resources to the best possible ways to prevent proliferation, retain Russian and former Soviet scientists, and turn their offensive weapons training into tools for peace and prosperity. We must lock down and account

for nuclear, chemical, and biological stockpiles with greater effectiveness and efficiency. We must create opportunities for Russian and former Soviet scientists to collaborate with American scientists in research and educational institutions to share knowledge that can assist our medical and public health professionals to effectively counter chemical and biological attacks or outbreaks, and we must be creative in thinking how to develop new and innovative efforts to quickly neutralize this threat. We simply do not have time on our side.

To illustrate how real this threat is and how imperative it is that we act now, I would like to share some shocking reports coming out of one of the newly independent Russian states. Just recently, on February 25, a *Newsweek* article tells of accounts where workers at the premier bioweapons facility from the Soviet era now state that keeping track of the pathogens stored there is "next to impossible."

[The information referred to follows:]

SECTION: INTERNATIONAL; Pg. 26

LENGTH: 1400 words

HEADLINE: In the Germ Labs

BYLINE: By **Fred Guterl** and Eve Conant; *With* John Barry, Mark Hosenball *and* Adam Rogers *in Washington*

HIGHLIGHT:
The former Soviet Union had huge stocks of biological agents. Assessing the real risk.

BODY:
Bakyt Atshabar has worked for the anti-plague Institute for more than 25 years, and for much of that time there was little need for security guards and fences and heavy metal doors with keypad locks. As an unofficial part of the Soviet Union's vast bioweapons program, the institute routinely kept dozens of different strains of anthrax, plague and tularemia stored in unlocked refrigerators. But Moscow's ironclad control over life in Kazakhstan protected the labs. So did a veil of secrecy that hid the institute's bioweapons role from local residents. When the Soviet Union collapsed, however, the thick shrubs surrounding the institute's campus began to attract petty thieves and drunks. "We had bums right outside my window here," says Atshabar, now director of the institute, which is located in a leafy suburb of Alma-Ata, the largest city in Kazakhstan. "They would sleep there"--he points to a tuft of trees--"and drink vodka." Criminals once broke in and stole an aluminum part of a centrifuge, useless except as scrap metal. It would have been even easier to rob--or smuggle out--a small vial of nasty germs to sell on the black market. As far as anybody knows, no such theft ever occurred at the institute (formally known as the Kazakh Science Center for Quarantine and Zoonotic Diseases). But keeping close track of pathogen cultures is next to impossible, even for the most tightly run lab. And at the Alma-Ata institute, vials of anthrax are kept in coffee cans, which themselves are stored in a 40-year-old refrigerator secured with a simple padlock.

In the wake of September 11, the Big Fear--the one driving President George W. Bush's most important decisions and dire pronouncements--is that a terrorist group like Al Qaeda will eventually get its hands on weapons of mass destruction. These worries are heightened because U.S. officials have learned that Osama bin Laden's network was trying to acquire such weapons. Documents recovered from Qaeda safe houses and camps in Afghanistan "show that bin Laden was pursuing a sophisticated biological weapons research program," CIA Director George Tenet told Congress earlier this month. Bush has used such concerns to justify his warnings against Iraq, Iran and North Korea--what he calls the "axis of evil." Such countries "could provide these arms to terrorists," he declared in his State of the Union Message. In large part, it's the fear of WMD in the hands of terrorists that is behind large increases in spending on the military and on home-land defense.

But the "rogue states" are not the only concern when it comes to WMD proliferation. Some experts worry that the countries of the former Soviet Union, with enormous stockpiles of pathogens, high levels

of corruption and grim conditions for scientists, could be vulnerable to terrorists looking for highly destructive agents. Al Qaeda itself appears to have targeted ex-Soviet weapons scientists for recruitment. According to U.S. intelligence reports, some Russian experts traveled to Kandahar for job interviews with unidentified Qaeda leaders. Intelligence officials believe the Russians turned down the chance to work for bin Laden, however, and by all accounts Al Qaeda's efforts to make or acquire bioweapons have gone nowhere.

So how worried should we be? At their peak, the Soviets probably employed upwards of 60, 000 people on bioweapons projects, which produced a greater volume and variety of deadly agents than any other country. When Ken Alibek, a senior Soviet bioweapons official, defected in 1992, he described a staggering offensive bioweapons production capacity--4,500 metric tons of anthrax a year, for instance--and an alarming array of deadly pathogens, including smallpox and antibiotic-resistant anthrax.

Gennady Lepyoshkin was Alibek's deputy in the Soviet era, and later took his job as head of the giant production facility at Stepnogorsk in Kazakhstan. In its heyday, the facility, with fermenting tanks as tall as four-story buildings, could produce 1.5 tons of weaponized anthrax in only 24 hours. Lepyoshkin has more than 20 years' experience in biowarfare, a doctorate in biology and another in microbiology. Now he's unemployed. (Russian born, he was replaced recently by a Kazakh.) As he walks along the perimeter fence at Stepnogorsk, where he no longer has clearance, he drinks a shot of cognac in honor of his old haunt. "Most of our scientists left for Russia, Ukraine or Belarus," he says. "But the ones who stayed--biological and chemical engineers--make ends meet by driving to Omsk to buy sausage and cheeses and then selling them here."

A few years ago the U.S. government estimated that 7,000 former Soviet bio-weaponeers were a "proliferation concern," says Amy Smithson, a bioweapons expert at the Stimson Center in Washington. After September 11, they upped the figure to 10,000. Suddenly, formerly benign activities began to look worrisome--veterinary institutes, for instance, hold livestock pathogens that in the wrong hands could devastate a nation's farms.

For the past eight years the State Department has been retraining former weapons scientists and helping institutes turn their bioweapons programs into peaceful, commercial ventures. The incoming Bush administration initially regarded this--and similar efforts to help Russian scientists--with deep suspicion. But 9-11 changed that. Now the Defense Department's work on former Soviet bioweapons facilities is to be greatly expanded, from $17 million in the current fiscal year to $55 million. Early this year the State Department's assistance program received a one-time appropriation of $30 million, which it will use to dismantle the Stepnogorsk military fermenters and put former Soviet scientists to work making vaccines. "They do a great job with the resources they have," says Smithson, "but even with the extra money they're only getting at the tip of the iceberg."

Not everyone agrees. It would be irresponsible for an expert like Smithson not to be concerned, but many respected specialists believe the numbers of unemployed bioweapons scientists are exaggerated. Alibek, the Soviet defector, has said that there are perhaps 100 former Soviet scientists capable of building a soup-to-nuts bioweapons factory. Western bioweapons experts put that figure higher--"the low hundreds," says one. But the more important point, says an intelligence source, is that "we think we know where almost all of those people are." An effort by Iran to recruit former Soviet scientists in 1997, in fact, helped invigorate the U.S. push to pay the scientists to stay in place. "We said, 'Work with us and you will get funding for real collaborative research; work with Iran and you will never see a penny of our money'," says Elisa Harris, who handled nonproliferation programs in the Clinton administration. Experts also stress, moreover, how difficult it is to turn a pathogen into a bioweapons agent like the "aerosolized" anthrax sent through the U.S. mail system in October. (Although investigators haven't ruled out a foreign source, the prevailing theory is still that the anthrax came from within the United

States.)

But what about ready-made stockpiles of weaponized agents, or even just virulent strains? Two years ago the DOD began helping former Soviet bioweapons labs to beef up security. The institute in Alma-Ata, which houses cultures of nonweaponized, but still dangerous, germs, now boasts a 2.5-meter concrete wall topped with barbed wire. Two guards armed with stun guns and tear gas patrol the front and rear entrances. But still, nobody is searched upon entering or leaving the building. And on a recent visit, no security guards were posted at the door to the "highly hazardous infections" wing.

The larger problem is that the Alma-Ata lab is about as good as it gets. Kazakhstan alone has eight other anti-plague institutes and about 140 minor labs. None of them have had the benefit of the DOD program. Beyond Kazakhstan, throughout the ruins of the Soviet empire, hundreds of laboratories holding samples of bioweapons agents also are poorly guarded. September 11 spurred the Bush administration to take the issue more seriously. But when success includes anthrax vials in coffee cans, it'll be a long time, if ever, before anybody feels absolutely secure.

With John Barry, Mark Hosenball and Adam Rogers in Washington

Senator LANDRIEU. Vials of anthrax are kept in coffee cans, which are stored in a 40-year-old refrigerator, secured with a simple padlock. Drunken thieves have broken into this facility, and the article goes on. Fortunately, they knew not of the trove of toxins in front of them and only stole some spare parts. But imagine what could happen if more deliberate thieves with more devious intentions breached this facility.

Most shocking are the stories Russian and former Soviet scientists have to tell. These well-trained and capable scientists were approached, according to this article and others, by al-Qaeda to work in Afghanistan. Fortunately, U.S. intelligence believes these scientists refused these overtures. Nevertheless, there is no way to tell how long these scientists, many of whom are now unemployed, making less than $2,000 a year, can refuse lucrative offers such as these.

There are simply too many stories of destitute Russians and former Soviet biological and chemical engineers, very brilliant people with doctoral degrees, driving cabs or peddling cheese and vegetables to make a living. When a Russian general cannot account for the whereabouts of a warhead, we must take extreme caution, pay extreme attention, and make every effort to neutralize this particular threat.

We must also provide opportunities so that these scientists can peacefully make a living and use their keen minds to better this world. To fail to take these efforts jeopardizes our security.

So, in closing, I just want to ask a few questions—and I will have more for the record. How can we best allocate our resources to prevent nuclear, biological, and chemical proliferation? How can we best account for Russian and former Soviet stockpiles? How can we improve the living conditions of these scientists via peaceful means? How can we collaborate more with Russian scientists and American scientists to expand fellowship and create peaceful means and peaceful approaches? Finally, what new ideas or programs may be effective toward this important end?

I hope you will also let us know about parts of the programs under your jurisdiction that you do not find are working well or find not effective, because we do not have the time or the money

to work on programs that are not actually increasing our security and minimizing these threats.

So, to summarize, I believe the threat is real. I believe that we need to make these programs more robust, and I plan to lead this subcommittee in that way. But I also want to make sure that the money that we are spending is truly minimizing the risk and increasing our security, and that we will not be at all hesitant to scrap a program if it is not working so that we can put the money where it will work. The American people deserve no less, and I think they are expecting our best effort.

Senator Roberts may have an opening statement, and then we will take our usual round of questions after hearing your testimony.

Senator Roberts.

Senator ROBERTS. Thank you, Senator Landrieu, and I would like to associate myself with your remarks. Some of my remarks will be repetitive, but I will try to get through them in an expedited fashion.

I want to extend a very warm welcome to Dr. Crouch and to Ambassador Brooks. As the distinguished Madam Chairman has indicated, this is the first time that I think both of you have testified before this subcommittee on these programs, so we appreciate your taking time out of your very valuable schedule and we look forward to your remarks.

Today, we are in a different world since this subcommittee last met, in our review of the budget request for these very critical threat reduction programs. Many of the emerging threats we identified in previous years' subcommittee hearings are now the established threats of today. They are no longer emerging. No one, and certainly not this subcommittee, could have imagined the events of September 11, but this subcommittee did, in fact, really identify with almost unthinkable accuracy, the threat posed by a biological weapon and our abilities to deal with it.

So, today we find ourselves the victims of bioterrorism. While we feared that such a weapon might be a product of the Soviet-era bioweaponized strain, I do not think any of us in the Hart Senate Office Building ever imagined that it might be homegrown. That story still has to be told and the investigation is ongoing.

Now we are concerned that a dirty bomb—that is how it is described in the press at least—will be the next threat on the horizon. If we all sat down and listed 100 things, Madam Chairman, that we thought the terrorists would do, they would probably do 101. But once again, our fears are that the Soviet-era nuclear materials might be the ingredients of such a device. I hope this remains a theoretical threat and not one that will be played out anywhere in the world.

Now, the administration has demonstrated its full support for these programs with the President's fiscal year 2003 budget request. On December 27, 2001, the President stated, "This administration is committed to strong, effective cooperation with Russia and the other states of the Former Soviet Union to reduce weapons of mass destruction and prevent their expansion and proliferation."

This spirit of cooperation was also demonstrated by Presidents Putin and Bush in a November 2001 joint statement when they

said, "Both sides agree that urgent attention must continue to be given to improving the physical protection and accounting of nuclear materials of all possessor states, and preventing illicit nuclear trafficking."

I share these views. I support these programs. These programs warrant the best management and implementation and oversight possible to ensure that they achieve their missions and protect us from terrorist acts.

So, I look forward to working with you to ensure that you have the tools you need to effect good management and execute solid implementation.

With my cough and frog in my throat, I think I will simply ask that the rest of my statement be put in the record. I will get a glass of water and we can move to the testimony and the questions and we will sum up at that time. Thank you, Madam Chairman.

[The prepared statement of Senator Roberts follows:]

PREPARED STATEMENT BY SENATOR PAT ROBERTS

Thank you, Senator Landrieu. I would like to extend a warm welcome to you, Dr. Crouch, and to you, Ambassador Brooks. I believe this is the first time both of you have testified before this subcommittee on these programs. I appreciate the time you have taken to prepare, and I look forward to receiving your remarks.

Today we are in a different world since the subcommittee last met to review the budget requests for these critical threat reduction programs. Many of the emerging threats we identified in previous years' subcommittee hearings are now the established threats of today. While no one, and certainly not this subcommittee, could have imagined the horrific events of September 11, this subcommittee did in fact identify with almost unthinkable accuracy the threat posed by a biological weapon and our abilities to deal with it. Today, we find ourselves victims of bioterrorism. While we feared that such a weapon might be a product of a Soviet-era bioweaponized strain, we never imagined that it might be home grown. Now, we are concerned that a "dirty bomb" will be the next threat on the horizon. Once again our fears are that Soviet-era nuclear materials might be the ingredients of such a device. I hope this remains a theoretical threat and not one that will be played out anywhere in the world.

The administration has demonstrated its full support for these threat reduction and nonproliferation programs with the President's fiscal year 2003 budget request. On December 27, 2001, the President stated that the "administration is committed to strong, effective cooperation with Russian and the other states of the Former Soviet Union to reduce weapons of mass destruction and prevent their proliferation."

This spirit of cooperation was also demonstrated by Presidents Putin and Bush in a November 2001 joint statement, "Both sides agree that urgent attention must continue to be given to improving the physical protection and accounting of nuclear materials of all possessor states, and preventing illicit nuclear trafficking."

I share these views and support these programs. I believe these programs warrant the best management, implementation, and oversight possible to ensure that they achieve their missions and protect us from terrorist acts. I look forward to working with you to ensure that you have the tools you need to effect good management and execute solid implementation.

I hope you will be able to provide the subcommittee today with a clear and detailed discussion of how your budget requests meet your mission and what you expect to accomplish with these requested funds for fiscal year 2003. I believe you are doing critical work in protecting our Nation and I commend you for your perseverance and dedication. I thank you for the time and attention you have placed in preparing your remarks for this hearing.

Senator Landrieu, thank you for holding this hearing. This concludes my opening remarks.

Senator LANDRIEU. Well, with his cough and my sniffles, we are both hoping to get through this hearing, but we are very interested in what you have to say. Mr. Secretary, please proceed.

STATEMENT OF HON. J.D. CROUCH II, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY POLICY

Dr. CROUCH. Madam Chairman and Senator Roberts, it is a pleasure to be here today. Thank you for giving the Defense Department an opportunity to review CTR programs with the Subcommittee on Emerging Threats and Capabilities.

I have a longer statement which I would ask that you might consider putting in the record, and I am just going to briefly summarize it here.

Senator LANDRIEU. Without objection.

Dr. CROUCH. By holding this hearing so soon in the legislative year, I think the Senate is sending a high profile message that the CTR program is important to the United States, and the Department of Defense and the administration could not agree more. Over the last decade, the CTR program has made important contributions to U.S. national security by dismantling some 795 ballistic missile launchers, 92 heavy bombers, 21 ballistic missile submarines, and 729 ballistic missiles. The CTR program also contributed to our nonproliferation goals by improving the security around former Soviet nuclear, chemical, and biological weapons facilities. There is more to do.

With that in mind, we appreciate Congress' decision to fully fund the President's fiscal year 2002 request and urge a similar commitment in fiscal year 2003.

September 11 and the anthrax attacks here in the United States have prompted the Defense Department to consider how the CTR program might contribute to the global war on terrorism. You will note that our budget request includes a new program area called "weapons of mass destruction proliferation prevention." This new area is intended to help programs managed by the State Department and the Department of Energy to enhance capabilities among non-Russian former Soviet states to deter, detect, and interdict unauthorized movement of weapons of mass destruction and related materials across their respective borders.

CTR assistance would help to train military forces, border guards, customs, and other security personnel in the techniques and tactics necessary to secure their borders against proliferation of weapons of mass destruction.

CTR would also help train these forces to respond effectively to terrorist incidents at their borders.

The CTR program has made considerable strides by establishing cooperative relationships with our partners and helping them dismantle strategic delivery vehicles as soon as they are removed from operational systems. We have tried to leverage that success by recasting both the objectives and the management structure of the CTR.

With respect to management, we have brought CTR's policy making office under a new deputy under secretariat, though it will still report through my office to the Under Secretary of Defense for Policy. The new Office of Deputy Under Secretary for Technology Security Policy and Counterproliferation will be responsible for the Department's input to the interagency export licensing process through DTSA, the Defense Technology Security Administration, as

well as development of the Department's counterproliferation policies.

We believe that there are crosscutting national security issues among these areas, technology security, counterproliferation and nonproliferation, and cooperative threat reduction, that we can better address when the Department's expertise in these areas is under one management structure.

We expect CTR to play a key role as we try to realize policy and management synergies across these three areas.

To go further, we have recast CTR's objectives to sharpen the focus on emerging WMD and proliferation threats and the individual scientists whose skills are a part of that threat. We are particularly focused on the growing threat of biological weapons and bioterrorism. A significant portion of the funds requested for the biological weapons proliferation prevention program will be used for targeted, collaborative biological research, to encourage higher standards of openness, ethics, and conduct among scientists, and preempt the potential brain drain of former BW scientists to rogue states.

DOD will partner with international science and technology centers to initiate projects with scientists in Russia, Kazakhstan, Ukraine, Uzbekistan, and Georgia. This collaborative research will help enhance the transparency of Former Soviet Union biological weapons facilities.

Through this type of effort, DOD has developed continuous, routine access to bench-level scientists and leveraged their expertise to develop measures to counter bioterrorism. We want to do more in this regard.

In the past, I would also note, these projects have been thoroughly reviewed by experts from the National Academy of Science, U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and the intelligence community. In light of September 11, we have directed that all these projects and all future projects will be vetted to prevent access to information or technology that might be useful to terrorists.

We intend to expand research cooperation with the ministries of health in Kazakhstan, Uzbekistan, Georgia, and Ukraine to build infectious disease surveillance networks in areas once closed to the West. Such networks will improve our ability to detect, characterize, and monitor disease outbreaks with natural or bioterrorist origins. This has taken on greater importance with the deployment of U.S. forces in Central Asia and their potential exposure to emerging infectious diseases, some of which are poorly understood in the West.

Within current authorities and with congressional support for new flexibility, there is a range of emerging opportunities for CTR. Planned program activities already help support the new strategic framework with Russia and can be leveraged to increase transparency. There are also potential vehicles for promoting new codes of conduct in the developing U.S.-Russia relationship.

In the new security environment, CTR's technical and regional expertise offers a potentially valuable resource in emergency situations involving the proliferation of WMD or related matters. We want to work with Congress to determine whether the current

range of authorities and notification structures permit CTR to be as flexible as it might be in an emerging crisis. Whether it be responding to a specific proliferation threat, keeping WMD and related technologies out of terrorists' hands, or other scenarios, CTR may well have a key role to play in securing U.S. interests after September 11.

In this and all other CTR endeavors, the Department looks forward to working with Congress and with this committee in particular which has played such an important role in founding and improving this program.

Thank you, Madam Chairman.

[The prepared statement of Dr. Crouch follows:]

PREPARED STATEMENT BY DR. J.D. CROUCH II

Thank you for inviting me to discuss the Department of Defense Cooperative Threat Reduction Program.

The Soviet Nuclear Threat Reduction Act of 1991—the Nunn-Lugar Act—charged DOD with establishing a program to assist the Soviet Union and any successor states to destroy, safeguard, and prevent the proliferation of weapons of mass destruction (WMD). The Department of Defense created the Cooperative Threat Reduction (CTR) program to implement the Nunn-Lugar Act. This program continues as an important element of our national security strategy of the 21st century. The administration's review of nonproliferation and threat reduction assistance to Russia concluded that CTR has significantly contributed to U.S. national security. Through CTR, the U.S. has assisted states of the Former Soviet Union (FSU) to dismantle, consolidate, and secure weapons of mass destruction and their associated delivery systems, infrastructure, and technology. Similarly, CTR's defense and military cooperation with the states of the FSU has also supported the objective of preventing proliferation.

Based on sustained support from Congress, DOD has obligated nearly $3 billion since 1992. This investment has produced real dividends. Moreover, the DOD CTR program helped deactivate 5,829 nuclear warheads and eliminate 797 ballistic missile launchers, 92 heavy bombers, 21 ballistic missile submarines, and 736 ballistic missiles. Belarus, Kazakhstan, and Ukraine acceded to the Nuclear Nonproliferation Treaty in 1993 and 1994 based on promises of United States assistance to rid their countries of nuclear weapons. [Note: Belarus and Kazakhstan acceded to the NPT in 1993; Ukraine in 1994.] The CTR program helped fulfill this promise by 1996. CTR has also helped: (1) eliminate WMD infrastructure; (2) improve accountability for, and storage and transport security of, Russian nuclear warheads; and, (3) provide secure storage for weapons grade fissile material.

Five years ago, CTR initiated a biological weapons (BW) threat reduction and proliferation prevention program. The massive, highly covert Soviet offensive BW program left a legacy of vulnerable technology, pathogens, and expertise. Our first project in this area was the dismantlement of the Stepnogorsk anthrax production and weaponization facility in Kazakhstan. This facility was built to produce and weaponize over 300 tons of agent during a wartime mobilization period. Today, its dismantlement is nearly complete. In cooperation with the U.S. Departments of State, Energy, Agriculture, and Health and Human Services, DOD has been cooperating with biological research and production centers in Russia and Kazakhstan. These research projects have given us greater insight into the scope and magnitude of the FSU's BW program and are intended to prevent the proliferation of BW expertise to rogue states and terrorists. The BW proliferation prevention program has grown to include securing dangerous pathogen collections and dismantlement of additional former Soviet BW production and research facilities.

CTR has enjoyed sustained bipartisan congressional support since its inception. The President's fiscal year 2003 budget request includes $416.7 million for DOD's CTR program, a slight increase over the $400 million fiscal year 2002 appropriation.

RECASTING CTR

September 11 offered a vivid illustration of what a motivated terrorist organization can accomplish. The specter of terrorists armed with chemical or biological weapons is especially chilling. In the post 9/11 environment, we need to ensure projects are vetted especially well from both counter-intelligence and counter-terrorism perspectives. CTR's current focus and organizational history lend themselves to

addressing the new challenges we face in the post-9/11 environment. CTR needs evolve if it is to remain relevant to the most pressing national security threats facing the U.S. With continued support from Congress, we believe this important program can serve national security in the future as well as it has since its inception.

In this regard, we have recast both the objectives and the management structure of CTR. With respect to management, we have brought CTR's policy-making office under a new deputy under secretariat, though it still reports through my office to the Under Secretary of Defense for Policy. The new office is the Deputy Under Secretary of Defense for Technology Security Policy and Counterproliferation. This office is responsible for the Department's input to the interagency export licensing process, through the Defense Technology Security Administration, as well as development of the Department's counterproliferation policies. We believe that there are cross-cutting national security issues among the areas of technology security, counterproliferation and nonproliferation that we can better address when the Department's expertise in these areas is under one organic management structure.

We expect CTR to play a key role as we try to realize policy and management synergies across these three areas. To go further, we have recast the objectives of the CTR program to sharpen the focus on emerging WMD and proliferation threats.

RECAST OBJECTIVES FOR THE CTR PROGRAM

DOD has revised CTR program objectives to reflect high priority security and proliferation concerns in the FSU. These overarching objectives are to:

1. help dismantle Former Soviet Union WMD, delivery systems, and associated infrastructure;
2. help consolidate and secure FSU WMD and related technology and materials;
3. help increase transparency and encourage higher standards of conduct; and
4. help support defense and military cooperation with the objective of preventing proliferation.

DISMANTLING FSU WMD DELIVERY SYSTEMS AND ASSOCIATED INFRASTRUCTURE

The potential proliferation of FSU nuclear weapons, delivery systems and related technologies continues to pose a threat to U.S. national security. Several CTR program areas assist the FSU in dismantling these items at their sources.

The President's fiscal year 2003 budget request includes $70.5 million for the Strategic Offensive Arms Elimination (SOAE) program area to assist Russia in reducing its strategic nuclear delivery systems. While this is a reduction from previous years, we have significant unobligated balances that we plan to apply to SOAE. One of the larger areas under SOAE—elimination of strategic nuclear submarines—will require only about $15 million to $20 million total funding per year in fiscal year 2003 and the future. Russia has fewer than 20 strategic ballistic missile submarines (SSBNs) remaining to dismantle, and we expect their launchers will be eliminated and the SSBNs dismantled at the rate of about two per year. In fiscal year 2001, DOD helped Russia eliminate 4 SSBNs, 80 SLBM launchers, 99 SLBMs, 24 SS–18 launchers, and 29 ICBMs.

In addition, Strategic Nuclear Arms Elimination projects have eliminated all of Ukraine's START-accountable nuclear delivery system launchers and are helping to dismantle WMD infrastructure and delivery systems (i.e., SS–24 missiles, Tu–22M bombers, and Kh–22 nuclear capable air-to-surface missiles).

This year, DOD initiated a CTR project with Uzbekistan to eliminate the Soviet biological weapons testing complex on Vozrozhdeniye Island and to destroy anthrax that the Soviet military buried there. In addition, DOD is helping dismantle the former Soviet chemical weapons research, development, and testing facility at Nukus. In fiscal year 2001, this project dismantled and removed all pilot plant reactors, vessels, and piping along with lab equipment, filtration systems, and ducting.

The administration's review of nonproliferation and threat reduction assistance to Russia endorsed the construction of a CW destruction facility at Shchuch'ye. Therefore, DOD is requesting $133.6 million for the Chemical Weapons (CW) Destruction program in Russia. These funds also will continue demilitarization of a former CW production facility in Russia. DOD is assessing whether the Secretary of Defense can certify CW destruction facility assistance for Russia in accordance with requirements of the Fiscal Year 2002 National Defense Authorization Act. In the past 2 years design and site preparation have moved forward. This has permitted completion of construction procurement packages for over $200 million worth of work. Thus, once Russia meets the six conditions, DOD will be able to obligate the requested funds for this project promptly.

In addition, we have completely eliminated all strategic arms from Kazakhstan. The fiscal year 2003 budget request includes $8.8 million for the WMD Infrastruc-

ture Elimination-Kazakhstan program to continue efforts to consolidate and secure fissile and radioactive material, destroy equipment and facilities that were used to support the deployment and operation of Soviet WMD and delivery systems, including liquid missile propellant and a chemical weapons production facility.

CONSOLIDATE AND SECURE FSU WMD AND RELATED TECHNOLOGY AND MATERIALS

DOD's CTR and the Department of Energy's nonproliferation programs support U.S. efforts to prevent the proliferation of FSU WMD and related technology by consolidating and securing nuclear weapons, fissile material, chemical weapons, and dangerous pathogen collections.

DOD is seeking $19.7 million for the Nuclear Weapons Transportation Security program with Russia to continue assisting in consolidation of nuclear weapons from Russia's Ministry of Defense (MOD) operational sites to Ministry of Atomic Energy (MinAtom) nuclear weapons dismantlement facilities. In fiscal year 2001, DOD funded 53 rail shipments designed to carry nuclear warheads to dismantlement sites. We also funded the maintenance of 79 Russian railcars and contracted for specialized emergency response vehicles and nuclear weapons recovery equipment to support MOD training for accidents or incidents involving nuclear weapons.

We continue to be concerned with the potential for theft or diversion of Russian nuclear weapons. The $40.0 million for the Nuclear Weapons Storage Security program area is significantly lower than requested each of the last 2 years as a result of significant unobligated prior year balances. We need to complete integration of enhanced storage site security systems, as well as secure better access to sites under Russian law. We hope Russia revises its existing statutes by summer 2002, at which time the program will be able to obligate funding. During fiscal year 2001, we completed testing and finalized selection of a suite of security equipment to be installed at weapons storage sites. We think that the installation of physical security measures—preferably those which can be utilized without extensive training—is a good interim solution, pending eventual dismantlement of nuclear weapons stocks.

While the fiscal year 2003 budget requests no additional funds for the Fissile Material Storage Facility at Mayak, Russia, we anticipate completing construction of this facility in calendar year 2002. Once operational, it will provide centralized, safe, secure, and ecologically sound storage of up to 50 metric tons of weapons-grade plutonium and 200 metric tons of highly enriched uranium (HEU) removed from nuclear weapons. Russia plans to begin loading it with fissile material from dismantled nuclear weapons in late 2002 or early 2003.

Increased cooperation with former biological weapons designers and engineers in the FSU has enabled us to identify and gain access to research and production centers that house dangerous pathogens, technology, and expertise. The fiscal year 2003 budget request includes $55 million for the Biological Weapons Proliferation Prevention (BWPP) program area to consolidate, secure, or eliminate dangerous pathogen collections at former Soviet biological research and production centers, and to dismantle former Soviet BW research and production facilities. In fiscal year 2001, DOD continued four ongoing pathogen bio-security projects and developed bio-security projects at six additional sites; continued dismantlement of the former BW production facility at Stepnogorsk, Kazakhstan; and initiated dismantlement of the former BW test facility at Vozrozhdeniya Island.

INCREASE TRANSPARENCY AND ENCOURAGE HIGHER STANDARDS OF CONDUCT

A significant portion of the funds requested for the BWPP program area will also be used for targeted collaborative biological research to encourage higher standards of openness, ethics, and conduct among scientists and preempt potential "brain drain" of former BW scientists to rogue states. DOD will partner with State Department's International Science and Technology Centers to initiate projects with scientists in Russia, Kazakhstan, Ukraine, Uzbekistan, and Georgia. This collaborative research will enhance the transparency of FSU BW facilities. Through this effort, DOD has developed continuous, routine access to bench-level scientists, and leveraged their expertise to develop measures to counter bio-terrorism.

DOD intends to expand research cooperation with Ministry of Health institutes in Kazakhstan, Uzbekistan, Georgia, and Ukraine to build infectious disease surveillance networks in areas once closed to the west. Such networks will improve our ability to detect, characterize, and monitor disease outbreaks with natural or bio-terrorist origins. This has taken on greater importance with the deployment of U.S. forces in Central Asia and their potential exposure to emerging infectious diseases poorly understood in the west. Additionally, such networks will assist public health officials in the affected republics.

SUPPORT DEFENSE AND MILITARY COOPERATION WITH THE OBJECTIVE OF PREVENTING PROLIFERATION

The fiscal year 2003 budget requests $40 million for a new initiative designed to enhance non-Russian FSU military, internal security forces, border guards and customs agents capabilities to prevent, deter, detect, and interdict illicit trafficking in WMD and related materials, and to respond effectively to trafficking incidents at the border. This initiative will provide training, equipment, and infrastructure designed to enhance recipient countries' capabilities to prevent WMD or related materials from falling into the hands of terrorists and rogue states.

EMERGING OPPORTUNITIES FOR CTR

Within current authorities, and with congressional support for new flexibility, there are a range of emerging opportunities for CTR. Planned program activities already help support the new strategic framework with Russia and can be leveraged to increase transparency. They are also potential vehicles for promoting new codes of conduct in the developing U.S.-Russia relationship.

In the new security environment, CTR's technical and regional expertise offer a potentially invaluable resource in emergency situations involving proliferation of WMD or related matters. We want to work with Congress to determine whether the current range of authorities and notification structures permits CTR to be as flexible as it might be in an emerging crisis. Whether it be responding to a specific proliferation threat, keeping WMD and related technologies out of terrorists' hands, or other scenarios, CTR has a key role to play in securing U.S. interests post-September 11.

In this and all other CTR endeavors, we look forward to working with Congress, which has played such an important role in founding and improving this program.

Senator LANDRIEU. Thank you, Mr. Secretary.

Ambassador.

STATEMENT OF AMBASSADOR LINTON F. BROOKS, DEPUTY ADMINISTRATOR FOR DEFENSE NUCLEAR NONPROLIFERATION, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Ambassador BROOKS. Thank you. Like my colleague, I have a longer statement, which I would appreciate being placed in the record, and I will summarize it.

Senator ROBERTS. Super. [Laughter.]

Ambassador BROOKS. I appreciate the opportunity to appear before you to talk about the National Nuclear Security Administration's nonproliferation programs.

As Senator Roberts mentioned, this is my first opportunity to testify before this subcommittee. I am conscious of the great support that we have received from this subcommittee in the past as we try to stem the spread of nuclear weapons, nuclear materials, and nuclear knowledge. I look forward to continued close cooperation.

I also want to note at the beginning that our progress has benefitted immensely from a cooperative relationship with Russia that President Bush has forged. In this new relationship, we have also benefitted very strongly from the personal involvement and leadership of the Secretary of Energy. Secretary Abraham and the Minister of Atomic Energy in Russia have worked together to accelerate our protection efforts to try to remove bureaucratic roadblocks. We have been very fortunate in the support that we have received from both the Secretary and from the NNSA Administrator, General Gordon.

That is particularly important because, as it is to everybody in this room, in the aftermath of September 11, it is clear to me just how complex the threat environment is. The sophistication required to carry out the September 11 attacks make some of the

threats that we are trying to guard against in Russia look a little less far-fetched.

We have made enormous strides in Russia in securing nuclear materials and in protecting nuclear technology and expertise. But the unfortunate fact is that only a relatively small amount of HEU or plutonium is necessary for a nuclear device. Therefore, we cannot allow our guard to drop. We have to continue to accelerate these efforts because it is very clear that the people who perpetrated September 11 would not hesitate to use nuclear weapons if they were able to get them.

The programs in the National Nuclear Security Administration are one element—in our view obviously an important element—of U.S. efforts to reduce such threats. We are built around four pillars: technology research and development, promotion of international nuclear safety, threat reduction efforts in Russia and elsewhere, and finally general support for international nonproliferation regimes.

Our budget request for these initiatives is $1.3 billion. It is a 36 percent increase from the last budget of the previous administration. I make that point only because I hope that there will be nobody in the room who will have any doubt of this administration's firm commitment to stemming proliferation and supporting these important programs.

Let me turn now and review briefly the programs.

Our research and development effort is built around detecting proliferation, monitoring for nuclear explosions, and responding to biological and chemical attacks. We are requesting $283 million for these initiatives. They improve existing detection capabilities and response times for a wide variety of chemical threats. For example, we developed the prototype biological agent system that was deployed at the Olympics. We developed the system recently demonstrated in the Washington Metro for detecting and responding to chemical attack. We are developing a new generation of nuclear detonation sensors that will fly on global positioning system satellites. It is easy to ignore research and development because it does not contribute to solving today's problem, but it is absolutely crucial if we are to prevent tomorrow's problem.

We have also been accelerating, particularly since September 11, nuclear material protection programs in Russia. These programs are based on the philosophy of low technology, high pay-off solutions; low technology so that they can be effectively maintained. With the full funding of our request, we expect to complete all the scheduled work in Russia by 2008. That is 2 years earlier than we would have expected to complete it 6 months ago. We will also be accelerating the Second Line of Defense program. This is a program to install monitors to detect nuclear materials at border crossings and is intended to provide a second line of defense if material in the Russian Federation and elsewhere comes into the hands of terrorists or other rogues. In fiscal year 2003, we will install new equipment at 21 additional sites in Russia, Kazakhstan, and Ukraine.

Senator Roberts mentioned the notion of so-called dirty bombs. Our fiscal year 2003 request includes an effort to look at so-called radiological dispersal devices. We have not looked at them in the

past because they are not directly nonproliferation related, but they do have a use for terrorists, and we will look to see whether there is something useful that can be done to secure them in the Russian Federation.

Our budget requests $39 million for programs to prevent the migration of knowledge from Russia. We have combined the Nuclear Cities Initiative (NCI) and the Initiatives for Proliferation Prevention (IPP) into a new program called Russian Transition Initiatives. The programs now share a common manager and common procedures while preserving their separate focus on scientists and on infrastructure. We are pleased with the success we have had with finding peaceful employment for former weapons scientists. We are seeing a number of commercial initiatives that are directly relevant to how we address terrorist threats.

On the Nuclear Cities portion, 2 weeks ago we negotiated an agreement to ensure access to the closed cities. This builds on the written agreement of last fall to cease all nuclear weapons work at the Russian facility, Avangard, and we look forward now with some of these bureaucratic obstacles out of the way to increased effectiveness on this program.

In another new effort for me, the administration, as a result of its review of nonproliferation programs, has decided to transfer the responsibility for shutting down plutonium production reactors in Russia from the Department of Defense to the Department of Energy. These reactors are still producing plutonium. They are also producing heat and light for their associated communities. We will provide replacement heating and lighting capability, and based on our budget request, we hope to have all of these reactors shut down by 2007. We believe it is important to move forward with this effort. We are working to have unobligated prior year balances transferred from the Department of Defense in the amount of $74 million. Some of that money comes encumbered with some restrictions on fossil fuel plants, and we will be working with the committee to find a way to lift those restrictions.

In nonproliferation and international security, we will continue our export control activities, our support for the International Atomic Energy Agency (IAEA), and our efforts to safeguard nuclear materials outside of Russia. We will also continue efforts to explore how technology can work to improve regional stability and thus reduce demand for weapons of mass destruction.

Finally and perhaps the most spectacular new part of this budget, our fiscal year 2003 request would fund the program to dispose of surplus weapons grade plutonium through the irradiation of mixed oxide, or MOX, fuel in commercial nuclear reactors. This was the result of a major review of this program conducted beginning last spring. Our revised program will confirm our commitment to dispose of 34 metric tons of plutonium, and match that commitment with the disposition of a comparable amount of Russian plutonium. It will result in a savings of about $2 billion over the next 20 years compared to the previous program. It will result in less technical risks, lower peak year funding, and a 3-year acceleration of the program.

We are now working with the Russians to seek comparable efficiencies in their own program and with other countries to provide financial assistance to Russia in meeting their obligation.

With the end of the Cold War and especially since last September, all of us have had to think hard about security, especially nuclear security. It is the administration's view and my view that we attack the problem on many fronts, working with our colleagues in the Defense Department and our colleagues in the State Department to cut off the supply of materials and tighten international borders. It will take a sustained effort to meet these objectives. That is why I am so honored to have these new responsibilities where I hope to help make a difference. In doing that, I will benefit, I hope, in the future, as my predecessors have benefitted in the past, from the support of this committee.

Thank you very much for your attention and I look forward to your questions.

[The prepared statement of Ambassador Brooks follows:]

PREPARED STATEMENT BY AMBASSADOR LINTON F. BROOKS

Good morning, and thank you, Madam Chairman, for the opportunity to come before the Subcommittee on Emerging Threats and Capabilities of the Senate Armed Services Committee to discuss the Department of Energy's National Nuclear Security Administration's (NNSA) nuclear nonproliferation programs. This is my first opportunity to address this subcommittee since assuming my responsibilities as the Deputy Administrator for Defense Nuclear Nonproliferation. Before addressing our specific programs, I want to say how important I consider this subcommittee's contribution as the United States works to establish sound approaches to stemming the spread of nuclear weapons, materials, technology, and expertise. I appreciate the subcommittee's support and I look forward to continuing working together in the future.

For all Americans, the events of September 11 were a rude awakening. The attacks forced the United States to come to grips with its own vulnerability. Americans now have to accept just how dramatically the threat has changed. At this somber moment, there is some reason for optimism. The good news is that the Cold War is over; President Bush has been masterful in moving this Nation beyond that conflict once and for all, and establishing a new, cooperative relationship with Russia. As the President has said, "We're transforming our relationship from one of hostility and suspicion to one based on cooperation and trust, that will enhance opportunities for peace and progress for our citizens and for our people all around the world. Russia and America share the same threat and the same resolve."

As we transform our relationship, there are few better examples of our success than our cooperative nonproliferation programs with Russia. Here we have benefited from the support and leadership of the Secretary of Energy, Spencer Abraham. No one has been more energetic and dedicated than Secretary Abraham in putting into action the President's vision. He has established a strong partnership with his counterpart, Russia's Minister of Atomic Energy Alexander Rumyantsev. Shortly after the Crawford summit, the Secretary and Minister Rumyantsev agreed to accelerate our material protection efforts in Russia, to work together to foster international cooperation in protecting nuclear material and to enhance the international nuclear weapons nonproliferation regime, and establish a process to ensure that their subordinates followed up on their decisions.

As a result of the Secretary's efforts, our Material Protection, Control, and Accounting (MPC&A) program has been accelerated, and we're enjoying unprecedented access in Russia—better than we've ever experienced. The Department has also been in the forefront of international efforts to improve the physical protection of nuclear materials. Since September 11, the Secretary has addressed the International Atomic Energy Agency twice—including an unprecedented appearance before the IAEA's Board of Governors. We are fortunate to have the strong support of both the Secretary and NNSA Administrator General Gordon.

So I feel confident about where our relationship with Russia is headed. But President Bush had it right: Even with the collapse of the Soviet empire, the United States is hardly "out of the woods." We need to be concerned about the new threats our country faces—nations acquiring nuclear weapons technologies, as well as ter-

rorist networks and entities that will apparently stop at nothing in their pursuit of WMD. These are threats that are immediate and, in many ways, more dangerous than what the United States experienced in the past. The terrorists with whom we are at war do not appear to perceive the same constraints that Russia demonstrated during the Cold War. Their wanton disregard for the value of human life has been amply demonstrated. They are prepared, in fact determined, to use the most destructive weapons available to them—deterrence is not yet a word in their vocabularies.

The events of September 11 have given this discussion a very real and immediate meaning. As the NNSA develops and implements its non-proliferation activities, we've also had to think hard about how counterterrorism activities are integrated into what we do. In some ways, there are strong correlations; in other ways, the linkages are not as immediately clear, but there nonetheless.

The problem that we confront—at the heart of the relationship between our non-proliferation and counter-terrorism concerns, is two-sided—it has a supply and demand side component. There are now any number of actors—so called "rogue" states, as well as terrorist organizations—that are seeking somehow to attain WMD capabilities and expertise. The international community sees a crisis in the fact that accelerated measures are needed to improve the physical protection of nuclear materials worldwide, to improve control and accounting over this material, and to strengthen export controls and prevent illegal trafficking and handling of nuclear materials. But these rogue actors view this crisis as an opportunity.

In Russia and elsewhere, enormous strides have been made in securing this material. But the fact remains that the theft of only a few kilograms of HEU or plutonium, the deadly ingredients needed to fashion a nuclear device, would be enough for a weapon. This under-secured material—the supply side of the problem—is just too tempting a potential target of opportunity for those who would seek to use it against the civilized world. Indeed, the IAEA reports that in the last decade alone, there have been almost 200 attempts to illicitly acquire such material, and that's just the known cases.

So these are the risks that our programs are trying to address. The prospect that weapon-usable material could be stolen or sold to terrorists or hostile nation states, and used against American citizens is a clear and present danger that cannot be underestimated.

NNSA is working hard to reduce this threat. Our programs are key elements to U.S. efforts to reduce terrorist threats, while denying opportunities for rogue actors to acquire materials that can make WMD. These programs are designed to detect the proliferation of WMD worldwide; prevent the spread of WMD material, technology, and expertise; and reverse the proliferation of WMD, while at the same time improving nuclear safety and security worldwide. We pursue these objectives through technology research and development; promotion of international non-proliferation and security objectives and nuclear safety; and our non-proliferation programs with Russia.

Before I turn to specific details, let me make one overriding point. There was concern on the part of some last year that the administration was not committed to non-proliferation. I believe that critics confused prudent review of programs with lack of interest. In any event, the budget before you—which is 36 percent above the last budget of the previous administration—should resolve any lingering doubts of the seriousness with which we are approaching these important issues.

TECHNOLOGY RESEARCH AND DEVELOPMENT

NNSA nonproliferation and verification research and development initiatives advance the U.S. ability to detect proliferation, monitor for nuclear explosions, develop biological and chemical response technologies, and conduct demonstrations that will help find the means to detect potential threats to national security more quickly.

As this description indicates, the charter for our R&D work goes beyond nuclear nonproliferation and includes important work in areas such as biological and chemical detection. Over the past year, for example, NNSA deployed a prototype biological agent detection system used at the Winter Olympics, demonstrated a prototype chemical agent detection and response system in the Washington Metro, began to operate a new generation of nuclear detonation detection sensors on GPS satellites, and continued to demonstrate highly accurate thermometry from space, with the DOE Multispectral Thermal Imager satellite that was launched in March 2000.

Looking ahead, our research and development programs will emphasize efforts that will produce direct near-term applications that can be fielded in 2 years or less. Our request of $283,407,000 will allow us to advance our efforts to develop and test technologies for detecting terrorist and proliferation activities involving WMD and

transition those capabilities to responsible user agencies; perform increased DNA sequencing and assay development for an increased number of biological agents, and develop the concomitant detection capabilities, improve existing detection capabilities and response times for a wide range of chemical threat agents; and improve the sensitivities of nuclear explosion monitoring capabilities.

INTERNATIONAL NONPROLIFERATION PROGRAMS: A FRESH LOOK

As you likely know, the administration recently completed a comprehensive and detailed review of its nuclear nonproliferation programs with Russia. This review was exhaustive and took some months to complete. We felt it important to take the time necessary to do it right, and to ensure that these programs were thoroughly considered for their continued usefulness and viability.

I could not be more pleased with the outcome of that review, which reaffirmed the fundamental importance of our programs and concluded that most U.S. programs to assist Russia work well, are focused on priority tasks, and are well managed. The review recommended expansion of some programs, adjustment of others, and in some cases, consolidation. We are actively engaged in implementing the recommendations of that review.

The International Nuclear Materials Protection and Cooperation program is already a success story and gives us much to build upon. The program provides high payoff, low-tech solutions to the pressing problem of under-secured nuclear materials in Russia. Security upgrades have been completed or are underway on about a third of the estimated 600 metric tons of Russia's weapons-usable material; hundreds of trucks and railcars have been made more secure through hardening and other measures; steps are being taken to consolidate nuclear material at fewer locations, reducing its vulnerability to theft or sabotage; and our experts are working with their Russian counterparts to more effectively respond to any terrorist threat.

With full funding of our request, NNSA will complete this program by 2008—2 years ahead of schedule. NNSA will work to accelerate the rapid and comprehensive security upgrades on at-risk plutonium, highly enriched uranium, and naval nuclear weapons at over 40 Russian Navy sites. This is real threat reduction.

We are planning to complete the transition of the Material Consolidation and Conversion Pilot Project to a full-scale program. Under that program, which has already converted 1.2 metric tons of HEU to low-enriched uranium (LEU), we hope in fiscal year 2003 to eliminate an additional 2.9 metric tons of HEU the same way. We will also work to harden an additional 70 trucks and 9 railcars, in order to reduce their vulnerability to attack or sabotage.

In related efforts, NNSA will accelerate the Second Line of Defense program, installing radiation detection equipment at 21 additional strategic transit and border sites in Russia, Ukraine, and Kazakhstan.

The fiscal year 2003 budget requests $39.3 million to fund NNSA programs to prevent the adverse migration of WMD expertise from the former Soviet Republics. The Nuclear Cities Initiative has been refocused and consolidated with its highly successful sister program, the Initiatives for Proliferation Prevention, under a new program called Russian Transition Initiatives. The two programs share a common senior manager, and both now focus on projects with commercial applications. Last year, IPP successfully garnered an additional $56 million in private investment funding to further augment its technology commercialization efforts. No other nonproliferation program in the U.S. Government has been as successful attracting private equity funds to help commercialize its own efforts.

By finding commercial, peaceful employment for former Russian weapons scientists, we not only create commercial opportunities for U.S. industry, but we also dramatically reduce the talent pool available to those states that would employ those individuals for their own evil ends.

These scientists are involved in any number of programs that will play a big role in how we address today's threats. Needle-free injector systems for mass inoculations; light-weight radiation detectors to detect smuggling of nuclear materials; and other innovative projects will have direct relevance to our counter-terrorism efforts—what a tremendous resource to have on our side, as we seek innovative solutions to the threats that confront us today.

NCI also had a highly successful year. It negotiated a written commitment from the Russian Ministry of Atomic Energy (MinAtom) to end nuclear weapons work at the Avangard plant by the end of 2003, and successfully negotiated and signed an access arrangement with MinAtom to regulate the terms of access to closed nuclear cities. This arrangement should provide a significant impetus to NCI efforts. Indeed, it is fair to say that NNSA is in its strongest position it has ever enjoyed, with re-

spect to the access we stand to gain and our ability to facilitate the downsizing of Russia's nuclear complex.

As part of its review, the administration has decided to transfer from the Department of Defense to the Department of Energy responsibility for the elimination of weapons-grade plutonium production in Russia. This will lead to the eventual shutdown of reactors in Russia that are still producing plutonium, and the provision of required heating and electricity for the local communities with fossil fuel plants. Beginning with the fiscal year 2003 request, DOE will assume responsibility for obtaining the required funding and for accomplishing this important nonproliferation objective by the end of 2007. We believe it is important to move forward with this, through the transfer and use of the DOD unobligated prior year balances in the amount of $74 million. We will need legislative help on this, as well as with removing restrictions against the use of this money for the construction of the fossil fuel plants.

Our Nonproliferation and International Security request of $93 million is essential to help attack the demand as well as the supply side of the proliferation problem. This includes our efforts to address under-secured nuclear materials worldwide, provide opportunities for regional security programs that may help to reduce proliferation incentives, support the International Atomic Energy Agency, and strengthen international nonproliferation problems. It will support NNSA efforts to develop capabilities to help monitor warhead dismantlement efforts in Russia, and develop lab-to-lab contacts with Russia to support U.S. counter-terrorism efforts. This budget funds efforts to accelerate work with known and emerging nuclear suppliers to control the export of dual-use and nuclear technologies, and to provide support for work to improve foreign regulatory, legal, and industrial-level export control systems.

The fiscal year 2003 request would fully fund the program to dispose of surplus U.S. weapons-grade plutonium through the irradiation of mixed oxide (MOX) fuel in commercial nuclear reactors. This reflects an important decision of the Bush administration: After considerable study, we have reaffirmed our commitment to dispose of 34 metric tons of U.S. surplus weapons-grade plutonium, while an equal amount is disposed of in Russia. The United States will turn this material into MOX fuel for use in commercial nuclear reactors.

Some challenged this program because of the cost of U.S. disposal. By revising our plans to focus excusively on MOX (thus dropping the companion immobilization program proposed by the previous administration), we've scaled back the cost for U.S. disposal to $3.8 billion over 20 years, a savings of almost $2 billion over the life of the program. We've also reduced peak year funding, accelerated the completion of the program by 3 years, and reduced technical risk. The United States is also working with other countries to provide assistance to Russia in meeting its obligations.

As a result of these efforts, Russia will eliminate enough plutonium to make over 4,200 nuclear weapons. We are working closely with Russia to improve the efficiency of Russia's program, and we are working with our allies to secure adequate international support.

CONCLUSION

It's now impossible to separate nonproliferation and counter-terrorism concerns, and I hope it is clear from my comments today that NNSA understands how the threat has evolved, and is taking proactive steps to address it.

With the end of the Cold War, all Americans have had to re-think their concepts of security—including nuclear security. For me personally, I have come to the conclusion that security from proliferation and terrorist threat is only attainable if we attack the problem on many fronts, from many directions. The U.S. needs to cut off the supply of dangerous materials, as our programs to improve the security of weapons-usable material in Russia seek to do. We have to reduce the demand, by reducing the motivation for proliferation and squashing the power centers of those that would want to harm us. We have to make it more difficult for these materials to leave Rusia and other places by tightening international borders, and we have to tighten our own borders, as our programs carried out in conjunction with the Coast Guard seek to do.

This is a multi-faceted task, and it's not one that will be completed overnight. It will take a long, sustained effort. That's why I'm so honored to be in my current position, where I have the opportunity under General Gordon to help make progress on all these fronts. It will be difficult, but I have no doubt that we have the will and the determination to get the job done.

I hope I've given you a broad sense of our budget priorities, and I look forward to working with you over the coming year to advance our common interest in reducing proliferation threats.

I'll be happy to take your questions.

Senator LANDRIEU. Thank you very much.

We have been joined by Senator Carnahan. We have given brief opening statements, but if you would like to submit an opening statement, Senator, or make any remarks at this time, please go ahead.

Senator CARNAHAN. I have a brief opening statement, if that is all right. Thank you, Madam Chairman.

I also want to welcome this distinguished panel today. I am looking forward to hearing the witnesses' testimony and their answers to questions on the Cooperative Threat Reduction program, as well as the Department of Energy's nonproliferation programs.

The newspapers in recent days have been filled with troubling stories about the deployment of nuclear detection devices and the existence of a shadow government to take over should a nuclear attack cripple our capital city. The nuclear threat is very real and we need to address this issue on as many fronts as possible.

Our nonproliferation programs are, as former Defense Secretary William Perry said, "defense by other means," and for the amount we spend on them, we buy a lot of prevention. It is far more effective to destroy weapons on site than to deal with them once they have fallen into the hands of the enemy. It is far more effective to provide security for nuclear materials across the globe than to try and detect this material when terrorists attempt to smuggle it across our borders.

Our threat reduction programs generally enjoy bipartisan support, but there are some detractors who believe these programs are needless foreign aid. They are not. The programs are essential to our national security.

The questions before this subcommittee are how much of our defense budget should be dedicated to these programs and should the programs be expanded to address the new threats facing our Nation.

Madam Chairman, failure is not an option. We want the history books 20 years from now to say that we did everything in our power to prevent terrorists from gaining access to nuclear or radiological devices. We do not want them bemoaning the road not taken.

Thank you, Madam Chairman.

Senator LANDRIEU. Thank you, Senator. I appreciate your efforts on this subcommittee.

We are going to have a round of questions of 6 minutes and, if we have time, come back for a second round.

Let me begin by asking a question about border control. Both of you mentioned this in your opening statements, and in this budget before us, DOE has worked with Russia now for many years to install, as you mentioned, sophisticated, rugged radiation detection devices. In this budget, DOD has proposed to use as much as $80 million for a similar program. Have you two discussed these programs? Is something being done jointly on similar technologies or

some coordination of these efforts, or is that necessary? If so, why? If not, why not?

Dr. CROUCH. I would just say that the answer is yes. There is a very effective, I think, interagency process that looks at all of these initiatives. I work very closely with Ambassador Brooks on these issues, as well as with colleagues at the State Department and the National Security Council staff. So, all of our new initiatives, as well as their new initiatives, have been vetted from an interagency standpoint, and we plan to make sure that we are not duplicating efforts. I know that one of the things the subcommittee is concerned about, and certainly that I am concerned about as somebody who works for the taxpayer, is that we do not do that. So, that is uppermost in our minds. But we do think that there are additional opportunities for promoting border security in these areas, and that is why we thought it was an area on which the Department would be able to help.

Senator LANDRIEU. Ambassador?

Ambassador BROOKS. I agree with Dr. Crouch.

We coordinate closely. To ensure that continued coordination, I have recently assigned a member of the Senior Executive Service full-time to work for the Director of the Defense Threat Reduction Agency (DTRA), who implements many of the defense programs to make sure that we are coordinated at the working level and the implementation level. We operate under a division of labor approach. My programs are technology detection programs. Dr. Crouch spoke also of training. We are also in different countries. His program is in several countries that I am not. Our efforts in the coming years are concentrated in Russia, Ukraine, and Kazakhstan.

Senator LANDRIEU. I appreciate that. I think this cooperation is very important not only because I do think it is critical that we save money where we can but also so that we can spend it in places where we really need it. The cooperation I think is important, and I appreciate your statement.

Let me ask this. Since there are always better ways to manage and better ways to restructure all of our work, could you both mention just briefly what are some of the roadblocks, either large or small, that you have seen in implementing some of the programs under your jurisdiction as effectively and as efficiently as you would like? Do any come to your minds, either large or small?

I will give you an example of a small one. We understand the process of processing travel requests in a timely manner through the State Department is a real problem in terms of some of the programs that we are trying to implement for scientists moving backwards and forwards. That would be an example of a roadblock. Do any others come to mind, large or small?

Ambassador BROOKS. First, let me address specifically the question you mentioned about travel. If you recall, the Baker-Cutler report, which was a review of the Department of Energy programs issued about 13 months ago, explicitly looked at that area and found that there were weaknesses. We have done a number of things to improve that process.

First of all, when I was confirmed, there was in progress an ongoing review of working arrangements between the Department of

State, Department of Energy, and the Moscow embassy. We reviewed and implemented the results of that review.

Second, I have assigned an experienced nonproliferation officer to the cognizant bureau in the Department of State full-time, working on a variety of issues to improve our coordination but also ensuring that travel issues are promptly processed.

Third, I have assigned my deputy to work with the Department of State to make sure that we do not have policy differences. These mostly come about because of some tension between our wanting to send enough people to get the job done and the Moscow embassy not wanting to overload the system. Since that assignment a few months ago, there has been in my view a complete improvement.

Fourth, we have established an office of international operations reporting directly to my deputy that, among other things, manages travel for all of my programs and is intended to centralize and speed up the program.

Finally, I conducted a review of travel procedures which is going to result within the next few days in some mandated simplification to our DOE procedures. Most of this will not actually happen now. It will just go to cumbersome bureaucracy, but cumbersome bureaucracy turns into a speed issue. So, I think that particular problem we have recognized and I am reasonably pleased we have attacked it.

With regard to other obstacles, there is a growing authority in Russia from the security services. A growing power and influence on the part of the Russian security services, the Federal Security Bureau (FSB) in particular.

What this means is that access that used to be easy is more difficult than it was 2 or 3 years ago. That's the reason why the access agreement we signed in September on material protection and the access arrangement was signed last month on nuclear cities are so important to us because we now need that to allow those in Russia who want to work with us to satisfy the requirements of their security bureaucracy. That is also why Secretary Abraham made such a point in his meeting with the Russian Minister of Atomic Energy to reach an agreement that they personally would hold their subordinates accountable for removing obstacles. I cannot speak for the Minister of Atomic Energy, but it is very clear to me that the Secretary is serious about that.

Senator LANDRIEU. Thank you. My time is expired.

Dr. CROUCH. It sounds to me like Ambassador Brooks has spent more time on the travel issue than I have.

Ambassador BROOKS. I needed to.

Dr. CROUCH. We have not experienced, I do not think, the same level of difficulty in that particular area, so I do not really have a lot to say on that particular issue.

I would underscore one thing, that this is a cooperative threat reduction program, and that means that we have to cooperate with the countries that we are dealing with. In some cases—he mentioned the issue of the increasing power of the FSB—we have to negotiate, in many ways, our way to get access to particular things. In Russia, this continues to be a problem and it is something that we bring up at high levels with the Russians when we meet with them, pushing transparency not just in this program, but across

the board. So, this continues to be an obstacle, particularly in Russia, and we are trying to get them to come around to seeing the benefits of giving us the kind of transparency and access that we need to be really accountable to you and to the taxpayer for the expenditure of these funds.

Senator LANDRIEU. Thank you.

Senator Roberts.

Senator ROBERTS. Yes, thank you, Madam Chairman.

I have an overarching question for both of you that I think has keen implications for our national security, and prior to asking it, I want to underscore again my very strong support for the CTR programs, working closely with Senator Lugar and having personal visits with Senator Nunn. It is a special program. It is a unique program that has very unique standing now.

We have worked hard in this subcommittee and in a bipartisan way to obtain the Russian commitments that you have just outlined. I think that they have come a long way in good faith, or at least the participants, in regards to the program, although I am troubled to some extent, Ambassador Brooks, about the influence of the security departments over in Russia or the security forces. We have worked hard for international support. We have worked hard for transparency. We have worked hard for access. We have worked hard for cost-benefit criteria that make sense. We have worked hard to make sure that the actual dollars go to the programs in Russia as opposed to agencies in the United States simply for planning purposes, although some of that is needed. So, I am a very strong supporter of these programs. As a matter of fact, I can report that since we have the broad jurisdiction, Madam Chairman, there are usually five or six from the House side that would be expressing some reservations, and we were able over several years to answer those concerns.

Now, for my questions to both of you. What level of effort is your office undertaking to ensure that any money that is provided to Russia is not diverted to the Russian modernization of its military capability? With what degree of confidence can you assure us that no U.S. money provided under the CTR program is being used for Russian military modernization, and further, what would be required to state with confidence that no diversion is actually occurring? Feel free, either one of you, to respond.

Dr. CROUCH. That is a very serious question, Senator. I think it is certainly a question that we think about in the Department of Defense all the time when we look at these programs. I think there are, first of all, two different ways of looking at it. Is money directly going or is money indirectly going? I am going to assume that your main concern is the direct funding.

Obviously, money is fungible. For example, if we were to cut up a submarine under the CTR program that the Russians would be required under START I to cut up, there is no doubt that we are saving the Russian federal budget money when we do that. Now, we believe that that is in our interest to do that, and so we have supported doing that.

But I think a more serious issue is direct funding, and it is one of the things that we look at very closely when we look at programs, whether or not, for example, in the biotech area, could we

possibly be indirectly funding biotech research. I mentioned in my prepared statement that not only do we have the National Academy of Sciences and the USAMRIID, as well as the intelligence community, look at those projects individually, on all future projects we are now having our export control people monitor those, as well as we are looking at them from a counterproliferation standpoint. What might be learned, for example, that we would not want learned about our own counterproliferation capabilities?

In terms of assurances, I think it would be very difficult to assure you, the way I think your question was phrased, that no money is going for modernization. I do not know that I would ever be able to assure you of that. But I think that the way we have reorganized the office, the way we are paying attention to this potential, I think we have a pretty high confidence that there is little or no money for modernization. In fact, one of the things that is exceptional about the CTR program is the fact that we focus on specific projects. We are not providing money per se most of the time. We have a very strict auditing process. There are a lot of Americans involved in that process. So, we have a pretty good idea across the board that the things that we want to spend that money on, the money is actually being spent on.

Ambassador BROOKS. We have a comparable philosophy. We focus project by project. For each project, we conduct an internal review that involves the intelligence community to make sure that we are not providing improvements in military capability. We have turned down things where we have judged a possible military benefit—improved communications systems, for example, where you can see a benefit for safety and security, but you can also see a benefit for military readiness, and we have chosen to turn them down.

In general, most of what we fund in terms of protection, I am not sure the Russians would fund. So, it is not quite the same situation as with the things they are obligated to do under START, but still the dollars that we spend are fungible. So, in that sense, any help has some benefit to them.

We use a contract system which involves, among other things, not paying until the work is done and verified by U.S. personnel so that we are reasonably confident that we are getting what we pay for, and we involve U.S. personnel both in the design and the oversight of the work, although the work itself is mostly done in Russia by Russians.

So, I think that that combination gives us reasonable assurance that the bulk of the money is going where we want it to and it is improving material protection. But like Dr. Crouch, 100 percent assurance of anything in Russia I think is not feasible—I cannot tell you that there is not a dollar that went in the wrong place. I can tell you there are not a lot of dollars that went in the wrong place.

Senator ROBERTS. Madam Chairman, my time is expired. I do hope we have an opportunity for a second round, as I have some additional questions. Thank you.

Senator LANDRIEU. We will.

Senator Carnahan.

Senator CARNAHAN. Ambassador Brooks, it is hard to imagine how the tragedy of September 11 could have been any worse, but at the same time many of us have wondered what the devastation

would have been like had the terrorists used nuclear or biological weapons, if they had had these on the hijacked plane that crashed that day.

Since that time, greater attention has been focused on terrorist access to weapons of mass destruction. What has your agency done differently since September 11 and have you developed additional programs that seek to address these new threats?

Ambassador BROOKS. In most cases what September 11 did for us, Senator, was give us a renewed sense of urgency. We were seeking to prevent materials and weapons from coming into the control of people we do not want to have control of them and whether those people are terrorists or rogue states does not much matter to the gate and the security system.

Specifically, however, we have placed more emphasis on chemical and biological detection research. I mentioned that we have an experimental biological detection system called BASIS that was deployed at the Winter Olympics.

We are also proposing in this budget to look at whether or not there is something we can do in Russia to secure radiological devices and things like radiographic sources. Those are things that are useful in making so-called radiological weapons which are interesting weapons to terrorists but not particularly interesting weapons to rogue states. We are suggesting spending about $15 million on it in 2003.

But I think that the real difference after September 11 is a renewed sense of urgency about the protection programs.

Senator CARNAHAN. Our nonproliferation programs have a remarkable record in curbing the spread of nuclear material throughout the world. Recently, the Energy Department instituted upgrades to its security programs in Russia, helping to install gates and train guards and to board up facility windows. These upgrades were relatively low-cost initiatives, but I believe they are essential for enhancing security at former Soviet nuclear facilities.

Would you describe these upgrades and explain their importance to the subcommittee?

Ambassador BROOKS. Certainly, Senator. We use a two-phase system in the work that we do. There is a division of labor between the Department of Energy and the Department of Defense. I do materials in the custody of the Ministry of Atomic Energy and I do weapons and unused fuel in the custody of the Russian navy, and the Department of Defense does the national strategic sites.

We use an approach that starts with so-called rapid upgrades. Those are things that improve doors, improve tamper seals, relatively quick efforts. We have completed, for example, of the 53 Navy sites, rapid upgrades on 48 of them. We will complete four more this year and the final one next year.

Then we move to much more expensive, several-million-dollars-a-site, comprehensive upgrades. This uses more technology, and focuses on more sophisticated material controls. There we have only completed about a third of the sites and we will be completing more in the coming years.

The emphasis here, however, continues to be on technology that is supportable locally. That is why we sometimes refer to this as a low-tech solution because ultimately the maintenance of this is

a Russian responsibility and we need to make sure that we are not just putting in technology that can only be supported in the United States.

Senator CARNAHAN. One final question, Mr. Ambassador. As you stated in your testimony, our nonproliferation programs have been quite successful in Russia and the Former Soviet Union, and these upgrades are simple and they are low-cost and low-tech. Are there ways to expand these efforts in a cooperative manner to other countries in the world that have nuclear facilities?

Ambassador BROOKS. Senator, we already do comparable efforts in some other countries. For example, in the former Soviet republics, we already worry about protection of unused reactor fuel or spent fuel that might be suitable for reprocessing.

With regard to broader efforts, the most obvious question is the question of the Indian subcontinent, but once again, you will note, as Dr. Crouch said, we speak of cooperative programs. Although I think the Secretary of State has publicly said that we would be happy to assist if there were something for us to do, thus far those governments have not chosen to ask for assistance.

Senator CARNAHAN. Thank you very much.

Senator LANDRIEU. Thank you.

Let me begin the second round with a question about Voz Island, which is, you may be aware, in the Aral Sea. It is partly controlled by Uzbekistan and Kazakhstan. The island was a Soviet open-air biological weapons test site. At one time about 800 people lived and worked and tested weapons there. With the collapse of the Soviet Union, this island was mothballed. We know that the Soviet Union used it to dispose of the anthrax virus, and we also know that we have been asked by the Government of Uzbekistan to help resolve the future of this island.

Dr. Crouch, do you have any comments about our status on that project? Is it something that you think is important? Have we been asked to lead any research in terms of the disease in the surrounding population or the current dangers associated not just with their population, of course, which is one point, but the materials that are still there and located on that island?

Dr. CROUCH. At this point we are still examining specifically what we are going to do at Voz Island. At the request of the Government of Kazakhstan, we have already removed the containment and production equipment in the production and support buildings, and those have been destroyed. Currently we are negotiating a contract to dismantle the buildings there. The mutual U.S. Government and Government of Kazakhstan goal is to basically greenfield the area occupied by this production complex.

As you, I think, alluded to, there is also a lot of other material around there, and we are currently in the process of looking at that. We have done some studies to see what, if anything, we might want to do in that area beyond the things we have already done.

Senator LANDRIEU. Let me ask about the Nuclear Cities Initiative. I realize there has been a restructuring and this is just a small program overlaying our larger program. But could you clarify for the record, either one of you, how many cities are we specifically talking about? Are we confident of the list? You touched on it in your opening statement, but just a little bit more detail for

the record in terms of the effectiveness of that program, how many cities, and just give us some more information, if you would.

Ambassador BROOKS. We have been concentrating our work on the City of Sarov and the Avangard plant there. In terms of an accurate listing of other cities, I wonder if I might submit that for the record just to make sure that I do not overlook something.

[The information referred to follows:]

There are 10 closed, nuclear cities under aegis of Russia's Ministry of Atomic Energy: Sarov (Arzamas-16); Snezhinsk (Chelyabinsk-70); Zheleznogorsk (Krasnoyarks-26); Lesnoy (Sverdlovsk-45); Novoural'sk (Sverdlovsk-44); Ozersk (Chelyabinsk-65); Seversk (Tomsk-7); Trekhgornyy (Zlatoust-36); Zarechnyy (Penza-19); and Zelenogorsk (Krasnoyarsk-45). We are confident of this list of 10 cities because the Russians have shared this information with us and it corresponds to what we have learned from other sources.

We are currently working in only three of these cities: Snezhinsk, Zheleznogorsk, and Sarov. Our kidney dialysis project with Fresenius, which I will discuss in greater detail, is located in Sarov. In Snezhinsk our projects include, among others, an Open Computing Center; ITEC, which is a successful company that provides identification devices for a wide range of industrial facilities, including nuclear facilities, and supplies a broad range of security services; and an International Development Center. In Zheleznogorsk, our projects include, among others, a Software Development Center, Atomlink Telecommunications, which builds modern, business telecommunications infrastructure and which is developing an Internet service provider company in the city; and the development of a Technopark Business Incubator and Industrial Site.

Ambassador BROOKS. With regard to the effectiveness of the program, we have some examples of good success. The one that we have mentioned to this committee before is the production of kidney dialysis equipment through a partnership with a company called Fresenius. They will be visiting the Avangard Plant Technopark next week, I think.

We have also seen some projects on commercialization of anti-terrorist equipment such as irradiation devices for screening material. We have seen an open software development center which we expect to employ about 100 people on a sustained basis.

So, I think that we are beginning to see some very concrete successes. We have, as I alluded, made some changes to that program, putting a common manager in charge of Nuclear Cities and IPP, so that they can feed off of each other, and we have eliminated some of the community development efforts that were part of the program a couple of years ago so that we can focus really on things that are taking the technological sophistication of the Russian scientists.

Dr. CROUCH. Senator, if I may say that I think I gave you a full and complete answer to the wrong question. I was talking about Stepnogorsk instead of Voz Island when I gave you that information.

Basically the end of my answer is correct, which is that we are still doing environmental reviews and other things to look at what we might do at Voz Island. The description I gave you was for what we have done at Stepnogorsk which is another BW production facility.

Senator LANDRIEU. I appreciate your clarifying that because it is a very important issue and one of the larger sites that we would like to stay focused on.

Let me just ask about our storage sites, and you have touched on this. We expanded our work to upgrade the security of the stor-

age sites. Are there efforts underway to consolidate these storage sites under the CTR program and what is being done along those lines? Consolidation of the storage sites, if there is any information, nuclear weapons storage sites.

Dr. CROUCH. I am going to have to take that one for the record. I am not sure.

[The information referred to follows:]

The Department of Defense, through the CTR program, is working closely with the Russian Federation (RF) to help consolidate nuclear weapons storage sites. Under applicable international agreements, we are working with the RF Strategic Rocket Forces (SRF) to eliminate strategic offensive arms. Specifically, CTR is assisting the RF with the elimination of road-mobile, rail-mobile, and silo intercontinental ballistic missile (ICBM) launchers at the SRF bases and sea-launched ICBM launchers from RF Navy strategic Submarine bases, as well as with the transportation of nuclear warheads from the bases to consolidation sites, such as central storage sites, and dismantlement facilities.

Senator LANDRIEU. If you would just give us an update so we can have this for our review. We had pushed for a consolidation of some of these sites, and just for the record, if you would submit that, that is fine.

Ambassador BROOKS. On the materials side but not the weapons side, we are seeing some consolidation. Most of it is in the sense of you have these very large sites and we are trying within those sites to consolidate material in a smaller number of buildings so you only have to protect a smaller area. But that effort is primarily on the fissionable materials side rather than on the warhead side.

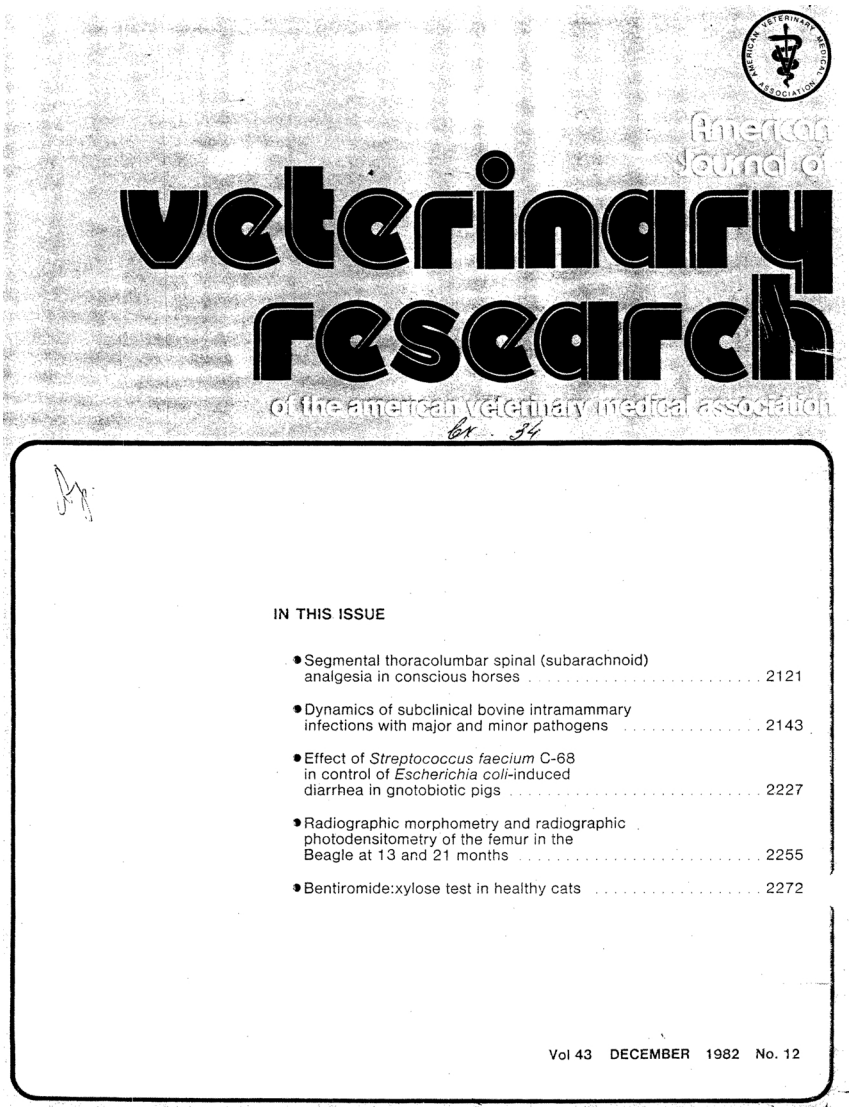
Senator LANDRIEU. Senator Roberts.

Senator ROBERTS. Yes, thank you, Madam Chairman. You would actually think that we have been working together on this. I am going to back to the Stepnogorsk issue and Voz Island.

I am glad for the clarification, Secretary Crouch, in regards to what you plan there with your continued study of the environmental situation.

Staff who sits right behind me went to the Voz Island recently, and in that complex they have a dilapidated center. Nobody lives there. The sea is drying up. She was fascinated to find a copy of the *American Journal of Veterinary Research* simply lying around, along with several bottles. I had meant to bring two bottles to give to both of you that held either anthrax or tularemia or ebola or the plague. [Laughter.]

[The information referred to follows:]



American Journal of
veterinary research
of the american veterinary medical association

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Senator LANDRIEU. But I would not allow him because we really want you all to stick around and help us on this problem, so I discouraged that. [Laughter.]

Senator ROBERTS. We got some soap and a toothbrush and some hydrogen peroxide and everything was going to be fine. Actually they were not the bottles that held this. They were bottles in storage, but it certainly indicated something that you want to look at in the description of the evil empire.

But here is a book from the American Veterinary Medical Association with all sorts of studies in regards to sheep, cattle, pigs, poultry, cats, and beagles. You can only imagine the things that

went on in regards to some of the research that was going on at Voz Island.

Here is an advertisement for a product that would help the pork industry called Entrogen.

[The information referred to follows:]

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References: 1. Welter CJ: Experimental and field evaluation of a new oral vaccine for TGE. *VM/SAC* :1757-1759, November 1980. 2. Krakowka S: Trends in veterinary immunology. *Mod Vet Pract*: 367-369, May 1981.

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Senator ROBERTS. I am not even sure that that is on the market now. But it is from Lenexa, Kansas, which is something to note.

But if, in fact, this is simply a place where you have some dilapidated buildings and nobody lives there and the sea is drying up, other than conducting the environmental impact statement, why would we want to make it a greenfield?

Dr. CROUCH. The greenfield response was focused on Stepnogorsk.

Senator ROBERTS. Deservedly so, there.

Dr. CROUCH. Yes. I do not think we have made a decision one way or another on that. Recently DOD and the Ministry of Defense of the Government of Uzbekistan signed an agreement under which we would provide some assistance to destroy equipment and structures at that complex. Beyond that, it may well be—again, we have not made any final determinations on this—that it is best to leave things the way they are and maybe establish better security as opposed to trying to raze what might be under those greenfields.

Senator ROBERTS. That was the point I was going to make next. I think you pretty well answered that.

Let me talk about your new CTR project for border control, and please, Ambassador Brooks, jump into this if you feel that you might offer some substance here, which I am sure you can.

In the fiscal year 2003 budget request, the CTR program is initiating a new project whose objective is to provide WMD equipment and training to improve border control capabilities, along the lines that Senator Carnahan was talking about in regards to various detection devices. I think somebody in their testimony pointed out that other agencies are also involved in the border control projects, which is now getting a lot of press.

My question to you is, if we have many agencies of the Federal government working to stop bioterrorism, how do we avoid any duplication and what about the efficacy of the equipment? Especially DOE, because I think, at least from what I have been able to understand, if you do not have the best, you are on the crest of the wave in regards to detection devices.

Then in addition, if it is basically in regard to anything that would be nuclear, are you also going to attempt to provide equipment that addresses the chemical and biological smuggling as well? It is my understanding this detection is not as refined, but at least we know because of the threats or when we ask all the experts, "what keeps you up at night," why obviously, they list those as well.

So, to avoid duplication and to get better coordination and avoid the possibility of having five, six, or seven different devices out there, where are we on this?

Ambassador BROOKS. Let me address the nuclear part. First, my programs are, in this area, exclusively nuclear, although while we have done some research on external detection of chemical and biological work—for example, if you have two identically appearing shells, I can tell you which one has chemical and which one has high explosive in it. We have not thus far tried to put that kind of capability into the border work we are doing in the Russian Federation.

With regard to biological weapons, I am unaware of any technology right now that is likely, without incredible intrusiveness, to keep people from walking through border checkpoints with vials in their pockets. There is technology that will detect this stuff, but I do not think it is anywhere near the stage where it can be deployed. So, let me just concentrate on the nuclear.

You said one thing, Senator, and I need to make sure I did not give an improper impression. We are the high-tech department, but we are using the same philosophy with these border detection devices in Russia that I referred to on material protection. That is, we are not deploying the best thing that I could make at Los Alamos and keep functioning with Los Alamos scientists. We deploy the best thing that I can build with Russian equipment and keep functioning with Russians at remote locations.

Senator ROBERTS. But the transferability on our own borders is what I am interested in. I know we need to have that capability over there and we are doing the best we can under that kind of a situation. But it is my understanding that Customs, DOD, State, DOE, and probably DEA have similar devices, similar programs.

Ambassador BROOKS. Oh, yes, sir. I am sorry. I misunderstood the question. We are working with Customs in at least two ways. We are working technologically to make sure that we make available to Customs the results of the work done at the national laboratories. One thing, for example, which we hope will be funded in the 2003 budget, is research on how you detect radioactive materials in crates without slowing down the processing in large ports where containers go through at a very great rate. For example, we are looking at a sensor that might be mounted on a crane so that, since you have to lift these things with cranes anyhow, at the same time you would be checking. So, we are sharing that knowledge with Customs.

We also have an agreement with the Customs Office of Anti-terrorism to share what we have learned in monitoring overseas as they increase their efforts in monitoring in the United States. We are going to do about six small training courses for a little over 100 of their field offices. So, we are very conscious of the importance of making sure that the information that we gain about protection abroad is shared with those responsible for protection here.

Senator ROBERTS. My time has expired, but let me just summarize: The United States spends close to $90 million on assistance to combat any nuclear material smuggling in about 30 countries, mainly in the Former Soviet Union and Central and Eastern Europe. Assistance includes the radiation detection equipment and the conventional inspection tools and training. Six agencies now provide assistance, and this was the basic question that I had and the concern that I had. The Department of Energy has installed radiation detection equipment in Russia, and that is what you are talking about, which is basically the second line of defense. The Department of State and Department of Defense provide radiation detection equipment to countries other than Russia. The U.S. Customs Service and the U.S. Coast Guard and the FBI provide other equipment and training for customs and border guard and law enforcement agencies.

My concern is it seems to me what we learn in one part of the world, we obviously can share in other parts, and I am not too sure we need six agencies to do this. I am also of the opinion that we probably use different detection devices. I do not know, with the six agencies involved, who has the oversight responsibility to say this particular device works best. Now, it could well be that you could have two or three for certain missions, but six agencies and $90

million and maybe six different detection means—I am not sure about that. I think we need to get a better handle on that. That was basically what I was concerned about.

Secretary Crouch, do you have any comments?

Dr. CROUCH. Number one, our interest in this border security goes beyond the detection devices. We are involved in training programs. One of the reasons we are involved in this program is that we have some special relationships with specific countries. In some cases, we are working directly with ministries of defense because those are the agencies that happen to be responsible in those countries as opposed to their customs agencies. So, we think we have to be a little bit more flexible in how we deal with specific countries based on a country-by-country basis.

I do not know the answer to whether there are six different devices or six different technologies for radiological detection.

Senator ROBERTS. Well, we will find that out here fairly quickly.

Dr. CROUCH. Our program is also looking at the smuggling of CW and BW as well and is trying to provide tools and training for people working those borders to be able to identify those problems.

Senator ROBERTS. We are going to have a report in the not too distant future—I am not sure about the exact date—from the GAO on this question, and I thought if there was any advance information—I have a whole series of questions that I may submit for the record. I know that it is 4 o'clock.

Senator LANDRIEU. We have a little bit more time. I would like to ask just a few questions to wrap up and perhaps Senator Roberts would have one or two more, and then the rest we could submit for the record.

I want to say that I think that the Senator raises a really good point on detection devices. The same question could be asked on every single aspect of homeland defense. Now we have many agencies and many departments getting ready to expend and invest millions, if not billions, of dollars in this effort. Our success in strengthening our security in large measure is going to be about how careful we are about not duplicating our efforts. While we could never hope for a seamless situation because you have all these many different agencies looking at the various aspects, but I think our committee has a real opportunity, as well as a responsibility, to really focus on this coordination and minimizing duplication, therefore stretching that dollar and increasing our security.

Let me ask a follow-up on a similar question that Senator Carnahan asked when she asked about your thoughts on the possible expansion of the cooperative threat reduction in a little different way. She asked about the possibilities for expansion into other countries or other geographic areas and you all have commented for the record.

But is there a way, post September 11, that we could think even more smartly about expanding this program to not just minimize the risk of attack but to use this program to maximize our ability to respond should such an attack occur, in other words, focusing more on lifting the knowledge of these scientists wherever they are, not just to keep them from harming us, but to help us set up more strategic defenses?

To me this is a real opportunity that maybe we are not taking as we should because we have a lot of people in the world, our allies and partners, who could help us. It would seem to me that it would be a wise thing for us to be more aggressive in taking that knowledge and helping us to stand up our defenses against biological, chemical, and other threats.

Do you have anything to say along that line? Would you agree with that or not?

Dr. CROUCH. I absolutely agree with it. I think the President has been very clear. We cannot let this come to us. We cannot wait around for the WMD equivalent of September 11.

I will give you two examples. One of the things that we are very focused on is the biological threat, not minimizing the nuclear threat, but we just think because of its dual-use, low-tech nature, relatively speaking, it is a weapon of choice, if you will, for a bioterrorist. So, there are two things that we are doing now. I am sure that there are others that we can do.

One is, I think, in the past we have focused on getting into facilities, tearing facilities down, that sort of thing. That is useful, but I think we need better and more access to scientists, and that is one of the things that we have increased money for in our budget. It is going to be hard because in some cases, particularly in Russia, getting access to those scientists who are involved in the defense programs is going to be a very difficult problem.

The other thing I mentioned is the idea of setting up disease surveillance networks. There is a lot of data out there. One of the things the former Soviet countries were actually pretty good at was keeping records, not only on these kinds of things, but on their own people. So, consequently we can mine some of that data, try to set up databases and network those databases in a way where we may be able to identify problems or identify strains, for example, or particular problems very early, and that will help our first responders, our emergency response to some kind of bioterrorist incident.

So, there is more we can do but I think that we are headed in that direction.

Senator LANDRIEU. Not to make light of it, and I want to hear your comment in a minute, but when we had anthrax in the Hart building where I think both my office and Senator Robert's office are, I thought to myself we could have used some scientists that really understood this. While we had some on our side, we could have used some more expertise, given what we went through and the lack of definitive information given out over quite a long period of time. So, that is just an example of what I am talking about.

Ambassador?

Ambassador BROOKS. Madam Chairman, I think you have asked for a mountain and I am going to describe a small hill. But we have a couple of things that we are doing that are directly in that area. We have established a mechanism between our research and development people to look at where there are things that we would like to know, and we are trying to get particularly under the Initiatives for Proliferation Prevention, where we go and commission projects from scientists to focus some of these on counterterrorism—the Russian Kurchatov Institute, for example—has come up with several interesting ideas, some of which may

have benefit in the United States and the threat. So, we are trying to start that effort.

We are also working jointly with our colleagues in the Department of Defense. There is a program called the Warhead Safety and Security Exchange which has a provision for doing collaborative efforts in counterterrorism. It is not under Dr. Crouch's part of the Department. It is shared between me and the technical side of DOD. We are looking to revitalize that effort once again because we share your assessment that there are a lot of smart people out there who we want to go think about something. They may as well think about things that will help us. But I think we are, at least in my Department, in the relatively early days of having that in a structured process, but we have started it in the last couple of months.

Senator LANDRIEU. What was the name of that program for the record? I did not catch it.

Ambassador BROOKS. There are two. The Initiatives for Proliferation Prevention is the program that is under my control, and then the Warhead Safety and Security Exchange. We are just beginning to see some counterterrorism projects there.

Senator LANDRIEU. I would really encourage you both along that line.

I have one more question and then Senator Roberts has a few to wrap up. This is on our plutonium reactor shutdown program. It has been transferred from DOD to DOE. The program is designed to provide an alternative power source for the last three Russian plutonium producing reactors. There has been considerable opposition in the House on this program. Primarily these objections were to DOD carrying out the program. As a result, there have been a number of prohibitions and restrictions placed on the funds from previous years.

Ambassador, can you give us an update? Have some of these objections been addressed? What should we do to move forward since this is an important project?

Ambassador BROOKS. I want to be very careful not to speak for the House. At the staff level, we have discussed this issue with the House. I hope that the House will be sympathetic to removing the restrictions. It is an important program. We have $74 million that has come to us from the Department of Defense. We need to be able to go forward with that funding.

Senator ROBERTS. Where are you with that?

Ambassador BROOKS. Well, we just assumed responsibility for the program about 6 weeks ago. We are in the process of discussions with the Russians on exactly the mechanism for going forward. The agreement under which this work will be done is obsolete because it was written at a time when we were using a different technical solution. So, we are working with the Department of State and the Russians to modify that.

Senator ROBERTS. But you are not having any trouble with the Department of Defense?

Ambassador BROOKS. Oh, no. The Department of Defense has been hugely cooperative. As I understand the restriction, it is on actually building things. So, nothing is slowing me down right now. Right now I am doing planning and integration. There will come

a time when I am going to need to spend that money to actually build things, and we will be working with the staffs of the relevant committees to remove the existing restrictions.

Senator ROBERTS. But in your statement you said you were requiring some legislative assistance. If, in fact, DOD is being a nice guy, like Secretary Crouch, are you talking about legislative assistance in working with the House then?

Ambassador BROOKS. Legislative assistance may have been a poor choice of words. I need whatever will let me spend this money without looking like I am thwarting the will of Congress.

Senator LANDRIEU. But let me ask the question again then because may not understand I, and if Senator Roberts does, he could help me out here. The House objected to DOD building the plant, and so we transferred it to DOE?

Ambassador BROOKS. Yes, ma'am.

Senator LANDRIEU. So, were there other objections we do not know about?

Ambassador BROOKS. Not that I am aware of.

Senator LANDRIEU. So, it looks like we can go forward.

Ambassador BROOKS. Yes, Madam Chairman. But I do not intend to start out my association with Congress by taking Congress for granted, so I just need to make sure that there are no remaining issues. I did not mean in the statement to imply I thought this was a big problem, but I did want to make it clear that I think we need to move forward with this.

Senator LANDRIEU. Well, I am going to send Senator Roberts over to the House.

Senator ROBERTS. No. I think Senator Landrieu can do much better.

Senator LANDRIEU. Senator Roberts does a good job over there.

Senator ROBERTS. She has a much more positive attitude. She is not obstreperous.

Senator LANDRIEU. No. Now, you see he thinks flattery will get him everywhere.

Senator ROBERTS. She can handle Curt Weldon far better than I can. [Laughter.]

Senator LANDRIEU. We will do that together.

That ends my line of questioning. Is there something you have, Senator Roberts?

Senator ROBERTS. Shchuch'ye and the conditions tied to that destruction project in the 2002 Defense Authorization Act, it had six conditions the Secretary must certify. Only two remain outstanding, basically that the Russians certify the complete destruction of their chemical stockpile, not just that, but all over, and that the Secretary could certify that. Can you give me any status report on that Secretary Crouch?

Dr. CROUCH. Obviously, the Department fully supports the President's December 2001 decision to accelerate the construction of the Shchuch'ye facility. At this point, the Secretary is not in a position to be able to certify all of those conditions. We are working through that. We are working with the Russians on it, and we will be getting back to you when we can. But at this point, he has not done so and we are not in a position to do so.

Senator ROBERTS. Well, four out of six is not too bad. You can get back to us.

Ambassador Brooks, one final question. You started off the hearing by saying that the only thing that has changed in some of your work is an increase in the involvement of the security folks over in Russia. That gets me back to the first question I asked you, which I am not going to repeat. Do you want to amplify on that a little bit?

Ambassador BROOKS. It is our impression—and I think this is a shared impression with our colleagues in the Department of Defense—that the Russian security services are more powerful in all aspects of Russian life. Where that spills over into my programs is a much greater interest in restrictions on access, a much greater tendency to have *x* days in advance notification.

This incident is trivial, but it is an example. One of the things that we do is we monitor the blending down of HEU that is being sold to the U.S. Enrichment Corporation. We had to go and do a routine source change-out of an instrumentation source. We used the identical procedures that we used last year in requesting that visit, but this year the request was denied because security services wanted to see a technical analysis that it really took 10 days instead of, say, 8.

So, what we are seeing is a greater willingness on the part of the Russian Federation to defer to the security services even when that means slowing down cooperation. I think that is a part of what I think most of us observe who watch Russia, a greater influence of security services in all aspects of Russian life.

That does not invalidate the programs. That is just a fact that has to be managed. But you asked what are some of the problems and that is clearly a problem.

Senator ROBERTS. Well, it is a paradox of enormous irony because they come to us with goodwill to try to meet the requirements that we thought were reasonable in regards to access and transparency, only to find out that we may be moving in the other direction. I hope that is not the case.

Thank you, Madam Chairman.

Senator LANDRIEU. Thank you.

I would like to close with a quote from the same *Time* magazine article I quoted earlier: "In the days after September 11, doomsday scenarios like a nuclear attack on Manhattan suddenly seemed plausible. But during the 6 months that followed, as the U.S. struck back and the anthrax scare petered out and the fires at Ground Zero finally died down, the national nightmare about another calamitous terrorist attack went away. The terrorists did not." The article goes on to say that the terrorists are real, they have expanded, they are in many countries. So our work is very important.

I thank you for your testimony today and look forward to supporting your efforts.

Dr. CROUCH. Thank you, Madam Chairman.

Ambassador BROOKS. Thank you, Madam Chairman.

Senator LANDRIEU. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR MARY L. LANDRIEU

FUTURE WORK WITH BIOLOGICAL SCIENTISTS

1. Senator LANDRIEU. Dr. Crouch, for several years the CTR program has been providing funding to support research for biological weapons scientists in the Former Soviet Union. These projects have, for the most part, been small, and yet they serve their function in providing work to these scientists, many of whom are paid either very little or intermittently, and some are not paid at all. As the CTR program enlarges the scope of its biological work, and as we learn more about the biological weapons work of the Former Soviet Union, I would like to explore the possibility of expanding the scope of the cooperative research with these scientists, particularly those in Central Asia and the newly independent countries. In expanding the scope of the CTR program, can we also make this program more focused and more tailored to broader U.S. and world goals?

Dr. CROUCH. An important component of the CTR Biological Weapons Proliferation Prevention (BWPP) program engages scientists in cooperative biodefense research. This program is intended to increase transparency and encourage higher standards of conduct among biological scientists. We intend to expand research cooperation with the Ministries of Health in Kazakhstan, Uzbekistan, Georgia, and Ukraine to build infectious disease surveillance networks to enhance the ability of the United States and CTR eligible countries in Eurasia to detect, characterize, and monitor disease outbreaks with natural or bioterrorist origins. DOD and the National Academy of Sciences advisory committee will actively solicit and develop research projects tailored to this goal. With the deployment of U.S. forces to Central Asia, the need to monitor and diagnose infectious diseases endemic to this region is very important to the health of our forces.

As we expand this program, we also will expand the scope of our peer review process and initial review of projects to ensure that vulnerability and technology security assessments are conducted to take into account counterterrorism concerns.

2. Senator LANDRIEU. Dr. Crouch, what are your thoughts on developing a broad-based vaccine research program?

Dr. CROUCH. Vaccines, where available, represent the single most effective element of our defense against many natural diseases as well as those under intentional development by potential adversaries. Many areas of the Former Soviet Union are experiencing a devastating resurgence of infectious disease incidence, which not only drives down regional life expectancies, but also potentially affects the rest of the world through human and animal travel opportunities. Therefore, CTR initiatives that address the development of safe and effective vaccines against acute infectious diseases will serve to protect both the local populations as well as deployed U.S. forces. Finally, advances in vaccine development and production technology gained through CTR initiatives can also assist our domestic vaccine capabilities and directly enhance U.S. healthcare in general.

3. Senator LANDRIEU. Dr. Crouch, are there any other opportunities to have a more organized approach to research?

Dr. CROUCH. I believe there are. We are currently developing a comprehensive strategic plan for the entire biological aspect of the CTR program.

4. Senator LANDRIEU. Dr. Crouch, how can U.S. industry and universities partner with these scientists?

Dr. CROUCH. We are reviewing possibilities for such partnering as part of the development of our strategic plan.

JOINT COUNTER-TERROR WORK WITH RUSSIA

5. Senator LANDRIEU. Ambassador Brooks and Dr. Crouch, President Bush has indicated a desire to work with Russia in a cooperative and joint way to address terrorism. From your perspectives, what is being proposed for nonproliferation programs to carry out this goal?

Ambassador BROOKS. Technical cooperation under the U.S.-Russian Warhead Safety and Security Exchange Agreement has been underway with the Russian Ministry of Atomic Energy and Ministry of Defense for the past 7 years. Joint cooperation to address nuclear threats has always been a part of the Agreement, and interactions and technology development have focused predominantly on the safety, security, and transparency of nuclear warheads. After September 11, however, U.S. and Russian national laboratories re-engaged on the topic of nuclear threats and have

now generated dozens of project proposals focused on counter-terrorism technology development. These technologies will be developed to help both U.S. and Russian security specialists detect, manage, and mitigate the consequences of terrorist attacks. Other joint counter-terrorism analysis and information sharing is also being considered. In addition, a variety of counter-terrorism projects are planned or underway as part of our Russian Transition Initiatives (which includes the Nuclear Cities Initiative and Initiatives for Proliferation Prevention programs).

Dr. CROUCH. The Department of Defense under the CTR program has been destroying, consolidating, and enhancing security for weapons of mass destruction and related materials to prevent them from falling into the hands of terrorists. The CTR programs in Russia specifically carrying out these efforts under applicable international agreements are as follows:

- Strategic Offensive Arms Elimination,
- Nuclear Weapons Storage Security,
- Nuclear Weapons Transportation Security,
- Chemical Weapons Destruction,
- Biological Weapons Proliferation Prevention, and
- Fissile Material Storage Facility (being completed with prior year funds).

6. Senator LANDRIEU. Ambassador Brooks and Dr. Crouch, is there anything in the fiscal year 2003 budget request to support this goal?

Ambassador BROOKS. We have requested a total of $24.5 million in the fiscal year 2003 budget to support counter-terrorism initiatives with Russia. Of this amount, the Office of International Material Protection and Cooperation has requested $16 million to begin to improve security on vulnerable international stockpiles of material that could be used as a dirty bomb. The other $8.5 million, requested by the Office of Nonproliferation and International Security, will accelerate joint counter-terrorism technology development under the Warhead Safety and Security Exchange Agreement. Additional funding would enhance and mature technical counter-terrorism cooperation. Additional counter-terrorism-related projects are being considered for funding under the Russian Transition Initiatives.

Dr. CROUCH. The budget request includes several CTR program areas that will provide assistance to Former Soviet Union states that will help prevent terrorists and others from gaining access to weapons of mass destruction, related materials and expertise:

- $40 million for Nuclear Weapons Storage Security (Russia),
- $19.7 million for Nuclear Weapons Transportation Security (Russia),
- $133.6 million for Chemical Weapons Destruction (Russia),
- $9.0 million for Weapons of Mass Destruction Infrastructure Elimination (Kazakhstan),
- $55.0 million for Biological Weapons Proliferation Prevention (FSU), and
- $40 million Weapons of Mass Destruction Proliferation Prevention (non-Russia FSU).

7. Senator LANDRIEU. Ambassador Brooks and Dr. Crouch, how does this statement transition from rhetoric to programmatic application?

Ambassador BROOKS. In the area of joint U.S.-Russian counter-terrorism technology development, we have already secured formal Russian agreement to pursue 3 important projects and have selected 10 additional projects from the dozens proposed by Russian national laboratories to meeting our most urgent needs. During the next few months, we will finish scoping these projects and securing formal Russian agreement to pursue them through the Warhead Safety and Security Exchange Agreement. Fiscal year 2003 funding will ensure that these projects begin as soon as possible in October 2002.

Dr. CROUCH. Under applicable international agreements and through the CTR program, we expect to apply the requested fiscal year 2003 funds in the following fashion to prevent terrorists from obtaining known weapons of mass destruction, and related materials, and expertise:

- $40.0 million for Nuclear Weapons Storage Security will provide comprehensive security upgrades at five to seven Russian nuclear weapons storage sites and seek to increase the effectiveness and reliability of Russian guard forces.
- $19.7 million for Nuclear Weapons Transportation Security will transport approximately 84 trainloads of deactivated nuclear weapons to centralized storage or dismantlement facilities, provide maintenance and certification for nuclear weapons transport railcars, and provide security support materials.

- $126.6 million of the $133.6 million request for Chemical Weapons Destruction will be used, once congressionally-mandated conditions have been met, to begin construction of a nerve agent chemical weapons destruction facility at Shchuch'ye to eliminate the enormous Russian stockpile there of nerve agent artillery warheads and missile munitions.
- $9.0 million for the Weapons of Mass Destruction Infrastructure Elimination (Kazakhstan) program area will help secure radioactive sources and fissile material, begin elimination of the former chemical weapons production facility at Pavlodar, and continue to eliminate nuclear weapons infrastructure.
- $55.0 million for Biological Weapons Proliferation Prevention program will dismantle former Soviet BW research and production facilities; consolidate and secure or eliminate dangerous pathogen collections at biological research facilities; and target collaborative research to encourage higher standards of openness, ethics, and conduct at the scientist level and preempt potential "brain drain" of scientists to terrorists and rogue states.
- $40.0 million for Weapons of Mass Destruction Proliferation Prevention will provide equipment and training to enhance the capability of non-Russian FSU states to deter, detect, and interdict illicit trafficking in WMD and related materials.

Additionally, using previously budgeted funds, we expect to complete construction of the Fissile Material Storage Facility at Mayak by the end of calendar year 2002. This facility will be capable of securely and safely storing up to 50 metric tons of plutonium and 200 metric tons of highly enriched uranium from nuclear weapons. We anticipate that Russia will begin loading this facility in early 2003.

We also are implementing comprehensive security upgrades for the Shchuch'ye and Kizner chemical weapons storage facilities for nerve agent-filled artillery and missile munitions using previously budgeted funds.

EXPANDED CTR

8. Senator LANDRIEU. Ambassador Brooks and Dr. Crouch, Russia and the Former Soviet Union are not the only nations in the world with nuclear weapons and other weapons of mass destruction, materials, and knowledge that might be attractive to terrorists or others with terrorist goals. Are we doing enough in Russia and the new republics to protect and secure materials, weapons, and knowledge?

Ambassador BROOKS. With regard to the scope of our efforts in Russia and former Soviet states, there are several areas where we are accelerating and expanding. Recently signed access agreements will facilitate our efforts to reduce the size of Russia's "nuclear footprint" through the Nuclear Cities Initiative, as well as the expansion of our MPC&A upgrades work in the MinAtom Weapons Complex, where the bulk of MinAtom's nuclear material resides. I also want to expand the scope of our Material Consolidation and Conversion program in order to close more buildings and sites storing excess weapons usable materials across Russia. We have increased efforts to dramatically accelerate the installation of equipment at Russian borders to detect and prevent the illicit trafficking of nuclear material. Expansion of our efforts to convert Soviet-origin research reactors from high to low enriched fuels will lead to elimination of highly enriched uranium stocks in the new republics. In the Newly Independent States and the Baltics, we are also expanding our programs to enhance security and are reviewing past security upgrades against the latest IAEA guidelines, which now include sabotage. In Uzbekistan, for example, we have enhanced a previously installed security system to increase protection of the site against terrorist attacks.

We are also working very hard to increase the pace of program implementation. In fact, accelerating existing programs to secure materials, weapons, and knowledge has been a primary goal since September 11. With the significant supplemental budget received this year for our material and warhead security program, we are signing additional contracts for security upgrades at more Russian warhead and material storage sites and border crossings. We have reduced program schedules on the order of 2 to 3 years due to these acceleration efforts.

Beyond Russia and the former Soviet states, we continue to develop and foster positive relationships both bilaterally and multilaterally through the IAEA to support programs to enhance physical protection of nuclear material and facilities abroad. The United States has been and will continue to be a strong supporter of the IAEA's new initiatives to counter nuclear terrorism and its efforts to strengthen the international framework for the physical protection of nuclear material and facilities.

We are accomplishing more than ever before—and many of our implementation schedules have been shortened because of the supplemental budget and the renewed, high-level attention our programs have received from the Bush administration and Congress over the last year.

Dr. CROUCH. The Department of Defense, through the CTR program, is working closely with appropriate government agencies in Russia and other new states to enhance their ability to provide adequate protection and security for weapons of mass destruction and related materials in order to prevent their proliferation. The U.S. Government is spending roughly $1 billion annually on nonproliferation and threat reduction programs in the Former Soviet Union.

Nuclear Weapons: Through the CTR program, DOD is assisting the Russian Ministry of Defense by providing: physical security upgrades at weapons storage sites; equipment and training to enhance the effectiveness of guard forces; drug and alcohol screening equipment and training to ensure the reliability of guard force members and applicants; an automated system for accounting and tracking deactivated tactical and strategic nuclear weapons; rail shipments of nuclear weapons to secure storage and dismantlement facilities; and reliable and secure nuclear weapons transport rail cars. DOD's efforts through the CTR program were cited as having helped Russia improve the security of its nuclear weapons by the National Intelligence Council's February 2002 *Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces.*

Progress in implementing comprehensive security enhancements at weapons storage sites had been hindered by the previous Russian Federation refusal to allow DOD access to the sites for project implementation and oversight. Based on a recent decision by the Russian Prime Minister to allow DOD access to these sites, we hope to proceed quickly with a variety of security enhancement measures at 10 priority sites.

Biological Weapons/Materials/Knowledge: Through the CTR Biological Weapons Proliferation Prevention program in Russia, Kazakhstan, and Uzbekistan, DOD is consolidating and securing, or eliminating, dangerous pathogen collections at biological research institutes; dismantling former Soviet biological weapons research and production facilities (including an anthrax production facility in Kazakhstan and an open-air testing complex in Uzbekistan); and targeting collaborative research to prevent the proliferation of biological weapons expertise to rogue states and terrorists through the employment of former Soviet BW scientists on peaceful, nonmilitary endeavors.

Chemical Weapons: In February 2002, DOD's CTR program completed immediate security enhancements at the Russian chemical weapons storage facilities at Shchuch'ye and Kizner to safeguard nerve agent munitions that are susceptible to theft. We are completing the design work for a more comprehensive security upgrade based on equipment developed for Russian nuclear weapons storage sites at the Security Assessment and Training Center in Sergeiv Posad. Selected equipment will be integrated to meet site-specific security requirements. Once design work is complete, we will begin equipment installation and testing. Project completion is expected in fiscal year 2003.

Fissile Material: DOD, through the CTR program, is constructing a fissile material storage facility at Mayak, Russia that will provide centralized, secure, safe, and ecologically sound storage of up to 50 metric tons of plutonium and 200 metric tons of highly enriched uranium removed from nuclear weapons. We anticipate that the project will be completed by the end of calendar year 2002 and the Russians will begin to load the facility in early 2003.

9. Senator LANDRIEU. Ambassador Brooks and Dr. Crouch, do we have an opportunity now to do cooperative work with other countries to secure and protect their materials and knowledge?

Ambassador BROOKS. Yes, we continue to work aggressively to develop cooperative relationships with other countries to improve the security of nuclear material. Such cooperation is implemented on a bilateral basis and also through the International Atomic Energy Agency's International Physical Protection Advisory Service. This cooperation often includes assistance in making physical protection improvements at facilities and training in physical security and material control and accounting practices, concepts, and procedures.

We are continuously analyzing existing or emerging threats to nuclear material and facilities. We are continuously analyzing existing or emerging threats in this area. We have and will continue to ensure that countries exhibiting these vulnerabilities are engaged to maximum extent possible and that, barring legal prohibitions, the only limitation on provision of assistance is the recipient's willingness to work with us towards a common goal.

Dr. CROUCH. The essence of CTR is that it is a cooperative program. This requires, at a minimum, other countries to accept a CTR presence at very sensitive research or military facilities. There may be opportunities to develop these types of relationships, but we must recall that the CTR program has taken nearly a decade to reach its current level of involvement in states of the Former Soviet Union. In addition, under current authorities, the Department of Defense can only provide CTR assistance to former Soviet states.

NUCLEAR WEAPONS DESTRUCTION

10. Senator LANDRIEU. Dr. Crouch, President Putin has said that he expects Russia to go to a 1,500 strategic nuclear warhead inventory at some point in the future. They currently have far more warheads, and an undetermined number of tactical warheads, in their stockpile. Is there an opportunity to work with Russia to dismantle warheads?

Dr. CROUCH. In the past, DOD offered through the CTR program to assist the Russian Federation in processing and packaging fissile material from dismantled nuclear weapons. The RF, however, would not agree to engage in such a cooperative project due to security considerations. There is no indication today that Russia would allow even more intrusive CTR assistance with actual dismantlement work. On the other hand, DOE has the expertise and is working with the Ministry of Atomic Energy of Russia in related areas. Therefore, it may be possible at some point in the future to resolve the issues that have constrained assistance in this area.

11. Senator LANDRIEU. Dr. Crouch, does our decision not to dismantle any warheads, as outlined in the Nuclear Posture Review, discourage Russia from dismantling warheads, particularly the tactical warheads?

Dr. CROUCH. There has been no decision by the U.S. Government not to dismantle any nuclear warheads; some warheads will be eliminated. The U.S. cannot produce new nuclear warheads. This is why some warheads will be retained to provide the option to increase operationally deployed force levels if the international security environment compels us to do so. The U.S. and Russia are in asymmetrical circumstances in this regard. While we cannot produce new nuclear warheads, and must therefore retain weapons in reserve, Russia retains the ability to produce new nuclear warheads at Cold War levels. Hence, there is no need for Russia to store warheads. Moreover, Russian warheads cannot be stored for long periods of time for technical reasons.

[Whereupon, at 4:12 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2003

TUESDAY, MARCH 12, 2002

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

SPECIAL OPERATIONS MILITARY CAPABILITIES, OPERATIONAL REQUIREMENTS, AND TECHNOLOGY ACQUISITION

The subcommittee met, pursuant to notice, at 2:39 p.m. in room SR–222, Senator Mary L. Landrieu (chairman of the subcommittee) presiding.

Committee members present: Senators Landrieu, Bill Nelson, and Roberts.

Majority staff members present: Richard D. DeBobes, counsel; and Arun A. Seraphin, professional staff member.

Minority staff members present: Charles W. Alsup, professional staff member; Edward H. Edens IV, professional staff member; Carol M. Hanna, professional staff member; and Mary Alice A. Hayward, professional staff member.

Staff assistants present: Leah C. Brewer and Daniel K. Goldsmith.

Committee members' assistants present: Craig E. Bury, assistant to Senator Byrd; Marshall A. Hevron and Jeffrey S. Wiener, assistants to Senator Landrieu; Robert Alan McCurry, assistant to Senator Roberts; James P. Dohoney, Jr., assistant to Senator Hutchinson; and Derek Maurer, assistant to Senator Bunning.

OPENING STATEMENT OF SENATOR MARY L. LANDRIEU, CHAIRMAN

Senator LANDRIEU. Our meeting of the Emerging Threats and Capabilities Subcommittee on the Special Operations Command (SOCOM) will come to order. Our subcommittee meets this afternoon to receive testimony from General Holland, our Commander in Chief of our U.S. Special Operations Command, and Mr. Harry Schulte, Acquisition Executive at Special Operations Command.

I just wanted to begin by noting that, as we sit here today, our Special Operations Forces are deployed in our war against terrorism in Afghanistan in Central Asia, in the Philippines, all over the

globe in fact, supporting Operation Enduring Freedom and conducting other missions to further U.S. national security.

The battles, as usual, have not been without casualties. Your forces, General Holland, are fighting for a just cause, to defend our citizens here and abroad. Some of them have made the ultimate sacrifice. In fact, since September 11, 25 special operators have been killed in action or in support of Operation Enduring Freedom and 60 have been wounded.

The losses of each of these has hit us all very hard. This committee, in fact, has been touched in a very personal way by the recent accident, the death of 10 Special Operations Forces in the Philippines when their helicopter crashed. Our staff had just visited Echo 160th Aviation Company in January and had come back to report to the Senator and I how highly impressed they were with Major Curtis Feistner, Captain Bartt Owens, and Chief Warrant Officer Jody Egnor. They all perished in the crash February 22.

General Holland, Senator Roberts and I want to convey to you on behalf of our whole committee our deep and heartfelt appreciation for the work that you do. If you would please communicate to the men and women under your command that this committee, all of us, but this committee is particularly heartbroken over it, and commend you for your professionalism and your dedication.

This committee has a long tradition of interest in Special Operations. In 1986 the Nunn-Cohen amendment to the Goldwater-Nichols Defense Reorganization Act established the Special Operations Command within the Department of Defense and the position of Assistant Secretary of Defense for Special Operations and Low Intensity Conflict. The creation of the command and the assistant secretary position reflected this committee's interest in ensuring that Special Operations Forces and policies are integrated with conventional strategies and forces and that they are properly funded. Unfortunately, the position of assistant secretary sits vacant at this time.

Congress mandated 2 years ago in the Defense Authorization Act that the Department of Defense centralize its combating terrorism activities under one assistant secretary of defense. The Department of Defense informed us that the Assistant Secretary for Special Operations would be that official. However, Secretary Rumsfeld did not fill the position before September 11 and after September 11 he appointed the Secretary of the Army as interim coordinator.

Both Senator Roberts and I have expressed at different times the importance of filling that position. Perhaps we can talk a bit about that today, because 6 months later there is still no permanent coordinator in this important position.

The purpose of today's hearing is to examine Special Operations capabilities, operational requirements, and technological acquisition. Unlike conventional military forces, who are charged with countering a range of military threats, Special Operations, which you oversee, General, are organized, trained, and equipped for narrowly focused missions. We have seen how Special Operations Forces have utilized these extraordinary special capabilities, radioing close air support from horseback to B–52s flying over the skies of Afghanistan.

We are witnessing how the success of Special Operations Forces is spawning new missions in the Philippines, Georgia, and Yemen, just to name a few. Just yesterday President Bush declared that we would train militias everywhere.

Yet, as Special Operations Command is handed more missions it is incumbent upon those of us who fund these missions and who provide legislative oversight to the Department to explore some fundamental questions: Are Special Operation missions becoming more relevant and necessitating increases in the total number of Special Operations Forces? Or, should the conventional forces adopt some of the Special Operations Forces roles and missions? If so, which ones, and how should that integration or coordination take place and how should it be funded in the future?

Can we improve upon the integration of Special Operations Forces into conventional military plans based on lessons learned in Afghanistan? Is funding for training, education, and ongoing missions sufficient and appropriate, given the increased demands and dangers, of the critical mission involved?

Are we taking sufficient steps to recruit and retain Active and Reserve special operators? Perhaps more important, how does the proposed budget address concerns that Special Operations families have regarding housing and other benefits so that the morale will be high, families can be happy, as well as the soldiers and combatants involved?

Finally, what can we do to improve Special Operations technology development and acquisition to better support the men and women in the field?

Today our special operators are making use of technologies that were developed with small but significant investments in science and technology in the past. Investments that have led to more precise weapons, better night vision gear, and lighter, more capable radio and communications equipment, to name just a few examples.

This subcommittee notes that the budget request for Special Ops research and development includes, unfortunately, only a very small increase for next year and, in fact, a decrease in the longer term research programs, despite the critical role that I have just outlined.

The subcommittee would like to learn from you, General Holland and Mr. Schulte, about your current technology development activities and how they support current operations. But more importantly, we would like to learn about any shortfalls in the budget, including in areas that impact upon training, education, recruitment, and retention of your fine soldiers. We also want to explore some other important elements that I have outlined earlier in my opening statement.

At this time, let me recognize Senator Roberts for opening remarks and then we will hear your testimony and go into a round of questioning. Thank you.

STATEMENT OF SENATOR PAT ROBERTS

Senator ROBERTS. Thank you, Madam Chairman. I join you in welcoming these two very distinguished witnesses from the U.S.

Special Operations Command and I applaud your forward thinking in holding this important hearing.

Some of my remarks are going to be repetitive of the distinguished chairman, but I think they bear repeating. We have all been extremely thankful for the initial success of our Armed Forces in Afghanistan and around the world in this global war against terrorism. While much will be debated in the months and years ahead about the relative value of air power, sea power, ground operations, in what we call Operation Enduring Freedom, one thing is very clear: The quiet warriors of Special Operations in the air, on the sea, and on the ground were trained and ready—and have performed in magnificent fashion. General Holland, you and your predecessors deserve a great deal of credit for this high level of readiness, and the committee thanks you.

Now, before I proceed, I want to acknowledge not only the tremendous contribution that Special Operations Forces are making to the struggle, but, as the chairman has indicated in very eloquent terms, the sacrifice they are making as well. From my standpoint and as the chairman has already indicated, on behalf of the subcommittee, and I would add the full Committee on Armed Services, please convey our sympathies, our condolences, and our gratitude to the families, units, and friends of those special operators who have lost their lives in this important global war against terrorism.

Their loss defending America and freedom reminds us of the dangers our men and women in uniform face every day around the world. Our Special Operations Forces are truly the tip of the spear.

As the chairman indicated, almost 15 years ago some forward-thinking members of Congress recognized that our capabilities in the area of unconventional warfare, low intensity conflict, and special operations were not where they should be and convinced their colleagues to create a new Special Operations Command as part of a larger Department of Defense reorganization.

The increasingly successful and sophisticated joint operations—and I emphasize, joint—joint operations our Armed Forces are able to conduct, including the seamless inclusion of your Special Operations, is a tribute to the joint warfighting concepts that were envisioned by the architects of the Goldwater-Nichols Act of 1986. As the chairman has indicated, the world has been amazed, absolutely amazed, at the pictures of soldiers on horseback directing 21st century weapons with devastating precision. We see images of the C–130, AC–130 gunships, firing at ground targets identified by unmanned aerial vehicles. We see silhouettes of parachutes through night vision goggles descending on distant airfields. This is the face of Special Operations. This is our first line of defense that has been quietly fighting terrorism around the world for years. These are the forces on which we will increasingly depend to confront the emerging unexpected unconventional threats of the future.

I am going to be brief, Madam Chairman, as it is most important that we proceed to the testimony of General Holland and his staff. I look forward to hearing General Holland's assessment of the performance of Special Operations Forces to date. More importantly, however, I am most interested in his view of the future. What do our Special Operations Forces need to be prepared for? You highlighted the budget shortfalls. What can we, Congress, do to help

him? I am especially interested in how the Special Operations Forces fit into the whole field of jointness.

As we begin deliberations on the fiscal year 2003 budget request, SOCOM is in a unique position to provide us some insights into the future of warfare, how to rapidly develop and acquire the capabilities we need to deter, to detect, and to defeat the emerging threats we face today.

I look forward to working with you, General, to ensure that our Special Operations Forces really continue to be the very best in the world and really continue to be truly special.

Senator LANDRIEU. Thank you, Senator Roberts.

General Holland.

STATEMENT OF GEN. CHARLES R. HOLLAND, USAF, COMMANDER IN CHIEF, U.S. SPECIAL OPERATIONS COMMAND

General HOLLAND. Madam Chairman and Senator Roberts: I submitted a statement for the record, but I have just a few remarks I would like to make at this time. Thanks for this opportunity to report on the state of the "Quiet Professionals," our Nation's Special Operations Forces (SOF). The September 11, 2001, terrorist attacks on our country underscored the need for an increased emphasis on America's ability to combat terrorism.

As you well know, SOF have been very heavily engaged in support for the global war on terrorism. We have executed nearly every mission Congress spelled out for SOF almost 15 years ago when it passed the Nunn-Cohen amendment. As a result of that legislation, the Department of Defense has a headquarters in the United States Special Operations Command that provides SOF for the successful conduct of worldwide special operations, civil affairs, and psychological operations, during peace and war.

The command also conducts strategic planning, provides operational support and oversight, allocates resources, and manages acquisition to ensure that SOF are prepared to carry out their assigned missions.

The support of the services is critical to our ability to provide the Nation with a Special Operations capability. The Army, Air Force, Navy, and Marine Corps work with us on matters such as service common equipment and personnel manning, as well as other areas of mutual interest. We have a solid relationship with each service and continue to cooperate on a variety of projects.

I am pleased to report that SOF are ready and healthy due to the wisdom of the legislation that gave us the tools to do our jobs and the leadership and dedication of extraordinary Americans. I must tell you that we could not be more proud of our men and women. They have demonstrated their training skills by teaming with the best warfighters the world has seen. From the European Command-led campaign in Kosovo to the Pacific Command support to counterinsurgency in the Philippines, and to combined training and exercises with our allies in the Republic of Korea, to Central Command's combat during Operations Desert Storm and Enduring Freedom and counternarcotics programs in Southern Command, the range of operations we have effectively prosecuted bodes well for the future fight against transnational terrorists.

United States Special Operations Command (USSOCOM) stands ready to provide SOF around the world in support of theater commanders in chief (CINCs) and American ambassadors. During this fiscal year Special Operations Forces have operated in 122 countries and foreign territories. In Afghanistan, USSOCOM's Air Force special tactics teams and air crews, Navy SEALs, Army and Air Force Psychological Operations, and Army Special Forces, Rangers, and air crews, and civil affairs are executing complex missions during limited visibility in climatic extremes and over rough, unfamiliar terrain in support of the United States Central Command.

A large part of the reason that we can support our global commitments is that several SOF truths are embedded in our philosophy of how to train and deploy. The SOF truths are: humans are more important than hardware; quality is better than quantity; Special Operations Forces cannot be mass produced; and competent Special Operations Forces cannot be created after emergencies occur.

In addition, the establishment of Major Force Program-11, which gives the Special Operations Command service-like responsibility with a budget and procurement authority, has ensured that we can get SOF-peculiar equipment to our warriors so that they have the tools needed to conduct Special Operations. Timeliness is important to our ability to resolve many of the challenges of transnational threats, as is mitigating the potentially catastrophic damage that can be caused by acts of terrorism, to include the use of weapons of mass destruction.

We find that all the elements of national power—diplomatic, informational, military, and economic—are applied at the same time to reach a fast near-term resolution of a particular crisis. A well-designed and dynamic collaborative environment allows us to properly share whatever is needed, whenever it is needed to defeat the next foe. At USSOCOM we are striving to develop collaborative structures and tools that afford timely, simple, and appropriate procedures to make certain that all of us on this joint interagency team can share resources and information and still maintain the necessary protective measures to guarantee that we do not compromise operations, personnel, or tactics, techniques, and procedures.

In closing, I want to reiterate two points: First, we provide the Armed Forces and our Nation with unique one-of-a-kind capabilities. We have been able to develop them because of the foresight of Congress in creating this command and providing it with the tools to get the job done.

Second, we must protect our people, provide for the professional development, give them the tools they need for their job, and remember those and their families who have given the last full measure.

With continued support from Congress and key investments in quality people, readiness, and modernization, we will continue to have the best Special Operations Force in the world, one that is ready, responsive, and relevant to the challenges of the 21st century. I believe that the SOF warrior is one of our Nation's great assets, superbly trained, physically tough, culturally aware, and an independent thinker—a quiet professional.

Madam Chairman, thank you for the opportunity to tell the Special Operations story and I look forward to your questions.

[The prepared statement of General Holland follows:]

PREPARED STATEMENT BY GEN. CHARLES R. HOLLAND, USAF

Madam Chairwoman and members of the committee, I am privileged to report to Congress on the state of the USSOCOM. In early September last year, the Nation was suddenly and brutally confronted with a new type of world war, waged against them on U.S. soil by terrorists. These terrorists, driven by an implacable hatred for Western conceptions of basic individual rights, and whose principal targets were civilians, have since had their own sudden, and yes, harsh awakening to U.S. resolve. The entire command is proud that SOF could play a part in their wake-up call.

The success of the campaign plan against this threat has been dramatic, but is not surprising. The superb team constructed at the U.S. Central Command (CENTCOM) under General Tommy Franks demonstrated the quality, professionalism, and determination of U.S. Forces and our staunch coalition partners. The successes in the campaign in Afghanistan in the global war on terrorism demonstrate again the wisdom of the joint warfighting construct initiated by the Goldwater-Nichols Act in 1986.

The recent action in Afghanistan is a prominent and exciting example of how joint warfighting has evolved from the Goldwater-Nichols legislation to a powerful and precise tool to support the Nation's vital interests. This success is not isolated; the ability to win across the spectrum of military operations requires tight teamwork, and Special Operations Command USSOCOM forces are privileged to team with the best warfighters the world has seen. From the European Command (EUCOM)-led campaign in Kosovo, to the Pacific Command's (PACOM) support to counter-insurgency in the Philippines and combined training and exercises with our allies in the Republic of Korea, to CENTCOM's combat during Operations Desert Storm and Enduring Freedom, and Counternarcotics programs in Southern Command (SOUTHCOM), the range of operations we have effectively prosecuted bodes well for the future fight against transnational terrorists.

The support SOF gets from the functional combatant commanders has been first rate: Transportation Command's (TRANSCOM)'s ability to get our warriors and equipment where they are needed fast, Space Command's (SPACECOM)'s warning and Information Operations expertise, and Strategic Command's (STRATCOM)'s absolutely vital help in cracking one of our most ambitious missions counter-proliferation of weapons of mass destruction (WMD) and hard and deeply buried targets. Finally, Joint Forces Command (JFCOM) provides a critical means to enhancing this team's ability to tackle enemies no matter their weaponry, tactics, or strategy. JFCOM's leadership in joint experimentation has made the advancement in joint warfighting sustainable.

The jointness of the current war provides a lesson in our dependence on all services for their crucial abilities. Early in the prosecution of the conflict in Afghanistan, we had to stage Special Operations Forces from Naval Carriers off the Pakistani coast. On the ground in Afghanistan, Air Force trained combat controllers (CCT) in our Special Operations Liaison Elements provided the direct connection needed for Navy, Marine and Air Force pilots to accurately target Taliban and al Qaeda positions and assets. This direct link allowed our Army SF teams to integrate the anti-Taliban cavalry charges with precision bombing runs with devastating effect.

The close relationship between our Special Operations Liaison Element and the Joint Force Air Component Commander's staff has allowed us to enhance allied combat effectiveness and minimize fratricide. The introduction of conventional Marine and Army forces with SOF strengthens U.S. capability and influence in the theater. The concept of combined conventional and unconventional units leverages the fact that they are trained for a mutually supporting frameworks, that significantly improves improving their joint warfighting effectiveness. SOF's complimentary relationship with the Air Force and Navy conventional forces has already shown what a truly potent force a joint force is to reckon with.

The battlefield successes in the campaign against terrorism further reveal the insight of Congress in the creation of USSOCOM the year following the enactment of Goldwater-Nichols. That legislation, the Nunn-Cohen Amendment (codified in Title 10, Section 167, U.S. Code, USC 167), created USSOCOM and consolidated all SOF under one command. Forces making up SOF include Army Special Operations Aviation, Special Forces, Rangers, Civil Affairs, and Psychological Operations forces; Air Force special operations aviators and special tactics teams; and Navy Sea, Air, and Land (SEAL) Teams and Special Boat Units.

The Nunn-Cohen Amendment also provides USSOCOM with its own Major Force Program 11 (MFP–11) funding. This legislation provides USSOCOM with the authority, direction and control of funds that allows us to develop and acquire Special Operations peculiar equipment to prepare SOF to carry out our assigned missions. In turn, this legislation provides the warfighter with the tools necessary to fight not only the most committed industrial age power, but also the means to fight entities that would and could wield influence through terror by any means.

USSOCOM's Fiscal Year Total Obligation Authority (TOA) is $4.9 billion, just 1.3 percent of the overall defense budget. This figure includes nearly $2 billion for our 47,000 military personnel (USSOCOM programs for these funds and the Services execute them) and $1.7 billion for Operations and Maintenance. Modernization, which consists of $777 million for Procurement and $431 million for Research, Development, Test, and Evaluation, is $1.2 billion of the TOA and the remaining $63 million is for Military Construction (MILCON).

USSOCOM's MFP–11 Fiscal Year 2003 request represents an $854 million increase over fiscal year 2002, the result of additional funding to address USSOCOM's modernization issues. This type of departmental support of Service and SOF resources greatly enhances the effectiveness of our Nations' SOF and our ability to meet the operational requirements expected. Yet these limited SOF resources greatly enhance the effectiveness of conventional military forces by providing essential leveraging capabilities while ensuring that "must succeed" special operations are completed with the absolute certainty and professionalism the Nation demands. The Fiscal Year 2003 President's budget makes important additions to SOF programs to begin meeting new challenges confronting SOF and the Nation.

Joint warfighting is not the only major success in this conflict: early in the planning process, CENTCOM planners were able to sort through the rush of international support to identify how best to use the variety of strengths offered by our allies. Important to our planners were the offers of SOF from around the globe. The legendary capabilities of the British Special Air Service (SAS) and Australian SAS, as well as special operations forces from other nations provide a unique, but not unfamiliar, combined special operations environment for us. This cooperative engagement with the best the world has to offer in fighting asymmetrically will assist us in the long battle ahead.

USSOCOM SUPPORT TO THE SECRETARY'S AND CHAIRMAN'S WAY AHEAD

USSOCOM is in full support of both the policy goals as voiced in Secretary Rumsfeld's Quadrennial Defense Review (QDR) and of Chairman Myers' goals as offered to this committee, the Senate Armed Services Committee (SASC), in recent weeks. Chairman Myers presented three objectives to the SASC: to win the global war on terrorism, to improve joint warfighting capabilities, and to transform to be ready to face future challenges. In our view these objectives provide a temporal roadmap to the goals of Secretary Rumsfeld's Defense Strategy as envisioned in the QDR. USSOCOM directly supports the defense policy goals of assure, dissuade, deter, and decisively defeat across the spectrum of conflict.

SOF's role as "global scouts" serves to assure allies and friends of U.S. Government resolve. Our participation in the Combatant Commander in Chief (CINC) Theater Security Cooperation Plans, Joint Combined Exchange Training (JCET), Humanitarian, Mine action, Counterdrug and Foreign Internal Defense (FID) provides tangible training benefits while building rapport with our friends and allies.

SOF's regionally-oriented, culturally aware forces provide a depth of expertise not available to the conventional forces. Through Civil Affairs (CA) operations and peacetime Psychological Operational (PSYOP) programs, U.S. interests are advanced at minimal cost in resources. As "warrior diplomats" and through recurring interaction with current and potential allies and friends they are able to influence situations favorably towards U.S. national interests.

SOF's presence and unique capabilities dissuade potential adversaries by complicating their planning and providing the President Secretary of Defense (SECDEF) a wider array of options in dealing with them. By having the capability to operate "in the seam" between peace and war, SOF can address transnational and asymmetric threats by synchronizing the activities of the military and interagency partners.

SOF can help shape the pre-conflict environment to set conditions favorable to the U.S. and can also provide a strategic economy of force by covering areas of the world left uncovered by the commitment of conventional forces to other contingencies. Forces organized, trained, and equipped to execute our highest priority principal missions of Counterproliferation of Weapons of Mass Destruction (CP/WMD) and Combating Terrorism (CT) also provide an effective deterrent against other asymmetric threats. SOF operating in conjunction with conventional forces provides a

mutually beneficial warfighting relationship. SOF provides increased security for conventional forces because of our ability to operate within the host nation environment, which they offers a valuable source of intelligence and acts as an outer perimeter of security for conventional force operations. Conventional forces, in turn, provide a ready means to conduct large-scale combat operations if a greater commitment of U.S. military force proves necessary.

SOF's clandestine insertion capabilities, specialized tactics and techniques provide additional means to our military commanders to allow them to set the time, place, and manner of victory and decisively defeat any adversary. Other SOF principal missions such as Direct Action, Unconventional Warfare, Special Reconnaissance, and Psychological Operations contribute to the warfighters' ability to achieve decisive victory by optimizing his forces' combat power at the decisive right place and time. The perfect example of this capability is the recent success that our Air Force Special Tactics and Army Special Forces units have had integrating close air support from allied aircraft with Northern Alliance ground force operations. In this case, SOF is acting as the critical enabling link between the conventional forces and the mission at hand.

The current state of SOF capabilities is strong, but to meet the evolving weaponry and tactics of potential adversaries, we must invest now to remain a reliable support for the Defense Strategy. USSOCOM's aim in pursuing transformation is to guarantee our forces remain relevant to any fight necessary, and ensuring we minimize risk to our Nation's vital interests. To do this, our intent is to transform to better support the Defense Policy Goals as described below.

ASSURE ALLIES AND FRIENDS

Presence: Forward presence of SOF pledges U.S. commitment to allies and friends; promotes access, improves interoperability and intelligence cooperation; expands the range of pre-conflict options to counter threats; deters aggression; influences positive behavior; mitigates the development of asymmetrical threat capabilities; and allows the U.S. to prosecute the war on its terms.

To provide presence in critical regions worldwide, USSOCOM must depend on the securing of Status of Forces Agreements with new and potential coalition partners in order to enhance interoperability and build a combined force far stronger than its components. USSOCOM will accomplish this through an array of joint, combined, and interagency experimentation programs designed to simulate actual combat—the final result being a global combat-ready "plug-n-fight" force. Participation in Theater CINC joint training activities provides near-term benefits to our national security and also builds rapport with our friends and allies to weather future challenges.

Anti-Access Environments: SOF's global access is a capability key to preserving national security. SOF must have the ability to access and operate anywhere in the world, in any mission environment, from overt to clandestine and from benign to hostile (including Chemical, Biological, and Radiological (CBR)). In much of the world, SOF maintains this access and an understanding of local issues through regional orientation and continued engagement, which is formalized in Theater Security Cooperation programs. However, to provide access to most parts of the world, SOF must retain and improve the capability to operate where U.S. forces may be unwelcome or opposed. Potential adversaries are acquiring weapons and developing asymmetrical strategies aimed at denying U.S. forces access to critical theaters of operations during a crisis. As the first responders, "door openers," and spearhead for decisive follow-on operations, "SOF access" sets the stage for assuring allies and friends. As a strategic asset SOF derives its value from its ability to operate independently or integrally as a vital key component of a conventional Joint Task Force (JTF).

Force projection is another critical element to the Defense Strategy's goal of assuring allies and friends. In a world of unpredictable and asymmetric security threats, low-intensity conflict has emerged as a pervasive mode of warfare. It is imperative that SOF remains a flexible, mobile and quickly deployable force able to react to, but more importantly, help mold the international environment. The ability to project power rapidly and to operate in small teams under austere conditions is a cornerstone of SOF operations. To enhance our force projection capabilities, DOD must continue to invest in programs to improve strategic mobility, sustainment, and information dominance.

Surrogate Warfare: A long-standing SOF mission that has received deserved new attention is Surrogate Warfare: "Great powers remain great if they promote their own interests by serving those of others." Stemming and reducing Operations Tempo (OPTEMPO), limiting hazardous exposure of U.S. forces, smart utilization of low density/high demand (LD/HD) assets, and increasing the SECDEF's options are

goals that can be achieved through a re-emphasis on a long-standing SOF strength: the training of surrogate forces to gain results favorable to our interests. In fact, the greatest contribution that surrogate warfare has had in Afghanistan is to achieve strategic objectives that were unobtainable with any other capability in the Armed Forces today.

Al Qaeda is a worldwide trans-national terrorist group that cannot exist without some form of popular support. The strategic Center Of Gravity (COG) for al Qaeda is their relationship with the world's Muslim population. Without active support from a sizeable minority of the Muslim population and the passive support of a greater number, al Qaeda would fold. They rely on popular support for both their recruitment and freedom of action. If we ignore this strategic COG, all our tactical and operational success will be for naught.

Osama bin Laden's consistent message to the Muslim world has been that the U.S. intends to invade Islamic territory and slaughter Muslims in a new crusade. He wanted a confrontation with massive U.S. ground formations while U.S. airpower rained down on Muslim populations. Such a scenario would have justified his rhetoric and provoked the Muslim backlash he desired. We chose a strategy that didn't play into his hands. By working with a surrogate Muslim force, we neutralized his plans.

The most telling results of this campaign come from press reports concerning the hundreds of Pakistani youths who had flooded into Afghanistan to support the Taliban. Many of these "would-be martyrs" returned to Pakistan and turned on the fundamentalist clergy that had sent them off to war. They had been told that they would be fighting a jihad against American invaders. Instead they saw no Americans and found themselves fighting "brother" Muslims in violation of the Koran.

Instead of helping al Qaeda increase its popular support, we have opened the first cracks of a rift between al Qaeda and the general Muslim populace and have demonstrated the President's intent—that this is not a war on Muslims, but a war waged on terrorists who are using Islam as a ruse to justify murder. This is one of the most important strategic outcomes of our operations in Afghanistan to date, and the capability to conduct surrogate warfare resides in our country's special operations forces alone.

The original foundation of the SOF approach to warfare was to organize and train friendly foreign forces to help them contend with hostile challenges. Increased emphasis in this area can multiply our influence globally without requiring a standing-force presence in a multitude of locations. The success of our JCET deployments, and support for the State Department's African Crisis Response Initiative (ACRI) are just two examples illustrating the effectiveness of a series of short-term education programs. They enhance the professionalism of third-world nations' armed forces, foster the growth of responsible regional-based forces, and promote U.S. values and interests. These initiatives are popular with host nations. They provide valuable training for our forces, enhance morale, and promote host nation stature within the region. Such programs increase U.S. influence and the likelihood that these new friends will be able to resolve crises peacefully, and in a manner advantageous to our national interests with minimal U.S. support.

Security Assistance: In assuring our allies and friends, SOF will continue to monitor, and if necessary engage, weak and failing states in Asia, Africa and the Western Hemisphere where there is an absence of responsible governments. Working in concert with State Department personnel on these Security Assistance missions improves the U.S. government unified approach to better address the security interests of these friends and allies and provides cost efficiencies in applying Title 22 funding.

We will project and sustain SOF in distant anti-access or area-denial environments. If we are to project SOF, we must invest in infrastructure in the continental U.S. (CONUS) to reverse the erosion of SOF training range infrastructure and ensure that ranges are sustainable, capable, and available. We must also invest outside the CONUS and secure funding for host nations to build temporary facilities and training ranges for SOF conducting interoperability and security assistance training, FID and exercises within the host nation.

OPTEMPO: Assuring allies and friends through forward presence, and involvement in small-scale contingencies, combined with SOF support to national mission requirements results in a heavy OPTEMPO. SOF can be consumed as quickly and completely by these missions as they are in major theater wars. To ensure that our LD/HD capabilities are available for urgent missions, we are working to mitigate force management risk, operational risk, institutional risk, and future challenges through OPTEMPO and personnel tempo (PERSTEMPO) controls. Tailoring forces to task, exploiting our Reserve and National Guard forces, transitioning non-SOF missions to the services, and outsourcing when the mission allows are just a few examples of actions we're pursuing at this time.

Total Force: We are working to ensure SOF Reserve components are properly resourced, trained, organized, equipped and postured. As an example, we are upgrading our PSYOP broadcast capability by transitioning it from older C–130s to new EC–130Js. This will strengthen these vital Reserve assets so that SOF will be available to assure our allies and friends as future challenges arise.

DISSUADE FUTURE MILITARY COMPETITION

Experimentation: Successes demonstrated in our current engagements make one thing certain: the adversary will work to find ways to circumvent SOF strengths on the battlefield. CENTCOM planners, through a brilliant use of joint and combined warfighting doctrine, deftly avoided the expected quagmire of the Afghan battle. SOF must build on the lessons learned from this campaign to enable the creation of a range of capabilities and warfighting options. These enhanced warfighting methods dissuade competitors by forcing them to develop responses stretching their limited resources or choosing the high-risk option of focusing their efforts on a subset of SOF warfighting options, leaving themselves vulnerable to others.

Research and Development: We must continue to invest in making our SOF more capable in austere environments. One lesson of the recent Afghan campaign was that seemingly small investments in equipment could be devastating in the hands of a prepared SOF operator. Two such successes were the Multi-band Inter/Intra Team Radio (MBITR) and the SOF Programmed Laser Target Designators. The MBITR enabled our operators to—with a single light weight device—replace several existing radios. This substantial lightening reduced the combat weight carried by our soldiers, sailors, and airmen in the field and improved their ability to coordinate via radio. The SOF Programmed Laser Target Designators dramatically improved the precision of our aerial assaults on Taliban and al Qaeda positions.

We intend to work on an array of improvements from better body armor and chemical protection, to advances in gunship armaments, to developing and leveraging Information Operations (IO) tools. USSOCOM's primary generator of success is has always been to ensure we select the best and train for innovation: we are equipping the warrior, not manning the equipment. We clearly recognize that the modern battlefield is comprised of land, air, sea, space and the virtual domains. IO has the potential to help SOF operators remain undetected and unlocated in hostile territory—a critical element for several of our principal missions. We intend to actively pursue IO capabilities and develop standing authority to employ these capabilities when needed. This will improve SOF effectiveness and access to previously denied environments, and dissuade potential competitors from engaging even if they perceive quantitative advantage.

Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C^4ISR): USSOCOM is continuously striving to leverage information technology and innovation concepts to develop an interoperable, flexible joint C^4ISR architecture and capability that allows rapid sharing of analysis and time sensitive information between the joint, interagency, and international communities. Recently, the command established a new element within our Joint Intelligence Center, the Special Operations Joint Interagency Collaboration Center (SOJICC), to provide data mining across multiple security classification domains and visualization tools to effectively display that information to support deliberate planning for all assigned SOF missions. By collaborating with national and theater intelligence organizations, as well as the Interagency Community, we hope to improve "knowledge discovery" and data sharing in combating trans-national and trans-regional threats. At the same time, we must also pursue and leverage a collaborative investment strategy and migration plan for integrated, cost-effective mix of intelligence collection platforms that are interoperable and responsive to future collection needs and challenges.

To foster an environment that lessens competitors' proclivity to develop threatening capabilities and postures, we must leverage our allies' and friends' influence to strengthen and stabilize regimes vulnerable to both state and non-state coercion. In combating the evolving terrorist threat, one promising avenue is to enhance Department of Defense (DOD) and interagency coordination INTERPOL to provide a more pervasive understanding of the threat.

Role of Civil Affairs (CA): CA manages the civilian dimension of operations for the combatant commander to gain support of the local government and populace, to provide legitimacy for military operations and to accomplish required objectives in support of the National Military Strategy. The transformation of CA will require additional training and equipment to meet and defeat the critical demands of current and future asymmetrical threats and to ensure full spectrum dominance over all adversaries, in all civil-military environments.

CA transformation is critical to ensure their status as a ready and relevant SOF resource in any dynamic operational environment. We must continue to address training and sustainment of language skills and to refine issues that develop and improve collaborative interagency and multi-national efforts to ensure efficient and optimum use of CA assets. CA also possesses the unique capability to effect crucial components of the combatant commander's campaign plan that help countries formally in conflict to establish or reestablish viable democratic institutions, capable of self-governance.

Role of Psychological Operations (PSYOP): USSOCOM is focusing on SOF PSYOP forces with the objective of further improving their capability to sew the seams between the national strategic and regional influence initiatives, and military operations. Today, PSYOP is playing a critical role in the success of Operation Enduring Freedom and our global war on terrorism (GWOT). Our PSYOP soldiers took radio programming that was produced at Fort Bragg, North Carolina, to support Operation Enduring Freedom, digitized those programs, and transmitted them to our EC–C130E PSYOP platform, Commando Solo. As a result of this innovation, we are leveraging our robust CONUS production and analysis resources. These assets have minimized our deployed footprint and the corresponding logistics demands, and have provided hundreds of hours of "influence" oriented commercial radio broadcasts to Afghani target audiences. To continue such success, we are reevaluating the SOF PSYOP force structure and assessing future capabilities required to meet an increasing U.S. need to favorably influence behaviors, attitudes, and actions globally.

As a first step toward real transformation of the joint PSYOP forces, we are developing a clear joint PSYOP vision and operational concept which will soon provide a common framework for enhancing the joint PSYOP force structure and making key investments for modernizing PSYOP capabilities.

Our emphasis on PSYOP is a cornerstone of our Nation's Influence Operations strategy. From a USSOCOM perspective, it is not inconceivable that in the near future, the battle may be fought over television, radio or the Internet rather than the traditional linear battlefield.

DETERRING THREATS AND COERCION AGAINST U.S. INTERESTS

Presence: Increased peacetime forward SOF presence establishes relationships which can later prove vital to gaining access to otherwise denied areas. This was recently demonstrated by the relatively smooth manner in which SOF were granted access to the Karshi-Khanabad Air Base in Uzbekistan early in the Afghan conflict. Within the last year, CENTCOM tasked SOF to conduct military-to-military contacts with some of the same decision-makers that sped this agreement. Forward presence also provides critical information on adversaries, strengthens deterrence in critical areas, provides rapid strike capability, augments global intelligence, and limits the complexity of infrastructure protection for follow-on forces.

Improved Deterrence Through Transformation: The Defense Strategy envisions an improved deterrent posture by ramping the capabilities of the forward-deployed forces to lessen the size of reinforcement required to counter even the most intense conflicts. These transformational initiatives improve the forward-deployed SOF and conventional forces' deterrent effect and free forces now dedicated to reinforcement for other missions.

Operational Preparation of the Battlefield: USSOCOM is continually evaluating the potential for new technologies to improve the preparation of operational space. The command sees this as one area that can significantly assist in combating asymmetric approaches. For USSOCOM our battle-space goes well beyond the traditional battlefield. The use of data mining and "links and nodes" analysis capabilities with multiple databases and multiple agencies in a collaborative environment provide a better assessment of the future battlefield. With the product of this effort we can campaign plan for effects-based targeting, not only of traditional targets, but, also more focused or discrete ones, and other asymmetric threats.

Seamless C4: USSOCOM shares the DOD vision for a Global Information Grid (GIG) that will provide all forces a seamless network to provide the uninterrupted exchange of information necessary to achieve decision superiority. Over the past several years, the command has created and refined the SOF Information Enterprise (SIE) as our part of the GIG.

The SIE provides a standard "enterprise" approach to not only our information infrastructure, but also the systems, applications, policies, processes, and knowledge required by our forces to prepare for and conduct special operations across the spectrum of military operations from daily staff functions to war. This enterprise approach has created standard tactics, techniques, and procedures on how we plan and execute missions in a collaborative way. The key to this has been our SOF Mission

Planning Environment which is standardizing our mission planning applications and the use of web technology to share common functional area information, such as intelligence, logistics, and deployment information. The Web Information Center or WIC has been very successful in providing a common web view to our warfighting forces at the theater SOCs.

Critical to our warfighting capability is our dependence on satellites. We strongly concur with the recommendations of the SPACECOM led Senior Warfighter Forum to synchronize the space platforms with our ground terminals and to get the mobile user satellites in place in the 2010 time frame. Our resource requests for information technology match our most critical needs, such as individual radios, tactical local area networks (TACLAN), continued sustainment and modernization of our garrison and deployed networks, and continual training of our information professionals—all of which are crucial to our capabilities in meeting the threat of global terrorism. SOF C^4 systems greatly improve our warfighting capability and provide the foundation for our transformational efforts.

Targeting Speed: SOF units benefited greatly from the improvements over the past decade to surveillance assets. The War in Afghanistan illustrates that persistent surveillance, tracking and rapid engagement of adversary forces is critical to enable SOF to react to surprises and to help pre-empt "bolt from the blue" attacks.

Innovations in tactics, techniques and procedures, as well as oncoming technologies will allow SOF to exercise extreme time sensitive targeting. USSOCOM's TACLAN program will enable deployed forces to receive the latest intelligence at all security levels down to the "last tactical mile." The Special Reconnaissance Capability program (SRC) will provide the remote sensors and tagging/tracking capabilities to further enhance our ability for rapid targeting.

An increased overall DOD HUMINT program will enhance not only traditional force's capabilities, but also SOF capabilities. The rapid response and pre-emptive capabilities made possible by these transformation initiatives provide a strong deterrent to our adversaries, serving as a means to impose the commander's will rapidly to any threatening action.

Advertise: USSOCOM must ensure that the high profile SOF has enjoyed in its efforts alongside the conventional forces in Afghanistan is used to better its effectiveness. Our Nation's SOF are well known to most of our allies and our potential adversaries. SOF can be used to improve understanding of non-allied foreign governments in how improved relations with the U.S. can help their nation, improve their people's lot, and enhance their stature in their region of the world.

Even more surprising is that many of our foreign friends, and many U.S. government agencies are unaware of what capabilities SOF can bring to a collaborative effort through both DOD and Department of State avenues. USSOCOM expects to improve its combined SOF and interagency programs, benefiting both DOD and the interagency in accomplishing their objectives.

IF DETERRENCE FAILS, DECISIVELY DEFEAT AN ENEMY

Capabilities-Based Transformation: As we look to the most critical capability, being able to defeat any adversary, transformation is not only important, it can be the difference. USSOCOM is intent on transforming SOF to a capabilities-based force. To gain this objective, SOF will focus more on how an adversary might fight versus who the adversary may be or where the war might occur. Having the necessary capability to confront an enemy regardless of circumstances enhances the SOF ability to adapt to surprise.

Force Protection/Situational Awareness: As we commit our forces, one of our greatest responsibilities is that of their protection. Force protection demands a robust HUMINT program to provide the first line of defense. At the tactical level, exploitation of advanced signals of interest and the capability to receive analyzed and fused intelligence from national and theater broadcast systems is a critical requirement to provide credible threat warning. Our Joint Threat Warning System (JTWS) will provide this critical SIGINT capability tailored for all our components.

C^4ISR: USSOCOM is pursuing an investment strategy that focuses on providing communications and intelligence in support of SOF missions deep in hostile environments. The C^4ISR programs I've discussed have been programmed in the current POM. Operation Enduring Freedom (OEF) has highlighted increased requirements for these programs and a need to accelerate their development and procurement. The command must provide our teams with interoperable global reconnaissance, special reconnaissance and command and control assets; making them globally available to receive real-time intelligence enroute to advise forward and surrogate forces.

Theater Security: The global war on terrorism demonstrates that the Theater Security Cooperation (TSC) Plans now under development provide an opportunity to address a transnational threat not engaged by the predecessor to the TSC, the Theater Engagement Plans. In the TSC process, the DOD can now synchronize the Theater Security Cooperation Plans, ensuring that transnational threats that straddle CINC theaters are addressed in a coordinated manner.

War to Peace Transition: SOF must revise "SOF-to-conventional-force" transition plans in order to relieve our LD/HD capabilities from non-SOF missions as soon as the threat allows. SOF expects to be called on early in the conflict to provide a force that has trained aggressively for politically sensitive missions. Their capability to handle unforeseen missions branches will continue to make SOF a scarce asset; because commanders will always want to minimize the risk of a mission's failure by employing such capable forces. When transition allows, we must ensure it is done smartly, to allow the employed SOF to reconstitute and prepare for the next challenge.

Improved mission capabilities: USSOCOM is working to improve SOF capabilities to prosecute Unconventional Warfare and Foreign Internal Defense programs to better support friends and allies. The value of these programs, demonstrated in the Afghanistan campaign, can be particularly useful in stabilizing countries and regions vulnerable to terrorist infiltration.

Realignment: For the past several months, USSOCOM has been exploring the current posture of our Theater Special Operations Commands to find areas where we can improve our responsiveness, regional expertise, and training. This study has been conducted in response to the SECDEF's Quadrennial Defense Review direction, and has uncovered some interesting possibilities for the future of SOF force structure, forward basing, and mission capabilities. We are still exploring the obstacles and advantages to these ventures, but hope will soon to provide the SECDEF with a set of recommendations to improve the responsiveness and effectiveness of SOF.

CRITICAL ISSUES FOR THE COMMAND

As in the Chairman of the Joint Chiefs of Staff's statement, there can be only one number one issue for any commander. For USSOCOM, the "SOF Truths" drive what we consider critical. These SOF Truths are:

- Humans are more important than hardware
- Quality is more important than quantity
- Special Operations Forces can't be mass produced
- Competent Special Operations Forces can't be created after an emergency occurs

The message that we take away from these truths agrees with that of the Chairman's testimony to the Senate Armed Services Committee several weeks ago: People are the most important asset we have. Quality SOF are the toughest asset for this command to replace. Our primary concern echoes the Chairman's: we need to take care of our people by improving pay and compensation, health care, housing, infrastructure, and base support programs. Our most cost- and mission-effective path is to keep the tremendous people we have as long as possible.

SOF, like the services, is experiencing shortages of personnel with critical skills, in both the officer and enlisted ranks. The SECDEF's call for a sweeping overhaul of longstanding Pentagon personnel policies to enhance retention will go far in correcting this downward trend. USSOCOM continues to pursue innovative recruiting and retention programs and reinforcing our efforts to improve morale. Recruitment and accession of minority personnel into the Special Operations community continues to be a challenge for us. This issue is certainly considered relevant, given the nature of Special Operations missions and the value that people of different races, backgrounds, cultures, and language skills can bring to SOF units. During the period September 1994 to September 2001, minority representation in Army Special Operations Forces grew from 11.6–15.1 percent, with all groups more or less showing equal growth.

While women have made significant gains within the officer warfare communities, there was virtually no change in overall ethnic/race and female composition within Navy SOF over the same period. Gains within the Air Force SOF community mirror those of the Service, with the largest gains in the African American population. AFSOC minorities rose from 16.7–20.6 percent during this period. AFSOC has the highest representation of females in SOF due to their inclusion in fixed wing SOF aircraft.

It is important to note that not all military personnel can meet the stringent requirements for joining SOF, and women have been barred from most SOF units due to the restrictions of combat exclusion. However, both SOF personnel and minorities

polled outside our community voiced strong opposition to the establishment of quotas or devaluation of standards to achieve greater diversity. We are keenly aware of this issue and monitor it closely. It remains an item of special interest for SOF component commanders. Gains in this area, though not significant, have been realized and show a positive trend.

Some other issues that have continued to be of concern to SOF over the past year are addressed below.:

Mobility: We must guarantee the SOF Air Force component rotary-wing capabilities remain secure until a replacement aircraft (CV–22) with the required capabilities is fielded. We recommend re-capitalizing our MH–53 helicopters with modifications to ensure airworthiness and defensive system capabilities to fly in the threat environments of the future, well beyond the currently scheduled retirement date of 2007.

CV–22: The CV–22 may seem like a long-range issue, but it is one we need to keep our eyes on. Extending the MH–53 helicopter force structure to fill the capability gap created by the CV–22 program slip is a temporary solution. The command is committed to the CV–22 and the unique capabilities it will bring to the fight. The long-range, high speed, vertical lift CV–22 fills a long-standing SOF mission requirement not met by any other existing fixed or rotary wing platform.

MH–47E/60K. Our limited fleet of Army Special Operations Aviation assets must also be closely monitored. We are concerned about the battle-damaged and destroyed aircraft now missing from this fleet and how quickly they can be recapitalized.

ASDS: The Advanced SEAL Delivery System (ASDS) is a specially designed combatant submarine that will provide clandestine undersea mobility for SOF personnel and their mission support equipment. The ASDS is capable of operating in a wide range of environmental extremes and threat environments, providing increased range, payload capacity, robust communications, loiter capability, and protection of SOF personnel from the elements during transit. The ASDS provides a quantum leap in our undersea mobility capability.

USSOCOM is closely linked with the Navy in support of the SSGN Trident conversions, which will provide a host platform for Navy SEALs to conduct their crucial maritime missions. SOF may also require afloat staging bases to provide operational presence in international waters during periods of potential conflict or in the initial phases of combat operations.

Transformation: USSOCOM's approach to transformation is an integrated conceptual, organizational, and process based. It provides an effective yet efficient framework for SOF to institutionalize change and ensure SOF is prepared to meet future challenges.

USSOCOM is institutionalizing a Long-Range Planning Process (LRPP) which will provide the systemic programmatic methodology for applying resources towards transformation. The LRPP will provide the required cyclic senior level review and assessment of SOF transformation azimuths and power settings to ensure that SOF transformation is properly funded. USSOCOM is committed to transformation, the tenets of Joint Vision 2020, and to ensuring SOF remains a full spectrum force.

Transformation Roadmap. At the direction of the SECDEF, USSOCOM, the Services, and the Defense Agencies are developing Transformation Roadmaps that will establish the way markers for each respective transformation efforts. The USSOCOM roadmap will integrate the transformation efforts of Army, Navy, and Air Force SOF with emerging revolutionary technologies such as the CV–22, the Advanced SEAL Delivery System (ASDS), the SSGN (Trident Conversion), and the SOF Information Enterprise (SIE). These integration efforts will ensure that USSOCOM always provides the best trained and equipped SOF in the world. Additionally, this roadmap will be the keystone for linking SOCOM transformation efforts with the Services.

Military Construction Investment Program: Lastly and related to readiness, quality force, and effectiveness is our continuing need to modernize the infrastructure that supports our SOF capabilities. Our military construction investment program directly contributes to the training, readiness and operational capabilities of our Special Operations Forces. Separate from the SOF budget, the Services provide quality family housing, barracks and community support facilities for our forces and their families. We applaud Congress' support for these programs to enhance the quality of life for all soldiers, sailors, airmen, and marines.

CONCLUSION

As USSOCOM moves into the 21st century, we are evolving to meet future challenges and sustain the relative capability advantage we enjoy today. USSOCOM is already considering new and innovative methods of assessing and developing people;

is debating possible changes in doctrine, roles, missions, and force structure; is preparing an investment plan for modernization and streamlined acquisition that leverage the Revolution in Military Affairs and Business Affairs; and is examining new operational concepts for the conduct of special operations in future environments. USSOCOM is meeting this challenge; transitioning from a traditional military staff to an Information Age staff that is matrix-shaped around core functions more flexible and better postured to resource and support global SOF requirements.

We cannot know with certainty who our foes will be or precisely what demands will be placed on us in the future. However, in a time of both uncertainty and opportunity, USSOCOM will continue to provide our Nation with the means special capabilities to protect our interests and promote a peace that benefits America and the democratic ideals that we cherish.

Senator LANDRIEU. Thank you, General.

Mr. Schulte.

STATEMENT OF HARRY E. SCHULTE, ACQUISITION EXECUTIVE, SPECIAL OPERATIONS ACQUISITION AND LOGISTICS CENTER, U.S. SPECIAL OPERATIONS COMMAND

Mr. SCHULTE. Thank you, Madam Chairman. It is an honor and a privilege to report to you on the topic of Special Operations Forces acquisition and technology.

Congress, through Title 10 U.S. Code, chapter 6, section 167, empowered the USSOCOM to develop and acquire Special Operations-peculiar equipment, material, and services. We have implemented streamlined and cost effective processes to provide our SOF soldiers, sailors, and airmen with the technology and equipment they need to execute their warfighting and peacekeeping missions.

Our fundamental acquisition philosophy in USSOCOM is to field in an expedited manner an 80 percent solution while working with our warfighters and industry to address the remaining 20 percent of the requirement. We leverage the three services, the Defense Advanced Research Project Agency (DARPA), the Department of Energy, and other agency research and development programs to look for technologies to apply to our SOF warfighter needs. We survey industry and use a buy and try approach for government and commercial off-the-shelf items. Our warfighters perform early user evaluations of these potential systems, then we modify, test and field acceptable products.

We enjoy an exceptionally close working relationship with our SOF operational users. They are willing and anxious to accept a timely increase in capability provided by an 80 percent solution and their high state of training and experience enables us to accept risk in our fielding decisions. This process enables USSOCOM to shorten the typical acquisition cycle and rapidly insert technology to provide our SOF-critical warfighting advantages.

The acquisition organization's collocation with headquarters USSOCOM, daily contact with our warfighters, our relatively small size and short decision cycles, and the support we receive from the services, the Department of Defense and Congress are major contributing factors to our effectiveness.

I will briefly discuss the acquisition of one of our recent successes, the Multi-Band Inter-Team Radio (MBITR), which I am holding in my hand right now. The MBITR is currently fielded with our Special Operations Forces in Afghanistan. The MBITR acquisition program was completed in less than 3 years. This significant acquisition timeline compression was accomplished primarily be-

cause of the close government, industry, and operational user relationships established very early in the program.

Dialogue between the program office and candidate developers led to definition of suitable technologies to satisfy the MBITR requirements. A competitive cost-sharing development contract with production options was awarded to Thales Communications of Clarksburg, Maryland. USSOCOM accepted cost accountability for the management and the contractor assumed the risk for the functional design, including the software.

After contract award, contractor, operational users, and other government agencies participated in a joint integrated product team. This team ensured strict adherence to multi-service customer requirements, interoperability standards, and joint technical architecture. USSOCOM used extensive early user evaluations of prototype radios to eliminate any test incidents that you would normally find later on in operational test and evaluation (OT&E). Prototype radios were released to the Joint Interoperability Test Center, Navy Special Warfare, and Marine Corps force reconnaissance units for evaluation in mission scenarios.

The evaluators employed the MBITR in diving, high altitude parachuting, and ground operations. During these evaluations, the contractor was allowed full visibility, thereby shortening the development learning curve and facilitating rapid modification of these test articles prior to formal OT&E. The close working relationship among program stakeholders minimizes the acquisition cycle time and produced a top-notch product for the warfighter.

It turns out MBITR replaces six to nine other radios. You will see some of them sitting on a table over your left shoulder, basically radios that are talking from ground to air—three or four different kind of radios from ground to air—and also ground to ground communications.

Over 8,000 MBITR radios have been fielded to SOF, other service users, and coalition users at this time. Our warfighters in Afghanistan report that this new radio is proving to be exceptionally effective in joint operational requirements.

I want to thank the committee for the support that you have provided USSOCOM for the MBITR program over the last few years.

Madam Chairman, with your consent I will conclude my remarks at this point and submit my remaining statement for the record.

[The prepared statement of Mr. Schulte follows:]

PREPARED STATEMENT BY HARRY E. SCHULTE

I'm Harry Schulte, Acquisition Executive for the United States Special Operations Command (USSOCOM). It is an honor and a privilege to report to you on the topic of Special Operations Forces (SOF) acquisition and technology. Congress, through Title 10 U.S. Code, Chapter 6, Section 167, empowered the USSOCOM to develop and acquire Special Operations-peculiar equipment, material, and services. We have implemented streamlined and cost effective processes to provide our SOF soldiers, sailors, and airmen with the technology and equipment they need to execute their warfighting and peacekeeping missions.

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form early user evaluations of these potential systems; then we modify, test and field acceptable products. We enjoy an exceptionally close working relationship with our SOF operational users. They are willing and anxious to accept the timely increase in capability provided by the 80 percent solution, and their high state of training and experience enables us to accept risk in our fielding decisions. This process enables USSOCOM to shorten the typical acquisition cycle and rapidly insert technology to provide our SOF critical warfighting advantages. The acquisition organization's collocation with headquarters USSOCOM, daily contact with our warfighters, our relatively small size and short decision cycles, and the support we receive from the Services, Department of Defense and Congress are major contributing factors to our effectiveness.

ACQUISITION PROCESS EXAMPLE

I will briefly discuss the acquisition process for one of our recent successes, the Multi-Band Inter/Intra Team Radio (MBITR). The MBITR is currently fielded with our Special Operations force in Afghanistan. The MBITR acquisition program was completed in less than 3 years. The significant acquisition timeline compression was accomplished primarily because of the close government, industry, and operational user relationships established early in the program. Dialog between the program office and candidate developers led to definition of suitable technologies to satisfy MBITR requirements. A competitive, cost sharing development contract with production options was awarded to Thales Communications, Inc., of Clarksburg, Maryland. USSOCOM accepted cost accountability for management and the contractor assumed total risk for the functional design.

After contract award, the contractor, operational users and other Government agencies participated in a joint Integrated Product Team (IPT). The IPT ensured strict adherence to multi-service customer requirements, interoperability standards, and the joint technical architecture. USSOCOM used extensive early user evaluation of prototype radios to limit test incidents typically experienced in Operational Test and Evaluation (OT&E). Prototype radios were released to the Joint Interoperability Test Center (JITC), Navy Special Warfare and Marine Corps Force Reconnaissance units for evaluation in mission scenarios. The evaluators employed the MBITR in diving, high altitude parachute, and ground operations. During these evaluations, the contractor was allowed full visibility, thereby shortening the development learning curve and facilitating rapid modification of the test articles prior to OT&E. The close working relationship among program stakeholders minimized acquisition cycle time and produced a topnotch product.

Over 8,000 MBITR radios have been fielded to SOF, other service users and coalition users. Our warfighters in Afghanistan report this new radio is proving to be exceptionally effective in the joint operations environment.

OUR CHALLENGE

Although our people are certainly SOF's most important asset, maintaining and improving materiel capabilities remains SOF's most difficult challenge. SOF must keep its equipment up to date, while keeping the cost for sustaining its warfighting systems under control. SOF depends on leading-edge technology to provide the critical advantage and to support participation in a growing number of technologically complex missions and operations. Our challenge is to find ways to modernize or sustain legacy systems when it makes sense, while developing technological bridges with our industry, service, interagency, and international partners.

I will now briefly discuss our Urgent Deployment Acquisition (UDA) process and a few of the standout technologies used in Operation Enduring Freedom. Then, I'll discuss how we invested Defense Emergency Response Funds (DERF); what's new in the budget and, promising technologies for the future.

OPERATION ENDURING FREEDOM

Our current top priority is supporting Special Operations Forces engaged in Operation Enduring Freedom. We have implemented processes to identify, validate, and rapidly acquire Special Operations—peculiar materiel solutions to emerging requirements of our SOF warfighters. The regional CINCs forward Combat-Mission Needs Statements (C–MNS) to USSOCOM. The USSOCOM staff forms a rapid response team to validate the mission need and develop a plan of action. This team provides their recommendation to our Deputy CINC within 48 hours. When the DCINC approves a C–MNS, resources are identified, and I initiate a program to address the warfighter's need. Our streamlined acquisition procedures are further streamlined as fielding warfighter C-MNS solutions is our top priority. These UDA programs are yielding exceptionally positive results. I'll briefly highlight three of them.

Laser Targeting Devices. In 7 days we were able to contract, acquire, and deliver into the area of operations an initial operating quantity of new technology laser targeting devices. These binocular-like electro-optical devices are being used by SOF ground forces to observe and precisely measure the three-dimensional coordinates of distant targets such as cave entrances. Through our joint communications systems, our forces on the ground relay those coordinates to Air Force and Navy flight crews for delivery of precision guided munitions. This system has proven to be a significant combat multiplier.

Aerial Leaflet Delivery Bomb. We are fielding an aerial bomb leaflet delivery system for deployment of PSYOP leaflets by F–16 and F–18 fighter aircraft. At the request of CINCCENT, we initiated the project in October and will accomplish an initial operating capability in theater later this month.

Man-portable UAVs. Unmanned aerial vehicles (UAV) are providing significant capabilities and value. Technology has matured to the point where man-portable UAVs can provide ground forces an organic capability to remotely conduct local reconnaissance and surveillance missions. This capability will allow operators in small teams to look over the next hill and assess enemy activity and avoid unplanned engagements with larger enemy forces. We are continuing to explore sensor and miniaturization technologies to enhance this combat multiplier.

DEFENSE EMERGENCY RESPONSE FUNDS

In response to the September 11 terrorist attack, the Secretary of Defense authorized Defense Emergency Response Fund (DERF) obligation authority to resource immediate requirements. These critically needed funds are used to resource our urgent deployment acquisitions and accelerate current programs prioritized by Theater Special Operations Commands and USSOCOM Component Commanders. Some of these DERF programs are:

Night Vision Electro-optical Equipment. SOF enjoys a decided advantage in this area . . . it has been said, on numerous occasions, "SOF owns the night." While this is currently true, similar commercial technology is becoming readily available throughout the world and it is very likely that our "ownership of the night" will erode over time unless we continue to push the envelope. More importantly, we need to carefully control release of our technologies to other countries and keep pushing the envelope on precision laser targeting, thermal imaging, thermal weapon sights, and night vision device technologies.

Aircraft Survivability and Capability Enhancements. Accelerated efforts include directional infrared countermeasures, enhanced situational awareness, and several MH–53 sustainment modifications. To enhance AC–130 Gunship capabilities, the Air Force recently integrated a capability to allow direct real time streaming of Predator UAV video data to the gunship. This rapid technology insertion improved gunship effectiveness by shortening the engagement chain, enabling our crews to place fire and steel precisely on target in a very short time.

Other DERF efforts include: deployable secure local area networks; blue force tracking devices; all terrain vehicles; remote observation sensors; U.S. rifles modified to fire foreign ammunition; standoff explosive detection systems; man-portable chemical decontamination equipment; joint interoperable SOF radios; body armor; lightweight environmental protection combat uniforms; and, joint threat warning systems for operators and platforms.

As we expand to other areas in our global war on terrorism, USSOCOM will continue to acquire technologies that provide our forces the ability to fight and win in varied environments. We have the process in place to accomplish this task.

WHAT'S NEW IN THE BUDGET

Key transformation initiatives in our budget focus on air and underwater capabilities to infiltrate and exfiltrate SOF into denied areas and survivability of our platforms and forces. Our flagship programs continue to be the CV–22 Osprey and Advanced SEAL Delivery System. Other major initiatives are: maintaining our MH–53 fleet through fiscal year 2007; a 20 year service life extension program for the MH–47; enhancing psychological operations capabilities; adding up to 4 AC–130Us to our fleet of gunships; development of a directed energy weapon for the gunship; and multiple programs to enhance SOF aircraft survivability.

TECHNOLOGIES FOR THE FUTURE

On the horizon we see promising technologies maturing that will help keep SOF on the cutting edge. USSOCOM is working closely with industry, labs, and academia to insert those into our technology thrust areas: signature reduction; high

bandwidth/reachback communications; underwater communications; unmanned systems; batteries/fuel cells; remote sensing; advanced training systems; bioengineering; and, directed energy weapons. These thrust areas address the technology gaps we see and offer USSOCOM the greatest opportunity for technological payoff.

CONCLUSION

The DERF resources you provided enabled USSOCOM to rapidly acquire and deliver high technology products to our deployed forces that made an immediate difference. Without DERF, and the flexibility it gives us, many of our urgent deployment acquisitions, which have proven to be effective combat multipliers in Afghanistan, would still be program plans awaiting approval and resourcing.

USSOCOM has worked hard to wisely use its modernization resources to sustain systems when it makes sense, to integrate new technologies into legacy systems, and to acquire new technically advanced systems that are enabling our combatant CINCs to win the war on terrorism. We intend to continue our focus on modernization and transformation challenges to ensure our ability to rapidly adapt to changes in technology, the operational environment, and ensure we always provide our SOF operators with the decisive advantage.

Senator LANDRIEU. Thank you, Mr. Schulte.

The Senator and I were just discussing, since that radio has worked so well on the battlefield, perhaps we might use it to communicate better in Congress. We need all the help we can get up here.

But I am glad you raised that issue because I wanted to say before I get to my questions that I am very proud of the action of this committee last year that plussed up your budget for those radios. I hope that the cameras could actually get a good shot of that radio that you have in your hand and what it replaced.

But it is not just the equipment that it replaced. It is the lives it saved, the confidence it has built, the bravery that it encouraged because people could go into a battle relying on their equipment, knowing that they could operate as they have been trained. So it was not a lot of money, $14 million, but it was an important investment. I think that is what Senator Roberts and I want to convey, that it is not just the amount of money, but it is the way it is directed into what you would say is a relatively simple, yet revolutionary idea. That actual people on a battlefield could really communicate to each other. So I think that is a good lesson for us and for our staff to see, and I thank you for bringing that up.

Mr. SCHULTE. Thank you.

Senator LANDRIEU. Let me start then with my first question. We will go through this in rather an informal way, but we do have quite a few questions we want to get on the record.

General, you mentioned in your opening statement that we have given you the tools, or the predecessors of this committee gave you the tools, to do your job. What are the most useful tools in your toolbox? If you could just restate for the record again so that we can continue to give you more of those kinds of tools and not burden you with things that do not work.

General HOLLAND. Madam Chairman, to really answer that question I could probably go through an exhaustive list. But just let me go back onto what we just talked about, the MBITR, because MBITR is a great example. The Operational Detachment Alpha commander made a comment: It did not matter what he wore, as long as he had a good radio he would be successful. Because of the support that we got from Congress last year, our people have that in their hands.

This is all about equipping the man, not manning the equipment. In our business what we try to make sure of is that our people who go out forward, we ensure that they have the right equipment to be successful. That is not only to include what they need from an intelligence perspective, but it is also the weapon and it is also the mobility platform that will take them into that part of the battle.

It is a very comprehensive list of items that we need, and we would look forward very much to having you come and visit and see up close and personal the type of equipment that we talk about.

Senator LANDRIEU. Our committee is looking forward to that. We are scheduled, in just a few weeks to get that done. Would you also argue that it is the discretion that you have within your budget, or the special designation of your budget, that allows you to sort of plus-up or step-up and coordinate and integrate to achieve a result that you have just shown us? Is that part of the method or mechanics that helps you to be as successful as you obviously are?

General HOLLAND. Yes, ma'am. I think you hit the nail on the head. It is our opportunity that when we see the mission need statement that comes in from our people that are forward—and during the war in Afghanistan on Operation Enduring Freedom we have had a dozen or so requirements that have come to us—as those requirements come into our headquarters, we have a way to rapidly turn those around.

In the statement for the record that Mr. Schulte has provided to the subcommittee, it gives those examples of how we can rapidly meet the requirement of our people in the field. That is what this is all about. It is the timeliness, it is the ability to affect the outcome. Obviously, we want to stay on the inside of the decision cycle of the enemy. Because we have the money, Major Force Program 11, to be able to accomplish those tasks, that is what continues to steady us, to keep us on the forefront in our war against terrorism.

Senator LANDRIEU. Let me back up if I could to a broader question. This was also addressed to some degree in your opening statement. But SOF's Command Publication-1 it states that, "Special Ops must select emerging targets or threats that either cannot be engaged effectively by conventional forces or be dealt with better by small, highly specialized units. Similarly, as conventional forces add capabilities and become able to attack targets that previously belonged solely to SOF, Special Operations units must re-orient themselves toward targets that will be vulnerable to their special capabilities."

Given this most recent experience—and we are continuing to experience it daily—what missions do you believe should now be moved to conventional forces, if any? Where does Special Ops need to further improve their capabilities? Could you just give us a little bit more on the record about that integration?

Senator Roberts had indicated this is about your future vision, based—and building—on the experiences that we have. How is this integration between Special Ops and conventional going to work in the future, do you think, General?

General HOLLAND. To answer the question, I think the first statement I would make is obviously that people are very important in this equation. When we reflect back on Operation Enduring Freedom and we think about our people who first went forward

into Afghanistan, the global scout, the ability of our people to go into a strange country, to understand the language, to understand the culture, to be able to develop a trust and confidence with someone from an opposition group, that to me is something that we continue to need to steady our focus.

That aspect of it will continue to be very key. Now, the other aspects, as we continue on into the process, we have to determine where those capabilities are in the services. This is a comment that we had in our earlier discussion, that we work very closely with the Army, the Air Force, and the Navy. We have recently just signed a memo of agreement with the Marine Corps, to establish what capabilities we have in Special Operations Forces and what the capabilities are that exist within each of the services and where can we build the bridge, where can we sew the seam.

It is those capabilities that will allow our Special Operations people to then come off of that particular mission, turn it over to the conventional forces, which allows our people to come back, retool, refit, retrain, rehearse, and get ready for the next operation. It is not necessarily all about more; it is really about how we can exploit the capabilities that we have, not only within SOF, but also within the services, so that we can better come together on the battlefield and be mutually supportive of each other.

Senator LANDRIEU. That is helpful.

Let me get back to a question about research and development. The budget has been plussed-up in a fairly significant way from last year to this year. Special Ops still remains, however, despite the very significant budget request for an increase in defense spending, only 1.3 percent of the total budget. It was 1.3 percent 3 years ago and it has maintained that flat. Although the dollar amounts have gone up, the position has remained rather constant.

Under that flat 1.3 percent, our research and development effort seems to be slightly decreased. I do not know if either one of you might want to comment about any concerns you would have about that, what sort of promising research and technology do you think that is fairly urgent, given our current experiences and what the likely threats are out there? Is there something that our committee should know about where we can try to help you?

General HOLLAND. Madam Chairman, let me take the first part of the question. Then I would like to turn it over to Mr. Schulte for him to talk about what those plus-ups actually mean.

Think about our 2002 budget, which was about $4 billion, and our 2003 budget which is $4.9 billion. Now, the personnel account and the operation and maintenance (O&M) account basically have stayed about the same. Of course, we have gotten additional money to help out on those additional deployments that were not part of the plan. However, where the big increase has been is in our modernization account, and that is what is key.

That key is really what I would like to have Mr. Schulte explain, because that is what gives us these tools that we talked about into the hands of our operators that go forward.

Mr. SCHULTE. Yes, ma'am. I am looking at the numbers between fiscal year 2002 and fiscal year 2003 for the budget. Our research and development (R&D) numbers did go up about 10 percent. Our request is about 10 percent higher than it was in 2002, to about

$430 million for R&D. But the big increase, as the CINC said, has gone to procurement. We are up about $350 million in procurement. In the short-term, that is where our problem is.

We have developed some systems over the last few years that we have not had the procurement money to buy out the inventory objective. This is going to help us do that kind of thing. For instance, with the help that your committee provided last year we were able to buy a lot of the MBITR radios with some of the funds that just came in, quite frankly, in February, I think. We have them all on contract now. So every MBITR radio, all 10,000 of them that we required, is on contract basically now and we will have them delivered out probably in 12 months, something like that.

This procurement money is going to help us buy out a lot of things that we have been buying in small quantities and handing out to the guys as we got them. This is really going to help quite a bit.

But let me get back to your R&D question. We are up a little bit on R&D in 2003. We are happy about that. The kinds of things that we are looking at, the kind of areas we are trying to get into in R&D a little bit more, are the area of signature reduction, not just for platforms like aircraft or even boats, but individual signature reductions for the individual soldier. High bandwidth communications is important to everybody in DOD and this is important to USSOCOM, especially if we have somebody forward and there are observation posts or the like and we need high bandwidth to bring the data back to the command center.

One of the big increases in the budget in 2003 is for directed energy. The Advanced Tactical Laser Advanced Concept Technology Demo (ACTD) has been moved into the USSOCOM account beginning in 2003. We will be managing that Advanced Tactical Laser ACTD starting next year, basically I think because the ultimate user if that technology were to pan out, would be something like a future gunship. So the Department moved the money over to USSOCOM starting next year. That was where you had some of the increase in the account, too.

So we have a number of things like remote sensing that we are looking at. More research in batteries and fuel cells, which is very important to the soldier. The batteries—no matter how good your batteries are, they are never as good as you would like them to be. You would like them to last longer, you would like them to be lighter, you do not want to carry as many as you have to carry. If you are carrying batteries, you are not carrying water or food or ammunition, all of which are very important to the soldier.

Unmanned systems, we are looking at some very simple unmanned systems that are man-packable, something you can put in a rucksack and a guy can carry and then maybe hand-launch and it would go over the next hill with some video and take a look at what is over the next hill, those kinds of things.

Those are the areas that we are focusing on with our R&D money. We basically have taken all the SOF requirements and boiled them down into these thrust areas.

One of the things I would like to bring up just quickly is that there is a conference going on, it actually started today. It was cosponsored by DARPA and USSOCOM, called "Scientists Helping

America." I spoke at the conference this morning. The idea was to go after scientists from industry and academia that maybe are nontraditional R&D people as far as the government is concerned. Many of these people have never worked with the government before, and yet there are some great ideas out there.

Basically, I went down nine technology thrust areas that are needs in the command and set them up, and they are going to break into nine different seminars to come up with ideas on how they would solve this kind of thing and then come back to us. So we are working these nine thrust areas very hard and that is where the plus-up in R&D will help us, work some of these areas.

Senator LANDRIEU. Thank you, Mr. Schulte. I am very happy to hear about that conference you spoke about. There was a tremendous amount of discussion in our systems last year in terms of trying to get better technology quicker to the Pentagon, to get it working on the battlefield, by going through nonconventional methods. We never could agree between the House and the Senate about how to do that. So perhaps you can give us some good ideas this year about that.

My time has expired.

Senator Roberts.

Senator ROBERTS. One thing I wanted to do is go over again what the General has indicated are SOF truths in your testimony. Number 1, humans are more important than hardware; number 2, quality is more important than quantity; number 3, Special Operations Forces cannot be mass produced; and number 4, competent Special Operations Forces cannot be created after an emergency occurs.

I think the message we take away from these truths agrees with that of the chairman's testimony to the Armed Services Committee here just a short time ago.

During his recent testimony before the full committee, the Commandant of the Marine Corps, General Jim Jones, testified he had signed an agreement with you folks that would greatly expand the cooperation and interaction between the Marines and Special Operations Forces. You have referred to that in your testimony. In what areas do you anticipate increased cooperation?

The second part of that is, there have been marines assigned to headquarters elements of the Special Operations Command, but there is not a marine component of USSOCOM. Should SOCOM have a marine component? That is a question from an old marine, but go ahead. [Laughter.]

General HOLLAND. OK, sir. Can I start with your first part of your question?

Senator ROBERTS. Certainly.

General HOLLAND. I think the agreement that General Jones and I signed, the important part, is to ensure that the Marine Corps and Special Operations are, in fact, coordinating in those areas where we really need to be coordinating. Example: The amphibious readiness group (ARG). As they depart and go to sea, before they depart we need to have a sharing of information, their capabilities, where they are going to be, so that we have that in a plan in case something happens, so we understand that there could be mutual support that would be provided wherever that location would be.

The second part is, once the ARG gets into a theater we have the theater Special Operations Commands. Say, if it were going into the Mediterranean, then to have a Special Operations Command Europe (SOCEUR) liaison officer interface with the commander to ensure that they each give updates on, number one, the marine capability that they have with the ARG and the Marine Expeditionary Unit Special Operations Capability (MEUSOC) as it comes into location, but also to have the SOCEUR staff brief them on where they see potential hot spots in that particular area. There can also be a sharing of intelligence on what it is that each could be expected to do.

The next piece that we discussed was acquisition. There are a lot of things that Mr. Schulte works within our office that we need to be sharing with those people who would have people employed in similar circumstances.

Senator ROBERTS. Do you mean that the United States Marine Corps, that bailing wire outfit that I served in, could have equal access to a radio like that?

Mr. SCHULTE. They do, sir.

Senator ROBERTS. Not haul 200 pounds of batteries around with this outfit back here?

Mr. SCHULTE. The Marine Corps is buying the MBITR, sir, not our contract.

Senator ROBERTS. They do not have that radio now, or do they have that radio now?

Mr. SCHULTE. Some of them do. There are some radios in the Marine Corps now.

Senator ROBERTS. So certain units do have that radio? What about the Tenth Mountain Division in the Army?

Mr. SCHULTE. I do not think so.

Senator ROBERTS. But that is the kind of blueprint that you are talking about under that jointness doctrine you are developing?

Mr. SCHULTE. Yes, sir.

General HOLLAND. Then the other part that is important is that we look to our future, and both of us have a future as we look at tilt-rotor technology. As the CV–22 and the MV–22 come into our inventory, there are going to be a lot of areas where we will need to be sharing.

Just over in Afghanistan, as we are talking about what we have been accomplishing together, they have KC–130s, they have Marine helicopters, and we are also seeing that there are many areas that, even when you get to the crisis——

Senator ROBERTS. Very old helicopters, I might add.

General HOLLAND. —the joint task force commander is going to take a look at what resources are available and how can he put them together in such a manner so that they can be successful on the target. What it is going to take is for a mutual understanding of what each other's capabilities are and then to see what is that next step.

I have people on our staff that are working closely with General Jones' staff and we are going to be getting together later in the year to go over some of these initiatives that I just talked about.

Senator ROBERTS. Now, you do not have a warfighting lab per se. I know the Marines got into that several years ago at my and some

others on the committee's insistence. I suppose this is for Mr. Schulte, but the subcommittee is concerned about the Department of Defense's ability to effectively transition technology from the lab to the warfighter, and your statement reflects that and your response, General, also reflects that. Special Operations Command appears to be unbelievably successful, from the standpoint of a marine, at finding technological solutions and quickly applying them in the field.

My series of questions were these and you can just sum up: What lessons learned from your transition success can be shared with other services? You have already spoken to that, because now we are trying to share that information.

How is the effectiveness or ineffectiveness of a new system basically communicated back to the Special Operations Command? What works, what does not? Does a similar communication mechanism exist for informing the services about any particular systems which they are also working on? It is a two-way street.

Would you care to comment?

Mr. SCHULTE. I think I appreciate the comment that we have been successful in transitioning technology. I would not tell anyone whether we are better than the services or not on this, but it is a little different. The services start with basic research and basic research takes a while before it comes up with the technology and then eventually leads into a product, kind of the front-end of the process.

Well, a little bit on the front-end of the process, I have to admit we cherry-pick. We are looking across the Air Force, the Navy, the Army, the Department of Energy, DARPA, and anybody else we can find, for promising technologies that are going to solve an itch that we have. We will jump in when we think there is something ready to prototype or something ready to——

Senator ROBERTS. You could buy off-the-shelf.

Mr. SCHULTE. We can go to any of those places and we can get whatever we need. So the front-end of the process might look a little bit shorter because we kind of wait to see for the promising things that are a little bit farther along. I am not looking necessarily 10 or 12 years out. I am looking maybe a year or 2 years out where I can take something and get it into a product for the warfighter in the near-term.

Senator ROBERTS. Well, 10 or 12 years out you may not need it.

Mr. SCHULTE. That is exactly right, sir.

The front-end is we jump in a little bit later and take advantage of what the other services have done. The back-end of the process is, how do we get it to the warfighter? What helps is that we have a very close relationship with the warfighter. USSOCOM is relatively small. We work very closely with these units and we get them involved at the very beginning in the acquisition process.

So we will get something prototyped, we will get it to the guys at Fort Bragg. They will take it out to the field. They are very, very candid about what they like and what they do not like about equipment, and we will get that turned around and we will get it back. So you get very rapid feedback and you can get things to the field a lot quicker.

Senator ROBERTS. See what you can do about a new microphone while you are at it.

Senator LANDRIEU. It was such a good idea it blew the system.

Senator ROBERTS. I think the chairman has a question here.

Senator LANDRIEU. It is not a question; I just want to interject. I really hope that Senator Roberts and I continue to work as a good and effective team and accomplish many things. If there could be one thing that we could really make a contribution to, it would be on this point. We sit on a variety of subcommittees and I think to zero it down—Special Ops seems to be very sort of customer-focused in the sense that your customers are your warfighters. You ask them what they need, what they want, and then you just do your best to get it to them.

If you can get it through traditional R&D through the Department, that is great. If you can go to a store and buy it off-the-shelf, whatever they need. I wish, Senator—if we had more of that attitude, in this Senator's opinion, throughout the whole Department, I think we would be better served. Not to be overly critical, but just to raise the point that there are better ways, and you are really showing us a better way and I just wanted, Senator, to interject that. But I do not want to take your time.

Senator ROBERTS. Well, we have enough time here with the stunning attendance that we have here to ask any questions that we have.

This may or may not be an accurate analogy, but it is my prejudice, so bear with me. Staff and myself, others, attended an exercise with the Marine Corps out in Monterey, as I recall, called Urban Warrior. The exercise was based on the new doctrine that General Charles Krulak gave, the former Commandant, who could give quite a lecture on asymmetrical warfare and the warfare of the future. I hope everybody paid attention. I know I did and others did as well.

I was trying to figure out as these marines were conducting an exercise, and it was about 85 degrees, and they were still carrying 75–80 pounds worth of gear, slugging along with the little squatty bodies in the rear, just panting away, carrying batteries for this kind of a radio. We were trying to figure out from the warfighting lab standpoint, wait a minute. If this is the cutting edge, had it been 100 degrees you know what would have happened. There would have been about 50 pounds of gear on the ground.

I asked one of the people who was a casualty—not a real casualty, obviously—how much gear are you wearing? Then I picked it up, old man that I am, and tried to put it on. The helmet, which you cannot sit on and you cannot cook in it and it is a little different, and you probably want to get it off your head if you are in the littoral and you are fighting in an urban arena and your opponent is wearing a ball cap, a Madonna tee shirt, and a pair of Nike tennis shoes. Sight, vision, it seemed to me was extremely important.

It bugged me as to why we could not get more off-the-shelf equipment and get a marine that was truly a modern warfighter. Now, obviously at that particular time we did not have 9–11, we were not in Afghanistan, and we did not have the joint operations we have today. We were not sharing this so that radio can replace

these batteries and this radio or at least you can communicate with them.

Now, I am making a long-winded speech. Let me ask you, General, we were talking about the horseback cavalry and the members of your cavalry who were not quite as adjusted as the trail riders. They came from Texas to Abilene, Kansas, in regard to their skills on horseback, and the gear that they were wearing, and then the difference between the Afghan that was riding next to them at full gallop.

Can you tell me sort of the difference there? Not that we are going to have a cavalry ride again, although you never know. But you see what I am driving at in terms of being a highly mobile, highly flexible unit, buying off-the-shelf for a specific mission that really demands a very unique kind of weaponry for the warfighter.

General HOLLAND. Yes, sir. That whole story is a great story to hear and we would look forward to giving that particular vignette to you in one of your future visits.

But as you talk to our Special Operations soldiers that were on not only the horseback, but also had mules there to carry a lot of their equipment, one thing that did come from the opposition group was that they started realizing that things like radios and Special Operations Forces Laser Acquisition Markers (SOFLAMs) also could make the difference. So a lot of the equipment that our people carried, they soon realized the importance of what that equipment could do, especially if it could call in say B–52s, close air support, or the other fighters, both Marine, Navy, and other Air Force fighters.

So the equipment is obviously something that we continue to look at. That is why we continue to look at what is the weight. That is why we continue to look at how can we get smaller batteries that last longer, because we have to continue to worry about what goes into the rucksack and how we can reduce that load.

You talk about the temperatures. In Afghanistan look at the terrain. Most of all these operations that currently are ongoing are at 10,000 feet, so you are at 10,000 feet, heavily laden, rough terrain, and how do you maneuver? So this is something from a technology standpoint we need to continue to push, on how we can lighten the load of what our people carry and still be effective and accomplish the mission.

I have to admit that at this point, yes, we are not there yet. But making sure that that soldier, sailor, airman, or marine have the right equipment will continue to be very important for all of us, to include our services.

Senator ROBERTS. Well, we may not be there yet, but we are singing the same hymn in the same church pew.

My time has expired. I am assuming we will rotate back and forth.

Senator LANDRIEU. Yes, we will. We will go back and forth. But it is a very excellent line of questioning, and again we look forward to helping you to achieve that goal.

Let me move from research and development back to one of the central truths, which I think is important, that people are the most important. General, if you could just elaborate on that essential truth in how can our committee best focus our efforts in terms of

strengthening those people, helping improve the quality, supporting them, their families, those quality of life issues, and retention? Could you go on the record and elaborate in more specifics about how we could make that truth even more of a reality and support that truth?

General HOLLAND. Yes, Madam Chairman. The quality of life, I think that is important first. Both of you have made comments about the people that we have lost. Now, the people that we have lost have families and we think about their quality of life. The services have the responsibility to provide the quarters and all the different, support structure that we have at all the bases. Obviously we from Special Operations Command vigorously support the services in their endeavors to increase the quality of life for all of our people, regardless of where they are located, in which service.

So any time that you see a quality of life, you can see the impact that it makes to that particular individual. It really makes an impact when that individual is deployed and he or she knows that their families are being taken care of with the right support structure, the right housing, the right pay, and that list goes on. The quality of life piece, obviously we all feel very strong about that, and that is the reason that we are able to retain people.

There is a comment that we have often said, that we recruit the military member, but we retain the family. The people that we have in our business, these are not necessarily the people that just come in for a first term. They are people that are very well experienced. A lot of our Special Operations soldiers served in other units prior to coming into Special Forces. To have a seasoned Special Forces soldier takes usually about 8 to 10 years.

Unfortunately, when you think about Nate Chapman, he was the first military person that was killed by the enemy during Operation Enduring Freedom, who was 31 years old. You think about what Nate had accomplished up to that point he had served in Operation Just Cause, Operation Desert Storm, Haiti, and this was his fourth major operation.

So the amount of investment that we make in training and the personnel cost, it is not something that you can really put a dollar figure on when these people are asked to go forward and to give that last full measure.

Senator LANDRIEU. General, let me press this issue just a minute. I know that our men and women do not serve for the paycheck, which is obvious. But pay and compensation are important. Special Operators, since they go through such rigorous training—for every 50 applying and only 1 is accepted—are career people who have made this choice. It is really an extraordinary sacrifice and gift to the country. In your opinion, are we compensating them? Is there a differential, and if so, is it what you would see as appropriate?

In the range of quality of life issues, is it the housing or the health care that the services provided to family members? Could you try to be a little bit more specific? I mean, we would like to do it all. Let me state for the record that I think the MILCON budget is flat, which is a lot of where this comes out of in terms of housing and construction, at least for that part of quality of life. So I would like to see some additional help there.

Can you try to give us some more of your own personal views on that?

General HOLLAND. Well, one other comment that you made was about special pays. Our people, whether they are scuba or different types of qualifications, they do get additional pay. One thing that I have requested of my Command Master Chief Rick Rogers, who is sitting here behind me, is to get with all of the senior enlisted, the command chief master sergeant from the Air Force Special Operations Command, the command master chief from the Navy Special Warfare Command, and also the command sergeant majors from both the United States Army Special Operations Command and Joint Special Operations Command and come together and really look at what our people need. Because that enlisted person, that Non-Commissioned Officer (NCO), when you think about the people that are on point, that are doing our job for us, it is our NCOs.

There are so many stories about our NCOs just doing great things and making a difference. We need to make sure that we are doing everything we can for them. So he is going to be championing this cause, and from there we are going to come up with what we feel are the right places where we need to go through our Department to get support for our people that answer the call.

Senator LANDRIEU. I appreciate that. We would be very interested in that information, because this committee believes in that and wants to support you in that effort.

Let me ask about some budget numbers regarding the estimated cost of missions in Georgia, Yemen, and elsewhere. We have expanded our view. I think the President is right and I have supported him, and most of the members, both Republican and Democrats, in terms of going after terrorists wherever they are, recognizing they are just not all in one place or one country. This is going to be a fairly long, complicated, and very challenging operation. We want to make sure that the budget numbers are there to support it.

Can you give us any information about what it looks like to you in terms of the need for funding for the expanded missions that you see? I know we cannot predict the future, but what you can see that we will be doing in the next 6 to 8 months.

General HOLLAND. The problem that I have, Madam Chairman, is that I do not have a deployment order. So the details are continuing to be worked out on exactly what our involvement is and to what level. I would say that maybe we can take that one for the record. Once these details are worked out, then we can put together some type of estimate. I can be talking with the two theater CINCs that are involved with that particular operation and get into their minds, what do they expect.

But at this point I do not have a deployment order for our people to go forward. So the details are being worked out. Once the details are worked out, we would be pleased to provide that data to you.

Senator LANDRIEU. Senator Roberts.

Senator ROBERTS. Prior to the beginning of these operations in Afghanistan, what was the average strength of Special Operations Forces compared to the authorized strength? Where were you?

General HOLLAND. Senator Roberts, what I would like to do is give you some detail on that by each of our units. Overall we were in fairly good position. Our SEALs were around 97 percent. The Special Tactics, though, were at 80 percent. Our Special Forces enlisted were around the middle 80s and officers were up in the 90 percent. Depending upon the types of people and which ones you call upon, there is a different number.

What I would like to do for the record is provide you all the data where we were on September 11 before we deployed, and then we can come up with an overall percentage of where we are for our manning.

[The information referred to follows:]

Prior to 11 September 2001, Special Operations Forces (SOF) assigned to authorized strength was as follows, by Service Component: (Specific SOF communities mentioned by General Holland are broken out).

	Authorized	Assigned	Strength (Percent)
Army SOF	15,231	13,961	92
SF Officers	634	574	91
SF Warrants	385	340	88
SF Enlisted	3,983	3,446	87
Navy SOF	5,094	3,972	78
SEALs	2,123	2,016	95
Air Force SOF	8,846	8,911	101
Special Tactics	520	374	72

Since 11 September 2002, active component strength has remained relatively the same. However, personnel increases to support requirements for Operations Noble Eagle and Enduring Freedom have come through the mobilization of 3,836 Reserve and Guard Forces from all the Services as follows:

	Reserve	Guard	Total
Army	1,180	1,648	2,828
Navy	153	N/A	153
Air Force	742	113	855

*It is important to note that not all mobilized forces are purely SOF, but consist of a wide range of support personnel as well, to include force protection, medical, public affairs, personnel, etc.

Senator ROBERTS. I think that will be fine.

What are the challenges you face in finding and retaining, and I emphasize both, qualified personnel to fill the Special Operations requirements? As the chairman has pointed out, this is a rather unique set of criteria for only a chosen few.

General HOLLAND. Yes, sir, it is a continuing challenge. We have a very aggressive program. Obviously, we recruit from the services, and not everyone wants to sign up to do what we ask them to do.

Senator ROBERTS. But on the other side of it, your culture is special, and if I am any judge, that weighs in as to the number of people who would be willing to be recruited or to volunteer.

General HOLLAND. Yes, sir. What we are trying to do is——

Senator ROBERTS. I mean, they are doing what they want to do, is what I am saying.

General HOLLAND. Yes, sir.

We have done some studies, and especially from a psychological standpoint, what are the types of people that are successful when they come into Special Operations? Then, taking that the particular data, and go out for the recruiting. Where are these types of

people? The good thing is, when you represent only 1.3 percent of Defense Force Structure—and this goes back to one of the SOF truths, quality is better than quantity.

Senator ROBERTS. Right.

General HOLLAND. But what we want to make sure of is that we maintain the same standards we have in the past, because I think you and the American people, when you look at involving SOF in an operation, you expect it to be a success. As long as we keep our same standards, then we will be able to continue doing the job the way you would expect us to be doing it.

Senator ROBERTS. As we look at the future threat of asymmetrical warfare, there are some that have suggested that we need to increase the size of Special Operations Forces. Can you give me an estimate of an optimal size that you think would be sufficient? I realize this sort of dovetails into the chairman's question. Until you get your mission and we figure out where we are on this transnational war against terrorism, that is a little tough to suggest.

But in terms of optimal size and role of the Special Operations Force in our overall force structure, you are 1.5 percent. Do you think it ought to be increased?

General HOLLAND. Sir, the way I would like to answer you is I want to make sure that those authorizations that we have in all of our forces, that we fully man and equip them. As I mentioned, a lot of our forces are at the 80 percent level, so we need to get them to their maximum levels with the proper amount of equipment.

I think we continue to need this initiative that I talked about earlier, working the seams with the Services on their capabilities and then seeing what are these missions, if there are any, after we go through this review that we could then convert to conventional operations, thereby keeping our numbers stable where they are at this juncture.

These are the parts of this question that we are continuing to work with. There is a study right now that we are in view of and that is on SOF realignment, where should SOF be in the world, and with that, what is the right amount of force structure. This is a study that we are preparing for the Department of Defense.

Senator ROBERTS. You have not mentioned your Reserve Special Operations groups to sustain the current operations tempo, how you feel about their capability, their training level, to fulfil these obligations.

General HOLLAND. Yes, sir. They are magnificent. I would say that we probably have the best examples of the total force working together as an integrated team. As you well know, the 193rd Special Operations Wing out of Harrisburg, Pennsylvania—the only capability that we have in our military today to do what Commando Solo does—is with the Air National Guard.

Our Guard units that we have right now recently deployed. The reason they have been called up—and we have strong faith and confidence in their ability to accomplish the job—and the reason we need them is so we can give the existing active duty Special Forces Group back (which was deployed in October) retool, refit, and then get ready for their next operation.

Every place we look, we see the Reserves and the Guard doing yeoman's work in supporting us. The other part that I will add is the civil affairs piece. When you look at that particular organization, about 90 percent is made up of reserve forces, and they have answered the call and they are doing it well.

Senator ROBERTS. You have two major flagship programs on research, development, and procurement. You have quite a few programs, but the two flagship ones: the Advanced Seal Delivery System (ASDS) and the CV–22 tilt rotor aircraft, I have a special interest in. Can you give me the current status of each of these flagship programs as you understand them and are you satisfied that the safety, maintainability, and reliability goals associated with each of these programs will be achieved?

General HOLLAND. Sir, let me do that in two parts. I will do it real quick on the front-end and then I will let Mr. Schulte talk because, on the CV–22, he is part of the executive committee which gets into the details of the CV–22 program. Also, he has just been briefed recently on the Advanced SEAL Delivery System.

I will say from the top level that we are firmly committed within United States Special Operations Command to bring both of those weapon systems on board. We feel very strongly that we need tilt rotor technology. We need the technology that comes with the CV–22. I am even more convinced after seeing the operations in Afghanistan on how a CV–22 would best fit.

It is always great to have more options for a joint task force commander. When you are operating above 10,000 feet—in fact, our MH–47s have operated at 17,000 feet. Helicopters do well low to the ground, but when the terrain is as high as it is in Afghanistan that adds additional peril not only to the pilots but also to the capabilities of the equipment they are using.

So think about a CV–22 in that environment. Is it safe, reliable, maintainable—that is the part I have talked about—not only before these committees, but also in other speeches I have given, is that we can have a capability that will definitely help us as we go to other places in the world.

On the Advanced SEAL Delivery System, we owe it to our SEALs to be able to get them to an environment before they do the assault in a dry environment. If any of you have never had an opportunity to be on the current SEAL delivery vehicle, I know they get excited every time I visit our SEAL units, to put me in one because it is small, it is very contained, it is cold, it is wet, and there is really no opportunity for the team to really get together and think about their assault plan once they get to a target or whatever the mission is that they would have at that juncture.

Senator ROBERTS. General, I do not know about Senator Nelson. I am sure he probably has done this. He is sort of a snake-eater type.

Senator LANDRIEU. We could send him. He has gone before.

Senator ROBERTS. I have been there, done that, and had the wet tee shirt. They were doing me a great favor, my staff, which is amazingly still with me after this experience, in saying we are going to go out a little ways and then we are going to take your picture. I said, why not just take the picture here. We went out a little ways and the SEAL that was in charge indicated: Sir, we only

have 2 more miles to go and we are going to hit a little rougher water. I indicated: No, I think we are heading back now. [Laughter.]

If you have ever been in a church pew during a particular baptismal in one of the more demonstrative churches jumping up and down, that is a lot like what it is holding on. This has nothing to do with the question, Madam Chairman. [Laughter.]

Senator LANDRIEU. Well, I hope the others act more bravely.

Senator ROBERTS. If you do not have to do that—there is a whole list of things that some of us do not want to do any more and that is one of them. So I am for whatever kind of delivery system. Mr. Schulte, what are you going to provide that I can ride in? [Laughter.]

Senator LANDRIEU. Do not feel obligated to respond.

Mr. SCHULTE. We will talk about both the CV–22 and the ASDS.

Senator ROBERTS. I have already ridden that one.

Mr. SCHULTE. OK.

Senator ROBERTS. That was amazing, and that was even before the problems. I hope everybody listens to you, General, because that is something the Marine Corps and you folks must have, and I have every confidence we can do that.

I am sorry.

Mr. SCHULTE. Of course, I want to talk about ASDS. As General Holland said—let me give you a quick status on ASDS. That would be a good one to ride in, by the way, because you could stay dry. But, we have the first boat. It is kind of an R&D boat, but it is also going to be the first operational boat. It has some battery difficulties. It has silver-zinc batteries that we have been having some difficulties with. Congress gave us some money this year to work on the next generation of lithium batteries, which is hopeful, but it is not there yet. It may be ready for the second boat. It may not. We may have to go with another set of the silver-zinc batteries and try to work out the shorts and things that we have had with those.

Largely the ASDS meets the mission requirements. It has some noise difficulties, which we knew, because there have been some commercial pumps and things like that on there that we are probably going to have to change out. That is probably not a large item to do, but we have to do it. So the noise and the batteries are what we are working on now, and we have another, oh, maybe less than a year, of host ship testing that we need to do yet. We have some scheduling difficulties with the Greenville right now, but basically ASDS is moving along.

So those are our problems. The problems are in the noise and the problems are in the batteries.

On the CV–22, of course, the airplane has been grounded now for 14 or 15 months. The Navy and the Marine Corps have been going through a very exhaustive process of what is it going to take to fix all the different recommendations that came out of all the different panels that have been reviewing the V–22 program, the blue ribbon panel and all the other ones. It is a very exhaustive review. They have gone through every one. There are 186 recommendations. They have tracked every one down. In fact, I think there is a report that is either just coming to Congress or is about to come to Congress that is required from the program.

It is going through a flight readiness review process right now. It will go to the three-star level review next Thursday. There will be a four-star level review I think the first week of April. If all goes well—and it appears to be going very well—it is a very disciplined, very deliberate process to return this aircraft to flight. Everybody is concerned about the same thing. It has to be safe, it has to be reliable before we put people in the back of it.

The first flight is scheduled for the end of April for the MV–22. If everything goes well on that, probably the first flight for our CV–22s—there are two test airplanes that have been modified to a CV type of a test configuration; they are out at Edwards Air Force Base—they should fly in July.

So if we get back—it is kind of a crawl, walk, run test program, which it needs to be at this point in time until we get it back—it will be about 2 years of testing. So the program has slipped. You talk about the year it has slipped or so because it has been grounded, and it will go back into flight testing, pick up a lot of flight testing that was never done the first time around, and be a much more thorough process. I think by the time we get into a full rate production decision in a few years, we will know a whole lot more and we should feel very good about making a full rate production decision down the road.

Senator ROBERTS. Let me just say, Madam Chairman, before you turn to Senator Nelson—and I apologize, Bill—we had a full Armed Services Committee hearing following the various tragedies in regards to this aircraft and in the audience we had the pilots, the crew chiefs, and the families of the victims. While it was a very emotional hearing, we asked them to come up and testify: What do you think, is this a doable technology, is this aircraft something as you work with you feel confident in?

One hundred ten percent yes. The biggest thing that they said is, we will save marine lives, special ops lives, with this aircraft; let us do our work. They were of the opinion that they could continue to fly the aircraft as they were making the modifications. Obviously, they had an attitude situation where you would expect that to some degree, or maybe you would not expect that.

Afterwards we went out in the audience and talked to some of the families of the victims and to a person, with tears in their eyes, said keep going, keep going with this aircraft, this is what my husband really believed in and fought for. I have about that much of testimony that I sent to some in the media after it that had been very critical of this program. Unfortunately, they did not see fit to print that. But it was very telling testimony, very moving testimony.

I am sorry.

Senator LANDRIEU. That is a very important point.

We have been joined by Senator Nelson. Senator, we gave opening statements and had a round of questions. I do not know if you have a few questions at this time.

Senator BILL NELSON. Most of my questions I would like to save for the closed session, but I would like to ask in the open session your ideas about arming the Predator with the Hellfire. It looks like it is having some obvious success, so do you need some help getting that going?

General HOLLAND. Yes, sir. Senator Nelson, as you well know, the Predator is not a SOF piece of equipment. However, we have been exploiting the technology from the Predator and not only having the ability to use the Predator, to pick out a target, which I am sure if you talk to General Franks—that having that capability and being able to very readily identify and kill a target—is something that is very important.

From our standpoint at Special Operations Command, we are now taking streaming video from the Predator and providing that to the AC–130 gunship, and that is significant. The significance is that as you come into the target, you enter an orbit and you evaluate the target, and all this is happening while you are over top of what could be an enemy stronghold. Whereas with the Predator, we are providing information back to the gunship as it is enroute to the target. They are able to then determine where the actual target is. They are also able to determine whether or not there is enemy in the area and also if there are any AAAs that they have to be concerned about.

So the ability of all the forces to be able to exploit what Predator is bringing to the fight, and then of course Global Hawk, I think this speaks well for the UAVs and what UAVs will add to the fight of the future.

Senator BILL NELSON. Thank you.

Senator LANDRIEU. Thank you, Senator. I appreciate that.

Let me get back to another issue regarding the C–130s. The unit conducting the Commando Solo broadcast missions had planned to modernize, which entails purchasing a new C–130 every year. We are currently halfway there, but the Air Force did not include this in their budget. Can either one of you explain what ramifications this omission might have and give us your perspective on how this will compromise or how we are going to live with this particular decision? Mr. Schulte?

Mr. SCHULTE. Let me talk about that. The unit at Harrisburg basically has six Commando Solos and two kind of straight C–130s, all of which are probably the oldest in the fleet. Today Congress has provided five C–130Js to be cross-decked with the current mission equipment onto these C–130Js and so right now we have five of the eight aircraft scheduled to be replaced. Obviously, eventually we would like to see all eight aircraft replaced, six Commando Solos and two—which would end up being two of the Super Js (not Commando Solo)—would just be slick airplanes.

So that is what we would like to see. It did not make it this budget. We would like to see it in some budget eventually where we can modernize that whole unit.

Senator LANDRIEU. Well, maybe we can try to help make that happen.

Now, you have brought another piece of equipment. We have talked a lot about the radio. Can you share with us about these field binoculars that you brought. Maybe talk to us about how it is used, but also the research and development that played a part in developing it?

Mr. SCHULTE. This is one of, I think, our success stories in process. Can the command respond to a SOF warrior when he really has a need? This was an example. We got a combat mission need

statement in from Afghanistan, I think it was in probably mid- to late-October, and they basically said: We need a different laser range finder.

Basically, we have a very nice unit that SOF bought several years ago called the SOFLAM. General Holland talked about it and it is a Laser Acquisition Module. So basically what SOFLAM does is allow the SOF operator to designate a target and hold that designation on the target for a laser-guided bomb to come in and hit the target. It works very well, at ranges out to about 10 kilometers. They love it.

However, in Afghanistan, while they were using laser-guided bombs, they were mostly using Joint Direct Attack Munitions, JDAMs, GPS-guided bombs. So putting a laser on a target does not help a JDAM. What you have to do with JDAM is you need a laser range finder that can do a laser ranging to the target and then compute the GPS coordinates of the target.

That is what this device here is. This is a Leika Viper. It is a commercial off-the-shelf item that is made by a company in Switzerland. We were able to get 20 of these items. From the time the requirement was approved, which was within 2 days of us getting it, we had 20 items in Karshi-Khanabad in 7 days. They were into Afghanistan within days after that.

Basically, what this does is like a set of binoculars, it has a laser-range finder, it has a magnetic compass in it. It has a cord that plugs into a normal GPS that the soldiers already have. What it does then is it lases to the target, it gives you the range, elevation, and azimuth with the electronic compass, and then that information goes into the GPS receiver and it computes, because it knows where it is. It now knows relatively where the target is and it computes the GPS coordinates.

This is how—then they could use the MBITR and call the coordinates up to the B–52 or F–18 or F–14, or whatever happened to be overhead at the time, and then call the targets in.

So the process that USSOCOM has to react very quickly to a combat mission need statement—48 hours from the time the command gets it, the DCINC approves or disapproves a combat mission need, 48 hours. In this particular case, this was the first one that came in. Our guys know what is out there at all times, whether we own it yet or not. We know what is in the marketplace, and they were able to go out and get these 20 units to the warfighter in 7 days.

Then we got another—I think we bought a total of 96 of them before the end of the year, and all but 20 I think went over there.

Senator LANDRIEU. I would glean two things from what you said and if this is too simple, correct me. I am really determined to find a better process or to perfect the process we use, because I truly believe it will save lives and make our Nation much more secure. You have identified that one thing you do, is ask the warfighter what they need, and then you are very aggressive, you have a team of people very aggressive in knowing what is out there. When you mean what is out there, not only what we have developed internally, not only what traditional contractors have or plan to develop, but what literally is on the shelf, not just in the United States but in the world, in terms of technology that could be applied to that

request, that plea. It really is a plea. It is more than a request; it is, please, give me what we need to win this war.

That is basically the system you use and you have shown this as an example of that. Is that oversimplifying things?

Mr. SCHULTE. I think that is very accurate. I think the warfighter in this case—we knew about this piece of equipment, but so did the warfighter. They came back and said, this is what we need and we need it right away. Laser-guided bombs probably cost $50,000 or $100,000 a kit to put onto a bomb and a JDAM is $18,000, so it is also cost effective from the warfighter's viewpoint.

But our guys said, hey, what we really need is this kind of a thing and there is a couple of them out there and this is the one we are interested in; how fast can you get it? Well, we can get it pretty fast.

One of the things we did when Operation Enduring Freedom first broke—and I give a lot of credit to my contracting people—is that we wrote a blanket justification and authorization (J&A) for sole source procurement for urgent and compelling need for any requirement to support Operation Enduring Freedom in Afghanistan. So as soon as a requirement came in, as soon as it got approved, our program managers and contracting people could go right out and buy it. We did not stop. We did not even stop to compete anything. If it was an urgent and compelling requirement for a soldier on the ground, then that is what it was and they were cleared to go.

We got all of our priorities raised in the defense logistics system. We went to the front of every line in the priority system and did this J&A in order to speed the process, and it worked very well.

Senator LANDRIEU. I think that is excellent, very powerful testimony and I hope that we can use that.

Senator Roberts may have a few more questions. Senator Nelson may have a few more questions. I do not know if it is necessary to go into closed session, so if the Senators would focus any of their comments. Now, if they do require a closed session we have provided the opportunity for one and you all could let me know through the staffs.

But Senator Roberts, there are a few more questions that you might have.

Senator ROBERTS. USSOCOM mission: to provide U.S. Special Operations Forces to the National command authority, regional combatant commanders, and American ambassadors and their country teams for successful conduct of worldwide Special Operations and civil affairs. Let us take the civil affairs piece. There has been a lot of commentary and I think anybody involved in this knows that if we are going to be successful in the worldwide war against terrorism, we are going to have to assess the needs of the local populations and assist in regards to the infrastructure and provide stability. There has been quite a bit of emphasis in news coverage about this.

Civil affairs units following the Vietnam War for you folks were placed in the Reserve components. My question to you is do you have the civil affairs expertise available to meet these current requirements? Where are we?

General HOLLAND. Yes, sir, we are improving. We are definitely getting better. When I came on as Commander in Chief, USSOCOM when I looked at the qualifications of our people in civil affairs and it was about 58 percent. We have done much to go the next step. The first thing that the United States Army Special Operations Command has done is to make sure that they have the right equipment. We went through a period of time where our civil affairs people would get that equipment that was left over after we took care of all the Active-Duty Force, and if you have noticed what we call it is a BOIP. It is a basis of issue plan (BOIP). We have now expanded that to include our civil affairs people, to ensure that they have the right type of equipment that they need to do the job.

We have also doubled the training opportunities there at Fort Bragg. The last word I had is we were over 70 percent on our mission qualifications. So over this past year we have put an increased emphasis on this because, just as you said, Senator, we need to have that capability. As you start at the front-end of a warfight, as you transition, you need to have people that understand democracies and infrastructure and how we can work with the international community to go to the next step, the expertise that they bring to that is very important.

Senator ROBERTS. Is that unique to Special Operations? That is one heck of a broad challenge. Some people even think it cannot be done. You have to make the effort. But is that unique to you in terms of the other services?

General HOLLAND. Yes, sir. The civil affairs is located within United States Special Operations Command. However, the Marines do have a small capability that is embedded within the Marine unit as well.

Senator ROBERTS. But it happens anyway.

General HOLLAND. But it happens, yes, sir.

Senator ROBERTS. It would seem to me that we are going to have to really focus on that if over the long term you are going to be successful.

Senator LANDRIEU. Could I interject something here?

Senator ROBERTS. Yes, certainly. Yes, ma'am.

Senator LANDRIEU. It occurs to me that while we are thinking about that we could maybe apply the same methods we used to get the best technology to the warfighter to get the best human potential to our civil affairs by thinking a little creatively outside of the box. We need a new paradigm about getting the right kind of people with the right kind of skill sets, since we have had so much success with getting the right kind of people to the battlefield. I believe that civil affairs is going to be a growing, important part of Special Operations, not only to win the war but secure the peace so the war was worth fighting for first. Second, to get civil affairs involved perhaps to prevent the destruction that happens on a battlefield if your civil affairs is successful, which is another very important way of looking at why that investment, if done correctly, could be so crucial to the saving of lives and winning the wars before they start.

But General, I do not know if you or Mr. Schulte want to comment about that general thought. Then the Senator has another question, I believe, on another subject.

General HOLLAND. Let me just make a few comments. When you talk about civil affairs, many of the times we have operated as a joint task force and after we had engaged the target, we would then call in civil affairs. What we find is that we need to have civil affairs, they need to be involved at the beginning, because how do they know what needs to be the end game? They need to be involved up front.

We also realized that we had a shortfall on the active duty side because we cannot continue to come back and keep engaging our Reserve civil affairs people. So we have now plussed up the active duty. Right now we also have an initiative with General Shinseki in the Army to see what the next step would be.

But the amount of increase is about 1,100 more civil affairs people on the Reserve side and, in active duty people I think it is about 300 or 400 people because we understand exactly what you just said. We also see a probable increased role of civil affairs. We also need to make sure that they have the right equipment so that they can do their job.

Senator ROBERTS. Is that in the budget or is that on the unfunded list?

General HOLLAND. No, sir, we did this last year. This was something that we had worked and we were able to cross-walk those over.

Senator ROBERTS. We have, finally, a Joint Forces Command's first major joint field experiment. It is called Millennium Challenge 2002, short MC02, as of this summer. I am taking it for granted that you are going to be a part of that. What role will you play in that and what role do you envision for Special Operations in future joint experiments?

General HOLLAND. Yes, sir. I see a very active role on our part. We are working very closely with General Buck Kernan, because a lot of this has to do with getting the information to the warfighter. It is also how do we operate better in a joint environment and how we can share joint capabilities better than what we have in the past.

A lot of the experimentations were put into it—and I will let Mr. Schulte talk that part of it. But as I talk to all of our commanders, I want to ensure that we are there as we go through the actual Millennium Challenge 2002, because for our future it is going to be very important we understand how this joint warfight is going to work even better, especially when you talk about interagency, the collaboration, and how can we break down stovepipes and be able to use all the information that is available to be able to then focus that information to where it needs to be once we get into the crisis.

Senator ROBERTS. Madam Chairman—pardon me, Mr. Schulte—we have tried to get this funded and found opposition. Not only in this body but more especially in the House, to any Joint Forces Command exercises, thinking that they were not needed—well, "not needed"; they did not rate top priority, as opposed to a service-oriented exercise, which I understand. It is more traditional. It has been like heels dragging to finally get this done in terms of the

Joint Forces Command, and it took a war and the realization that everything will be joint that I can possibly imagine in any exercise in the future. So I certainly applaud your statement.

I think I have reached the end of the questions that I would like to ask.

General HOLLAND. Senator Roberts, I think Mr. Schulte would like to continue on on the experimentation.

Senator ROBERTS. I am sorry. Please proceed.

Mr. SCHULTE. We are participating in Millennium Challenge. There is a Pathfinder ACTD, advanced concept technology demonstration, that is going to work with robotics and remote sensors and things like that. We are very interested in Pathfinder, and we are working with the Marines on that. The Marines are also very interested in the robotics and remote sensors kind of thing. So that is one if the things specifically we hope to get out of Millennium Challenge for us.

That is all I have.

Senator LANDRIEU. Great. Thank you very much.

Senator Nelson.

Senator BILL NELSON. Our troops performed very well on this most recent battle, but there were some surprises: the enemy troop strength, their willingness to fight, the amount of ammunition that they had, and the fact that we relied on a lot of the Afghan fighters to take the initiative. We had to compensate for a lot of surprises, and we did it exceptionally well and are still doing it very well, which certainly speaks well of all of our operation there.

My question to you is what do we need to do so that we do not have those surprises?

General HOLLAND. Senator Nelson, I would like to say that we will never have any surprises, but, as you well know, I think there are always going to be surprises on the battlefield. Obviously, we can never underestimate the enemy, and especially this enemy, because this enemy is very well committed.

But I think as we continue to look at—this goes back to the experimentation, the things we are doing with Joint Forces Command. How do we get better intelligence? In any operation, it always comes down to do you have the actual intelligence to go to the next step. This is one of those issues on intelligence, and having the right intelligence at the right place at the right time and, if we have that intelligence, to ensure that the people who need it that are forward have it so they can either adjust their course of action or realize that there is a better way to accomplish the mission.

But as far as our people in that particular operation, I do agree with you they performed superior in the eyes of what happened. We appreciate your comments and I know that General Franks feels good about the way that they operated.

Senator BILL NELSON. They certainly did. They performed superbly. My question for closed session, Madam Chairman, is why did we not have the intelligence. As I understand it, you are not going into closed session, so we will submit that in writing.

Senator ROBERTS. Could I have a follow-up on that? Without the closed session, but part of what we do on the Intelligence Committee as we overlook September 11 in a joint effort with the House

is to go back several years, all of the warnings that we had from all of the commissions, the Bremmer Commission, the Gilmore Commission, the Hart-Rudman Commission, the CSIS study, and all those folks who gave us the warnings that I repeated and that other members of the subcommittee repeated.

As we went through Khobar Towers and the embassy bombings and the U.S.S. *Cole* and the bombing of the Khartoum chemical plant, what I described as the "Oh my God" hearings, how did this happen, it seemed to me that our collection capability was simply outstanding—the leap-ahead technology that we are now using, which perhaps we did not before, but there were some hurdles there and I think we have overcome those hurdles. But the analysis, the productive analysis, thinking out of the box, avoiding risk aversion, seems to me to be the area where we were deficient.

That is the area where it took place, an example being the India-Pakistan nuclear testing. The new party that took control of the government there had that as their number one campaign promise, and yet when we asked the people that allegedly were experts in the field, why on earth did you not think they would do that, well, we just did not think that they would do that.

As you well know, with this kind of an enemy, we could list 100 different things, Madam Chairman, on what we think would happen next and they would do 101.

So what is your opinion in regards to where we are now, Special Operations-wise, with the productive analytical ability of the intelligence we have, not so much the collection but the analysis part of it?

General HOLLAND. This is one area, Senator, I think that we need to continue to keep in focus. We have established the Special Operations Joint Inter-Agency Collaboration Center, and this is really about collaboration, where everyone shares the information above the table on exactly what everyone is seeing at a particular location and then having the operators involved with that to be able to make the assessments that you talk about.

Now, I think we are better than we have been in the past. I see more collaboration going on today than what I certainly saw either 4 or 5 years ago when there were other operations that we were involved with. So we are getting better. Are we as good as we need to be? No, but I think this goes back to the experimentation, Joint Forces Command, because this is one area that will also be highlighted during the Millennium Challenge 2002.

Senator ROBERTS. I appreciate that very much. Thank you.

Senator LANDRIEU. Let me follow up, just two questions. The hearing has been very good and I thank you for your time. But along that same line, some of these joint training programs, this particular combined exchange program called JCETS, something that has to be vetted through the State Department, only working with countries that we approve of their human rights records. My question for the record is can you comment on the quality of cooperation and responsiveness the State Department is giving you in terms of vetting the training programs? Are these requests, your requests, being properly expedited in your opinion?

General HOLLAND. Madam Chairman, I think the way that I would like to answer that is when we originally had the restric-

tions, it was very much what were the procedures and how do we come up with the procedures to meet the compliance of the law. Since we have been in the business of the Joint Combined Exchange Training under that new system and I know that since I have been in command, we have not had one that has been disapproved because of the human rights vetting restrictions.

But it is an area that we are going to continue to work. It is an area that we are going to continue to make sure that if there are some countries that maybe we need to be involved with and work a plan through the Secretary of Defense to make sure that we are at the right places—as I made the comment earlier, we are in 122 countries. Have we been in the right 122 countries over the last year? That is a question that I think each of us need to pose.

It goes back to what Senator Roberts had talked about, when you talked about maybe there are 100 things that we see that they are doing and they do the 101. How many of us ever predicted that we were going to be in Afghanistan? How many ever predicted when we went into Iraq? How many predicted when we went into the Balkans and Kosovo?

So it appears that every time that we get together and we think, well, this is the place where we need to be prepared next, we end up going to another location. It is an area we need to continue to put emphasis on. The Joint Combined Exchange Training provides a wealth of experience for our people, not only in the cultural awareness, the language capabilities, the opportunity to operate with another nation but in developing the trust and confidence that they would need to be able to do what we did in Afghanistan.

So it is the same process and they learn that process in another country. Yes, they applied it well as they went into Afghanistan. But it is those types of programs that are going to continue to be very important for us as well as the regional commanders in chief. Each of those combined exercise training scenarios come from the theater CINCs and they want us to be involved and we work that back through the theater CINC on our security cooperation in those areas.

Senator LANDRIEU. Let me follow up. You said you have not yet been denied, but my question was are requests properly expedited in your opinion. Are your requests expedited? Are you losing time through the process that we have established, or should we be concerned at all about that?

General HOLLAND. I think there have been some that maybe have slowed, but it is not something that I think that at this point I want you to worry about until we look into it, because I think we are better in the process than we were. We understand what is needed and we are complying with that. If that becomes an issue, then we will certainly get back to you and the committee.

Senator LANDRIEU. Thank you. My final question is, because the chairman of our committee is very interested in these Standoff Explosive Detection Systems, which have shown some promise, Mr. Schulte, and could protect our soldiers in the battlefield as well as protect our homeland and our civilians here. Can you just give us a brief update of the efforts, how is it proceeding, what kind of potential do you see for such technology?

Mr. SCHULTE. Actually, we are working a combat mission needs statement for a standoff explosive system right now. It came out of Karshi-Khanabad very early on, probably in early November. We are almost finished with this. What we are trying to do is marry up a robotic kind of a system with a sensor that you could send this out, for example to a truck that might be coming onto the post or something. In this case it was Karshi-Khanabad, but it could be anyplace.

We are pulling that together now. We should have that pretty much ready to go here in the next month or so. So we are working those kind of systems. The warfighter is saying, hey, I need this for force protection to try to do that. But we can always use and will always continue to work on better sensors. How close do you have to get in order to be able to sense that there is an explosive there or any of that kind of stuff? It has been something that we have been working on and we will be delivering a system here in the next couple months.

Senator ROBERTS. How many agencies are involved in this?

Mr. SCHULTE. I do not think I can answer that, sir.

Senator ROBERTS. There are six.

Mr. SCHULTE. OK.

Senator ROBERTS. Six agencies. One of the things that I think that the chairman and I will be interested in is what happens with the GAO report when we try to take a look at early detection and sensors in regards to how many agencies are involved and where, how, and at what cost.

But you are pretty confident in regards to your specific needs or your missions that you are on the right track?

Mr. SCHULTE. Yes, sir, for this limited capability that has been requested by the warfighter.

Senator ROBERTS. I see.

Thank you.

Senator LANDRIEU. Thank you. That finishes our round of questions. Again, it has been a great hearing. We have learned a lot of important truths I should repeat for the record: Humans are more important than hardware; quality is better than quantity; Special Operations Forces cannot be mass produced; and competent Special Operations Forces cannot be created after emergencies occur.

We have also learned that we need batteries, light, long-lived and reliable, and we are looking for some.

Thank you all. We have had a good hearing. We are adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR MARY L. LANDRIEU

PROCUREMENT

1. Senator LANDRIEU. General Holland, much of the procurement funding in your budget request is allocated for upgrading helicopters and purchasing and modifying AC–130 gunships. What is the requirement/rationale for two new AC–130s?

General HOLLAND. The requirement for the AC–130U gunship was established through the Operational Requirements Document (ORD), titled AFSOC 06–87–I–III, AC–130 System Operations Requirements Document (SORD), dated April 10, 1989. The ORD was revised in 1994. The current title is AFSOC 06–87–I–III–A, AC–130U Gunships, dated January 4, 1994. When this ORD was written, the Air Force Special Operations Master Plan called for [deleted] worldwide. The requirement is based on theater engagement plans and included conventional and unconventional missions. Due to USSOCOM resource constraints, only 13 AC–130Us were procured.

The current requirement for the number of AC–130s is established through our 2 year Strategic Planning Process (SPP). During this process USSOCOM determines the "Objective Force" needed to meet theater CINC requirements. During fiscal year 1999–2000 the SPP determined the AC–130 Objective Force for fiscal year 2002–2007 to be 25. Due to fiscal constraints, USSOCOM did not attempt to increase AC–130 force structure from 21 aircraft to 25 in the fiscal year 2002 President's budget. The latest SPP conducted in fiscal year 2001–2002 revalidated the AC–130 Objective Force of 25 aircraft for fiscal year 2004–2009.

2. Senator LANDRIEU. General Holland, what is the plan for employing the AC–130s and for servicing them with spares and additional crew?

General HOLLAND. The new AC–130s will be added to the current Special Operations fleet at Hurlburt Field, Florida, and will be integrated into the existing AC–130U squadron, the 4th Special Operations Squadron. Employment of the AC–130s will follow employment guidelines for the existing fleet, that is in the following roles: Close Air Support/Troops in Contact; Armed Reconnaissance; Interdiction; Convoy Escort; and other missions. The current infrastructure at Hurlburt Field (maintenance, supply, and training infrastructure) will support the additional aircraft, their servicing requirements, spares, associated crewmembers, and support personnel. Additional spare parts will be procured along with the additional aircraft. The fiscal year 2003 President's budget added the necessary flying hours and manpower to sustain and operate the additional aircraft. Growing the additional crew force and maintenance personnel necessary to fly and fix these additional aircraft will take time, but can be accomplished to meet the delivery timeline for the aircraft.

3. Senator LANDRIEU. General Holland, the associated funding for crews and spares included in the budget request is sufficient for how many additional AC–130s?

General HOLLAND. The funding provided in the fiscal year 2003 President's budget is sufficient to add aircrew, maintenance personnel, flying hour costs, and contractor logistics support (CLS) for four additional AC–130U gunships. The fiscal year 2003 President's budget also contains funding to procure two new C–130Js for the Air Force in exchange for two C–130H2s, which will be modified to the AC–130U configuration. The modification costs for these two aircraft are also contained in the fiscal year 2003 President's budget. Additionally, related funding designated in the "Cost of War" account is sufficient to procure two more new C–130Js for the Air Force in exchange for two C–130H2s, which will also be modified to the AC–130U configuration. The Cost of War account also includes the modification costs for these two aircraft. Together, the fiscal year 2003 President's budget and Cost of War account fund a total of four additional AC–130Us, support costs, and associated force structure.

4. Senator LANDRIEU. Mr. Schulte, special operators have complained perennially about the quality of the rucksacks they carry on missions. In addition, most Special Operations Forces would prefer to be able to purchase cold weather and other personal gear off-the-shelf. What is being done to address complaints about rucksacks?

Mr. SCHULTE. The Special Operations Acquisition and Logistics Center is conducting research on obtaining better rucksacks. In March of 2002, the Program Executive Officer for Special Programs gave the Special Operation Project Office at the Natick Labs, Research and Development Division, $100,000 to conduct preliminary research for rucksack improvements or replacement. Concurrently, we are working with our component commands to better define the requirement from the users. As with all personnel equipment, it is very difficult to find solutions every operator can agree on, however, the current rucksacks have received across-the-board complaints. The United States Special Operations Command has not waited for a formal requirement change to the current rucksack and has begun looking for improvements.

5. Senator LANDRIEU. Mr. Schulte, what are the restrictions on purchasing commercial off-the-shelf (COTS) equipment?

Mr. SCHULTE. There are no specific regulatory restrictions on purchasing COTS items. In general, decision-makers, users, and program managers first consider the procurement of commercially available products, services, and technologies, or the development of dual-use technologies, to satisfy user requirements. Urgency, highly sensitive mission requirements, or unique specifications challenge and restrict the USSOCOM's ability to exclusively acquire commercially developed items. Through market research and analysis, USSOCOM determines the availability, suitability, operational supportability, interoperability, and ease of integration of existing com-

mercial technologies and products and of non-developmental items prior to the commencement of a development effort.

6. Senator LANDRIEU. Mr. Schulte, is the Command pursuing such an option on COTS purchasing? How is this reflected in the budget request?

Mr. SCHULTE. Definitely yes. The USSOCOM has a very active process of finding and purchasing COTS and non-developmental item (NDI) hardware and software satisfying our operational requirements. USSOCOM conducts market surveys and combat evaluations (where we try samples of items before buying in quantity), and hosts an annual Advanced Planning Briefing to Industry (attended by over 240 companies) where we share our requirements and the companies share their projects and capabilities with our commanders and operators. USSOCOM issues announcements for sources sought for SOF requirements and holds industry days to explain SOF requirements and obtain industry input. Recent examples of successful COTS/NDI purchases that have been delivered to the troops on the ground in Afghanistan include nearly 100 4x4 trucks and all-terrain vehicles, 8 portable video teleconference sets, and nearly 100 hand-held laser targeting devices. Other examples of COTS purchases that are greatly shortening our acquisition delivery cycle include off-the-shelf computers and peripherals required for tactical local area networks in our TACLAN program, and the off-the-shelf hull and engine we are procuring for our Special Operations Craft-Riverine (SOC–R) program. USSOCOM continually seeks COTS/NDI sources for all of its non-developmental requirements, however the purchase of COTS is not specifically reflected in the budget request. There is no unique appropriation specifically identified for the purchase of COTS/NDI.

7. Senator LANDRIEU. Mr. Schulte, in addition, Air Force special operators working in the field with Army special forces and Navy SEALS state that they have lower quality night vision devices and smaller SATCOM antennae. How does the budget request address these discrepancies?

Mr. SCHULTE. All components of the USSOCOM are fielded with the most advanced night vision devices technology has available. The world of visual augmentation is rapidly changing and the advances in technology are an evolutionary process. Systems fielded this year will not appear to be as capable to those fielded next year, but the systems that are procured, fielded, and maintained within all SOF components are in compliance and meet the stated requirements at the time of production. The same goes for SATCOM antennae. Initially fielded versions may not be as capable as our most recent procurements, but both meet the stated requirements at the time of procurement. The real question posed here is whether the budget request adequately addresses the perceived discrepancies, to which the only solution is providing enough funding to completely outfit SOF with the same item in the same year. As long as we have fiscal constraints and the advancements in technology continue, however, there will always be various versions of equipment with inherently different capabilities as systems are procured over several fiscal years. That is the nature of the evolutionary acquisition cycle and technology insertion process. We strive to maintain a high state of readiness, provide our SOF operators with the best equipment available, and field to our components in accordance with approved, prioritized fielding plans.

8. Senator LANDRIEU. Mr. Schulte, will omni-directional antennae be available to more Special Operations Forces units?

Mr. SCHULTE. Omni-directional antenna are provided with all SOF fielded tactical radios such as the Multi-Band Intra Team Radio (MBITR) or Multi-Band Multi-Mission Radio (MBMMR). Tactical antenna present design trade-offs, with antenna weight and cube constraints ["must fit in rucksack"] often-compromising optimum performance. Single-antenna, when operated in wide-band radios, usually offer performance that is adequate across the entire frequency band, yet may not optimize performance across the entire band. Presently, SOF acquisition is staying apprised on new antenna technologies on omni-directional antenna for use with our current and future multiple frequency bands radios to improve antenna efficiency and effectiveness. To date, the USSOCOM has no new requirements or funding to procure any SOF unique omni-directional antenna. SOF Intelligence applications with omni-directional antenna include the following systems:

Privateer

MK–V: Bobcat Omni-Directional ELINT Antenna; MA–717 Omni-Directional Whip COMINT Antenna

Patrol Coastal: Bobcat Omni-Directional ELINT Antenna; AS–4293 Omni-Directional COMINT Antenna; AS–145 Omni-Directional HF Antenna

Sentinel: Currently there is no Omni-Directional Antenna installed/associated with the Sentinel system, however, an Omni-Directional DF Antenna will be installed on the AC–130H, AC–130U, and MC–130H aircraft. The current schedule for the Production Installation is as follows: MC–130H: March 2003; AC–130U: June 2004; AC–130H: September 2004.

QUESTIONS SUBMITTED BY SENATOR JEAN CARNAHAN

ACCELERATING TECHNOLOGY DEVELOPMENT

9. Senator CARNAHAN. Mr. Schulte, the Special Operations acquisition staff and troops they serve share something in common: the ability to move with impressive speed. The time it takes for you to go from technology development to acquisition is faster than that of any other command in our military. Why is this "accelerated technology transition" so important to SOCOM? Perhaps more importantly, describe how SOCOM is able to accomplish it—in other words, how is it you are able to bring technology "from concept to combat" so rapidly?

Mr. SCHULTE. The USSOCOM considers itself to be a "user" of technology rather than a "developer" of technology. We, as an institution, have become most adroit at adapting and modifying the technology developed by others within the government and commercially to meet SOF needs. Additionally, we use our relatively small size to our advantage. For instance, our chain of command isn't nearly as long or complicated as the Services. Because it is shorter we can get to the user, the Ranger or the Special Forces troop, the individual SEAL, or Special Tactics airman quickly to test, evaluate, or get/give input on specific technology. Moreover, the urgent strategic/sensitive nature of our missions, coupled with extremely short preparation time before execution (of operations), dictates we maintain a technological edge over our adversaries. Most of the technology we adapt is already in the BA 2 (Applied Research)/BA 3 (Advanced Technology Development) category. We also accept the 80 percent solution, use rapid prototyping techniques and manage risk with trained managers to further expedite the technology push. Lastly, we can field equipment faster than the services in that most SOF equipment is low-density—tens or hundreds vice tens of thousands.

10. Senator CARNAHAN. Mr. Schulte, Special Operations Forces have always performed impressively on what sometimes appears to be a "shoe-string" budget. You will see an increase in your 2003 budget; however, some items will be decreased. Your budget for earlier stage development of new technologies has been cut by more than half. It drops from $14 million to just $6.7 million. This must have some effect on future capabilities. Describe the impact this significant decrease in early stage development funding will have upon your ability to execute your mission.

Mr. SCHULTE. In fiscal year 2002 our budget request for "Applied Research" Special Operations Technology Development (SOTD) was $7.606 million. We did, however, receive $12.9 million in Congressional Plus-Ups in fiscal year 2002 for the SOTD program. Our projected budget for SOTD in fiscal year 2003 is $6.741 million, a reduction from the base program of some $860,000 for the upcoming fiscal year. The reduction will force the USSOCOM to reduce its level of effort on SOTD projects so it can focus on higher priority, nearer term needs. We must carefully prioritize, on-going projects and future technology nominations. We must also place more emphasis on forecasting which technologies offer the biggest "bang for the buck" for the operating SOF. Lastly, this reduction will delay the development of some key technologies, such as, enhanced technologies for SOF weapons (e.g. the M4 carbine), night vision and imaging capabilities (e.g. video imaging device, day/night sniper scope) and improvements in SOF deep penetration air and maritime mobility platforms (e.g. aircraft camouflage/visual and IR signature reduction).

EXPANDING ROLES REQUIRE NEW TECHNOLOGIES

11. Senator CARNAHAN. General Holland, the war on terrorism has required that we expand the role of our Special Operations Forces. It has also required Special Operations Forces to perform this role in an increasing number of countries known to harbor terrorists. As we increasingly rely upon our Special Operations Forces, what new technologies will they rely upon to perform their mission?

General HOLLAND. The war on terrorism will indeed expand the role of SOF around the world in the coming months and years. SOF are simply the right forces . . . at the right time. These forces, and the equipment they will carry, must be the best this country has to offer. It is incumbent upon those of us charged with provid-

ing them the very best equipment to focus on those areas that seem to hold the most promise or provide the greatest hope of technological payoff. Last year the USSOCOM published two planning documents in this area. One of these publications was entitled "Special Operations Technology Objectives (SOTOs)," discussing 40 diverse technologies having SOF interest. These spawned yet a further distillation of ideas with the development of the Technology Thrust Areas (TTAs). The TTAs are a synthesis of the 40 SOTOs into specific areas of SOF interest and offer USSOCOM the greatest opportunity for ultimate operational pay-off by defining and addressing significant technological gaps within the SOF arena, while at the same time identifying opportunities to apply technology in an evolutionary acquisition framework. Defining characteristics include: (1) they are important to a broad range of SOF operators; (2) they are solutions to compelling operational shortfalls; (3) they represent substantial technological opportunities; (4) they represent leap-ahead, non-linear advances in SOF operations; (5) they are difficult but achievable; (6) they are responsive to articulated user needs (U.S. Army Special Operations Command, Naval Special Warfare Command, Air Force Special Operations Command); (7) they are SOF peculiar/SOF unique; and (8) USSOCOM is a willing financial partner in collaboration with industry, academia and/or service labs.

There are a total of nine TTAs. Wide bandwidth/reachback communications key in the SOF arena because the uniqueness of the forces and broad mission requirements place a premium on high wide bandwidth and low probability of interception/low probability of detection communications. They must be extremely long range and possess reliable "reach back" capability so a field operator anywhere in the world can tap into both Defense and civilian databases.

Additionally, signature reduction of both personnel and platforms is key, for SOF personnel and aircraft operating in the enemy's back yard undetected.

Underwater communications must link into existing communications architectures while allowing the operator to communicate with other support platforms thereby enhancing the overall operational situational awareness of each swimmer or platform.

Unmanned systems are increasingly more important. For example, operators will use the entire spectrum of unmanned systems from microsystems to large national assets on air, sea, land and in the future space.

Batteries and fuel cells are another area of concern. For example, the energy sources of the future must be high power, long lasting, give off little or no signature, and provide SOF operators extended operating capabilities without requiring resupply.

Remote sensing is a huge effort within the SOF community. Sensors must be capable of detecting all electronic, acoustic, magnetic, RF, CBR, IR, and electro-optic and electro-magnetic targets in all climates and environments.

Advanced Training Systems must provide the latest in high fidelity, virtual reality mission rehearsal systems for air and maritime platform crews as well as ground operators.

Bioengineering offers the future SOF operator whole new worlds of advanced medical techniques, improved drugs, whole blood substitutes, bio-compatible material for implants, and nano-scale sensors for detection of disease as well as Nuclear, Biologic, and Chemical (NBC) agents.

Directed Energy applications will allow SOF to deliver a tunable (lethal to non-lethal) force against hard and soft targets in any environment.

12. Senator CARNAHAN. General Holland, in your estimation will the proposed 2003 budget sufficiently address our future needs in this counter-terrorist campaign?

General HOLLAND. While fiscal constraints obviously prevent fully funding every agency's complete needs, we feel the 2003 budget will go a long way toward satisfying the USSOCOM's most pressing needs required to meet our objectives in the global war on terrorism. Both Congress and the Department have been very supportive of USSOCOM's requirements to date and we look forward to this continued level of support.

ACQUIRING TECHNOLOGY FROM OTHER SERVICES

13. Senator CARNAHAN. Mr. Schulte, the Special Operations Command is comprised of troops from all branches of the services. Likewise, you depend upon these other commands and services to provide you with various equipment and weapons. For example, I understand that Special Operations Command has requested two additional AC–130 gunships. The regular Air Force will provide the aircraft, and it

will be up to USSOCOM to provide additional technology upgrades. What challenges do you still face in acquiring these large platforms from the major services?

General HOLLAND. The Services have been very supportive of our initiatives and have provided excellent support when we've needed it. Using the additional AC–130s as an illustrative point, we've been closely engaged with the U.S. Air Force (USAF) via the Integrated Product Team (IPT) process. An IPT was formed early on and they are in the process of working many of the salient issues with their service and command counterparts. Leaning forward, USAF already established a process for identifying the specific C–130Hs that will be modified to the AC–130U configuration. The modification program will be managed for USSOCOM by the Aeronautical Systems Center's Special Operations Program Office at Wright Patterson Air Force Base, Ohio. The challenges that the USSOCOM faces in this particular instance are more product-oriented than major Service focused. The challenges in this effort are vanishing vendors, parts availability, fleet commonality, and identification of "donor" aircraft to be modified.

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

UNFUNDED SHORTFALLS

14. Senator BINGAMAN. General Holland, what are Special Operations Forces' unique unfunded shortfalls, by programmatic detail, for RDT&E, procurement, and O&M for counterproliferation over the FYDP?

General HOLLAND. Thanks, in large part, to the outstanding support we have received from the Department and Congress, the command has funded all critical Counterproliferation of Weapons of Mass Destruction (CP–WMD) issues in the budget and program years. If we received any additional funding, we would seek out, and attempt to take full advantage of, possible emerging technology opportunities.

15. Senator BINGAMAN. General Holland, what are Special Operations Forces' unique unfunded shortfalls, by programmatic detail, for RDT&E, procurement, O&M and military construction to defeat hard and deeply buried targets over the FYDP?

General HOLLAND. As is the case with counterproliferation, the command has funded all critical Hard and Deeply Buried Targets (HDBT) issues in the budget and program years. No military construction funds are required. If we received any additional funding, we would seek out, and attempt to take full advantage of, possible emerging technology opportunities in this area as well.

NAVY SEALS

16. Senator BINGAMAN. General Holland, can you please explain the mission requirement for the Advanced Seal Delivery Vehicle and frame that in the current maritime mobility needs for Special Operations?

General HOLLAND. [Deleted.]

17. Senator BINGAMAN. General Holland, would you please explain your plans for a future coastal patrol ship? It is my understanding that the current platform has been returned to the blue water Navy yet it has been a mainstay of the SEAL community for the past 40 years.

General HOLLAND. In 1998, due to fiscal constraints, the USSOCOM decided to reduce the patrol coastal (PC) inventory from 13 ships to 7 by 2004. Subsequently, the USSOCOM Board of Directors approved zeroing-out the complete PC inventory by the beginning of fiscal year 2003. This decision was based on the PC ships continual dedication to a USSOCOM collateral mission (Counter Drug operations) and the dependency on the Navy for protection, command and control, and the ships' manning. The SOF primary mission return on our dollar investment was minimal and therefore relegated the PC program to a financial drain we no longer considered fiscally prudent.

USSOCOM does not currently plan to replace the PC. Our Navy Component, the Naval Special Warfare (NSW) Command, is still working on its Integrated Mobility Assessment for 2010–2030, and will address this issue in its final volume late this summer. One preliminary finding is concurrence among all of the Theater commands, Commanders in Chief, Theater Special Operations Commands and Fleet forces of the need to explore two potentially different concepts: a long-range maritime mobility asset, and a mobile forward-operating base (or mother ship). Recent

operations in the global war on terrorism have also identified a requirement for all U.S. Navy combatants to be better prepared to host NSW mobility assets.

DOD/CIVILIAN INTELLIGENCE INTERACTION

18. Senator BINGAMAN. General Holland, Special Operations Forces are the critical bridging element between the traditional DOD and the civilian intelligence community. Traditionally, this interface was shunned by the conventional military. Our 21st century conflicts show that this interaction will be more highly valued than in the past. How does Special Operations Forces envision itself in the future interacting with the operational elements of the civilian intelligence community?

General HOLLAND. SOF will continue to team with its intelligence community counterparts to prepare the battlespace for future conflicts, both conventional and asymmetrical. The intelligence community often provides access to hostile areas and the means to collect actionable intelligence. SOF brings the special military skills to set the operational conditions for success of follow-on main forces through reconnaissance, force reception, terminal guidance, and other advance force activities. The USSOCOM is also seeking to expand its own capabilities to conduct unilateral sensitive special operations abroad, when directed, with minimal reliance on other government agencies. This will involve the development of clandestine infiltration means to gain access to areas otherwise inaccessible to military forces.

19. Senator BINGAMAN. General Holland, are there any specific organizational shortfalls in deploying Special Operations Forces to support civilian intelligence missions or vice-versa?

General HOLLAND. Lessons learned in the global war on terrorism thus far indicate SOF need additional personnel and delivery systems to both meet its standing commitments and augment the operational elements of the civilian intelligence community. Particularly acute is the shortage of aircraft capable of operating in harsh environments across the spectrum of special operations. Operators fluent in Arabic and Middle Eastern languages remain a chronic shortfall. Also, the USSOCOM has a shortfall in certain sensitive tradecraft resources necessary to conduct clandestine activities.

20. Senator BINGAMAN. General Holland, are there any changes in existing law that would facilitate, under proper oversight, the integration of Special Operations Forces to support civilian intelligence community missions and vice-versa?

General HOLLAND. Generally speaking, SOF are able to support civilian intelligence community missions and vice-versa without any unacceptable legal impediments from Executive Order 12333 (U.S. Intelligence Activities), Title 50 USC 413 et seq (Accountability for Intelligence Activities), or Title 50 USC 1541 et seq (War Powers Resolution). Although we interpret Title 10 to provide SOF with its own unilateral, non-intelligence role in preparing the battlespace prior to a crisis, the above provisions are sometimes perceived as inhibitors to that mission. It is also unclear the extent to which sensitive special operations may be conducted abroad under the authority of Title 10 alone.

OPERATIONAL SHORTFALL

21. Senator BINGAMAN. General Holland, Special Operations Forces are at peak operational tempo and have been since the 1990s. What military personnel levels, in grade, by service, would you recommend over the next 10 years to alleviate this operational shortfall?

General HOLLAND. Thank you for the opportunity to address your concerns about SOF force structure. Among the USSOCOM's most important Service-like responsibilities, is building and programming the force. USSOCOM has developed a Strategic Planning Process (SPP) that parallels the procedures used by the Services. Our force structure development begins with National and Defense planning guidance and Illustrative Planning Scenarios (IPS) used by the Services. At the conclusion of the force structure build phase of the SPP, USSOCOM publishes the Objective Force list. The Objective Force, though constrained, is USSOCOM's stated force structure requirements throughout the Future Years Defense Program (FYDP). This process is repeated every 2 years and looks out 5 years. I have a high level of confidence that the information provided below will accurately address your question. Table A layouts the current force structure for Program Objective Memorandum (POM) 2002–2007. Table B is a compilation of validated requirements identified from the USSOCOM SPP 2004–2009 and recent force structure requests from our

Component Commands. A detailed listing of the type units is at TAB A. We are working closely with the Services to incorporate several of these force structure initiatives into the POM 2004–2009 submission. The POM 2002–2007 programmed force combined with the force structure identified in Table B will close the gap between the current force and the Objective Force for all major combat and combat support units. We believe that given this level of resourcing, USSOCOM will be better postured to meet the long term demands of prosecuting the global war on terrorism and relieve some long standing OPTEMPO/DEPTEMPO pressures.

Mil Type	Fiscal Year					
	2002	2003	2004	2005	2006	2007
Army Officer	6,085	6,164	6,166	6,168	6,168	6,168
Army Enlisted	20,719	21,182	21,280	21,373	21,373	21,373
Air Force Officer	1,945	1,960	1,994	2,340	2,076	2,086
Air Force Enlisted	8,562	8,775	8,977	9,323	9,517	9,562
Navy Officer	1,083	1,041	1,050	1,050	1,050	1,050
Navy Enlisted	5,277	5,043	5,100	5,100	5,100	5,100
Marine Officer	24	24	24	24	24	24
Marine Enlisted	25	25	25	25	25	25
Totals	43,720	44,214	44,616	45,403	45,333	45,388

Table A depicts current programmed force for fiscal year 2002–2007.

Mil Type	Fiscal Year							
	2004	2005	2006	2007	2008	2009	2010	2011
Army Officer	274	376	424	510	510	619	619	824
Army Enlisted	788	1,480	1,638	1,912	1,912	2,636	2,636	4,217
Air Force Officer	61	61	61	161	161	161	161	161
Air Force Enlisted	43	43	43	943	943	943	943	943
Navy Officer	33	33	51	51	51	51	51	51
Navy Enlisted	262	262	373	373	373	373	373	373
Marine Officer	0	0	0	0	0	0	0	0
Marine Enlisted	0	0	0	0	0	0	0	0
Total	1,461	2,255	2,590	3,950	3,950	4,783	4,783	6,569

Table B depicts additional USSOCOM force structure requirements.

TAB A—Additional USSOCOM Force Structure Requirements:

Army Active Component

U.S. Army John F. Kennedy Special Warfare Center and School Instructors
1 x Special Operations Aviation Battalion
1 x Special Operations Aviation Battalion
Ranger Regiment (Snipers/Medics)
Joint SOF Command and Control (C2) Headquarters Requirements
1 x Special Operations Support Battalion (Reserve Component)
Special Forces Group Redesign
112th Special Operations Signal Battalion (TO&E)
Special Forces Group Chemical Detachments
2 x Regional Psychological Operations (PSYOP) Companies
2 x Civil Affairs Companies
Headquarters U.S. Army Special Operations Command
Corps SOCCORD

Army Reserve Component

4 x Regional PSYOP Companies
Special Operations Support Battalion

U.S. Air Force

Special Operations Liaison Element
Weapons Instructors Course
Air Crew Training Operators Course
Language Training Course
10 x MC–130 Tankers

U.S. Navy

2 x Mission Support Center
2 x Combat Service Support Teams
1 x Regional Survey Teams
1 x SEAL Team
1 x Advanced SEAL Delivery System (ASDS) Platoon
Advanced SEAL Training
Advanced Combat Crewman Training
Advaned SEAL Delivery Vehicle (SDV) Training

Joint SOF

USSOCOM buyback of 15 percent Headquarters Reduction
Full support to Joint Special Operations Command (JSOC) command and control initiative
Special Operations Command-Central (SOCCENT) Forward Detachment Initiative

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QUESTIONS SUBMITTED BY SENATOR RICK SANTORUM

193RD SPECIAL OPERATIONS WING OF THE PENNSYLVANIA AIR NATIONAL GUARD

22. Senator SANTORUM. General Holland, the 193rd Special Operations Wing of the Pennsylvania Air National Guard was one of the first units to be engaged by the National Command Authority in the current war on terrorism, and is flying combat missions daily in Afghanistan. The "Commando Solo" mission spearheads the administration's coalition on public diplomacy in the coordinated effort by the Department of State and Department of Defense in the war against terrorist organizations worldwide, enhancing security at home.

With its unique electronic warfare capability, the 193rd Special Operations Wing at Harrisburg International Airport is the most highly deployed flying unit in the entire Air National Guard. The unit conducts information warfare missions such as psychological operations; civil affairs radio/television broadcasts; command, control, communications, countermeasures; and limited intelligence gathering.

The current EC–130E fleet consists of six aircraft configured for "Commando Solo" and two for another mission, "Senior Hunter." These highly modified C–130Es have been in service for 30 years, and at the current operational tempo are rapidly reaching the end of their service life. Leadership within the Pennsylvania Air National Guard have concluded that the C–130J—in the EC–130J configuration—is the best platform to replace the EC–130E aircraft.

How important is the 193rd Special Operations Wing to the war ongoing in Afghanistan?

General HOLLAND. Commando Solo aircraft conducted psychological operations (PSYOP) to include broadcasts in AM, FM, and military communications bands. A typical mission consists of a single-ship orbit offset from the desired target audience. Commando Solo aircraft were used effectively to broadcast daily PSYOP programs designed to change, persuade, and influence the Afghanistan populace. Additionally, Commando Solo aircraft were the only platforms in the theater of operations with the capability to conduct airborne psychological operations and to do so within the first 2 weeks of the war in Afghanistan. Commando Solo aircraft conducted daily broadcasts during their deployment to the CENTCOM Area of Operations in support of OEF. Commando Solo aircraft continued broadcasting PSYOP programs until late March of this year and were relieved only when land-based PSYOP-specific broadcast equipment could be installed and were fully operational in-country.

23. Senator SANTORUM. General Holland, how important is the mission of the 193rd Special Operations Wing to U.S. Special Operations Command?

General HOLLAND. Commando Solo aircraft are the only specially equipped EC–130E aircraft operated by the Pennsylvania Air National Guard's 193rd Special Operations Wing for the specific mission of broadcasting PSYOP world-wide. Commando Solo aircraft possess the only military capability to communicate to remote and isolated target audiences regardless of terrain and infrastructure limitations. With this aircraft PSYOP messages can be disseminated worldwide in near real time without the ground presence of U.S. forces.

24. Senator SANTORUM. General Holland, what will be the impact to the mission of the 193rd Special Operations Wing if replacement of the older EC–130E aircraft is not aggressively pursued? That is, can the 193rd Special Operations Wing perform its mission with these older EC–130E aircraft?

General HOLLAND. Under the original EC–130J program plan, the 193rd Special Operations Wing (SOW) was estimated to be in split fleet operations (operating EC–130Es and EC–130Js simultaneously) for approximately three years. The current Air Force plan to procure additional aircraft will put the 193rd SOW in split fleet operations for at least 6 years. Extended split fleet operations will be felt in the units training, readiness, and deployment signature (logistics). Although there will be impacts, the unit, in concert with its parent headquarters, Air Force Special Operations Command, will work aggressively to maintain the combat readiness of the unit. The 193rd SOW can and will continue to perform the mission with both aircraft until the conversion finishes.

25. Senator SANTORUM. General Holland, is an additional EC–130J aircraft on the U.S. Special Operations Command unfunded priority list?

General HOLLAND. No sir. This does not mean that the need for additional aircraft is not important to the Command, it is just a matter of limited resources and the knowledge of possible offsets that this Command cannot absorb at this time.

26. Senator SANTORUM. General Holland, to what extent does the Air Force's C–130 modernization plan help or hinder the acquisition of additional EC–130J aircraft for the 193rd Special Operations Wing?

General HOLLAND. The United States Air Force (USAF) and the USSOCOM are taking steps to remedy the disconnect between the traditional EC–130J procurement method (through Congressional adds) and future procurement programs. The new USAF C–130J procurement program helps the acquisition of additional EC–130J aircraft in that no new aircraft were programmed by USAF or USSOCOM in previous years. USAF is helping USSOCOM finish an effort that was started by Congress. It must also be noted that finishing the conversion of the 193rd Special Operations Wing will generate additional modification and sustainment requirements that must be resourced by both USAF and USSOCOM.

SOCOM RESEARCH (6.1)

27. Senator SANTORUM. Mr. Schulte, it is my understanding that USSOCOM has no basic research (6.1) program of its own. Instead, USSOCOM leverages basic research programs in the services, Defense Advanced Research Projects Agency (DARPA), national laboratories, and Small Business Innovative Research (SBIR) programs. Does USSOCOM have an opportunity to provide input during the annual budget process each of the services conducts? That is, can USSOCOM provide any direction or comment on both the type of research being done at the 6.1 level and the level of funding allocated by the services?

Mr. SCHULTE. In the review of the 1992 Defense Appropriations Bill, the Senate Appropriations Committee noted that "USSOCOM must be able to provide their validated SOF peculiar requirements to DOD and other Government technology base development communities for consideration in competitive resourcing, and to enter into cost sharing relationships with the same." In fact, we have not been fully successful in establishing a process to input SOF requirements directly into Service funded science and technology development efforts. We make indirect inputs through our Service Science Advisors as well as a Department of Energy (DOE) representative, who in turn provide indirect input into their respective agency/Service annual budget submission. Also, members of the Advanced Technology Directorate are invited members of various Integrated Product Teams (IPTs) for such entities as the Joint Non-Lethal Weapons Joint Services Small Arms Program, the National Systems Support to SOF (Tactical Exploitation of National Capabilities [TENCAP]), Air Force Research Program (specifically the Special Operations Forces Technology Planning IPT). Our input into the Office of Naval Research (ONR) and their Future Naval Capabilities is made through the Navy liaison in the Advanced Technology Directorate.

Additionally, directorate members are active in the U.S. Army's Technology Base Executive Steering Committee, the DOE Advanced Technology Program (through the DOE liaison officer) and the Defense/DOE Munitions Technology Development Program. Although we have had success on a "one-on-one" basis, our formal involvement is generally limited to one of review and comment, rather than making direct contributions in planing and shaping these science and technology efforts. We believe USSOCOM could benefit substantially if we were to become institutionally involved with the Defense Secretariat level Science and Technology (S&T) planning process led by the Director of Defense Research and Engineering. This would significantly improve our capability to influence Defense S&T and would allow the com-

mand to have direct input into development of the Joint Warfighting S&T Plan, the Defense Technology Objectives in addition to participating in the Technical Area Review and Assessment process. Furthermore, membership on the S&T Executive Council would establish USSOCOM's role in Science and Technology by providing us direct high-level visibility of our critical needs. We rely heavily upon leveraging the science and technology efforts of the Services, Defense, and other government agencies. If USSOCOM were able to more directly focus even a small portion of the technology base on SOF peculiar needs, our leveraging efforts would be much more efficient and USSOCOM's acquisition center more effective in providing advanced technology to the SOF warfighter.

ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION

28. Senator SANTORUM. Mr. Schulte, the Advanced Concept Technology Demonstration (ACTD) initiative enables the evaluation of a technology's military utility before committing to a major acquisition effort; permits the development concepts of operation for employing the new technology; and allows the retention of a low-cost residual operational capability. Can you provide information on whether SOCOM has the flexibility to perform advanced technology demonstrations and/or rapid prototyping of technologies to meet needs unique to Special Operations Forces?

Mr. SCHULTE. The USSOCOM has always had the philosophy of "try before you buy." This philosophy carries over in USSOCOM's aggressive involvement with ACTD topic selection and in demonstrations specifically relating to SOF. We are, however, a relatively small Defense entity and must shepherd our limited personnel resources. We seek, therefore, to leverage the Services' ACTD efforts and demonstrate and evaluate equipment that can specifically respond to SOF peculiar-SOF unique needs. The command does possess, on a very modest scale, an advance technology demonstration program similar to those sustained by the services, but again we rely primarily upon the services to provide the venues where SOF unique equipment may be demonstrated. Our rapid prototyping has limited funding and is executed under the Special Operations Special Technology Program (S200).

QUESTIONS SUBMITTED BY SENATOR SUSAN COLLINS

ADVANCED LIGHTWEIGHT GRENADE LAUNCHER/STRIKER PROGRAM

29. Senator COLLINS. General Holland, I am familiar with the Advanced Lightweight Grenade Launcher/Striker Program (MK47Mod 0), and I am aware it is included on your fiscal year 2003 unfunded requirements list. You may know that it is also currently being tested at the Marine Corps' warfighting lab. What can you tell me about the value of this program in terms of meeting mission requirements for the Special Operations Forces?

General HOLLAND. The Advanced Lightweight Grenade Launcher/Striker Program (ALGL) is of great operational value in terms of meeting mission requirements for Special Operations Forces. The ALGL will provide the special operators a first round on target capability with a 40mm grenade from 400 to 2,000 meters. This is a significant improvement over the current systems. The ALGL addresses three USSOCOM Desired Operational Capabilities: personnel survivability, sensory enhancements, and versatile weapons. The ALGL will be compatible with an advanced air-burst, pre-programmable, high explosive fragmentation grenade that will provide a capability to fire behind covered positions.

The ALGL provides the capability to engage personnel and motorized or lightly armored material targets with suppressive and destructive fires. The greater lethality of the ALGL system (compared to the MK–19) is a significant force multiplier for SOF. A significantly lighter weapon, the ALGL can be man-packed and readily employed by dismounted elements in offensive and defensive operations. Moreover, the first-burst hit capability of the ALGL eliminates the requirement to use 60 to 70 percent of SOF's 40mm ammunition loads for targeting.

30. Senator COLLINS. General Holland, can you also tell me if the Advanced Lightweight Grenade Launcher/Striker is, in fact, 40 percent of the weight of the current MK 19 Grenade Launcher, and 10 times more lethal against dismounted targets?

General HOLLAND. The ALGL does weigh 40 percent less than the MK–19. The ALGL weight is 100 pounds versus 168 pounds for the MK–19. Combining the increased probability of hit and reduction in engagement times greatly improves the lethality of the ALGL. The accuracy of the MK–19 is ineffective in that it provides

only a 25 percent probability of one round or more of a three-round burst hitting a small armored vehicle (BMP) sized target at 1,000 meters. This ineffective accuracy requires additional bursts to eliminate the target, with at least two to three more engagements on the original target for a complete kill. The ALGL must have an 80 percent probability of hitting five stationary BMP targets from 300 to 1,000 meters within 2 minutes. The first round hit capability and air-burst round greatly increases the lethality of the weapon system against dismounted targets. Dismounted targets will have no warning they are being targeted and therefore no time to seek cover. Bracketing the rounds into the target will be eliminated. The air-burst round will improve lethality as the round does not have to make impact with the target and will have a higher kill radius than current rounds.

VESSEL OR SHALLOW WATER CRAFT

31. Senator COLLINS. General Holland, how important is a vessel or shallow water craft in meeting the surface, submerged, and semi-submerged operations of Special Operations Forces? Please provide specifics on how the following craft can meet those particular operational needs: the Surface Planning Wet Submersible (SPWS); the Integrated Bridge System (IBS) for Special Operations Forces Combatant Craft; and the Integrated Command and Control System (IC^2S) for Special Operations Forces Combat Assault Vehicles.

General HOLLAND. Based on the current and future signature detection capabilities of potential adversaries, the technology for a craft to conduct surface, submerged, semi-submerged missions is essential to insert and extract SOF assets. The SPWS combines the benefits of a SEAL Delivery Vehicle (SDV) and a SOF insertion/extraction maritime platform into one efficient versatile craft. The capabilities of the craft are currently being evaluated by this command and we expect the knowledge gained from testing of SPWS to contribute to future applications.

The IBS is being developed for SOF combatant craft. The IBS increases the situational awareness as well as integrates the navigation, communication, and propulsion equipment into one display for the combatant craft crew. IBS hardware consists primarily of marinized computers and display screens. SOF platforms must be capable of providing near real time intelligence to the operator while enroute to the target. The IBS incorporates this essential capability while reducing the cockpit instrumentation. Combatant craft platforms will have a centralized call-up display with holistic mission information to increase the probability of mission success.

The IC^2S is the next generation combat data integration, display, monitoring, and control system being developed by the Naval Surface Warfare Center, Port Hueneme Division, Dam Neck Detachment for the USSOCOM's SOF. USSOCOM's SOF mobility platforms (land, air, and sea assault vehicles) require a system that seamlessly integrates various command and control capabilities and allows for their intuitive display, immediate access, and user friendly function. IC^2S will integrate those multiple systems of the individual land, air and sea SOF into a single integrated, scalable, modular system that will allow for a "plug-and-play" capability of those components required for unique mission assignments. IC^2S will be developed such that the system is configurable, transportable, and operational in both SOF airborne and ground vehicle platforms.

[Whereupon, at 4:23 p.m. the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2003

WEDNESDAY, APRIL 10, 2002

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

TECHNOLOGY FOR COMBATING TERRORISM AND WEAPONS OF MASS DESTRUCTION

The subcommittee met, pursuant to notice, at 9:09 a.m., in room SR–253, Russell Senate Office Building, Senator Mary L. Landrieu, (chairman of the subcommittee) presiding.

Committee members present: Senators Landrieu, Carnahan, and Roberts.

Committee staff member present: Gabriella Eisen, nominations clerk.

Majority staff members present: Madelyn R. Creedon, counsel; Evelyn N. Farkas, professional staff member; Richard W. Fieldhouse, professional staff member; Peter K. Levine, general counsel; Arun A. Seraphin, professional staff member; and Christina D. Still, professional staff member.

Minority staff members present: Edward H. Edens IV, professional staff member; Carolyn M. Hanna, professional staff member; Mary Alice A. Hayward, professional staff member; and Joseph T. Sixeas, professional staff member.

Staff assistants present: Dara R. Alpert and Leah C. Brewer.

Committee members' assistants present: Marshall A. Hevron, assistant to Senator Landrieu; Jeffrey S. Wiener, assistant to Senator Landrieu; Richard Kessler, assistant to Senator Akaka; Neal Orringer, assistant to Senator Carnahan; Robert Alan McCurry, assistant to Senator Roberts; Douglas Flanders, assistant to Senator Allard; Kristine Fauser, assistant to Senator Collins; and Derek Maurer, assistant to Senator Bunning.

OPENING STATEMENT OF SENATOR MARY L. LANDRIEU, CHAIRMAN

Senator LANDRIEU. Good morning. Let me welcome all of our panelists this morning and say that we are very pleased and enthusiastic about this hearing that we think is very important.

Senator Roberts will be joining us in just a few minutes. He is on his way, as are several other members of the subcommittee.

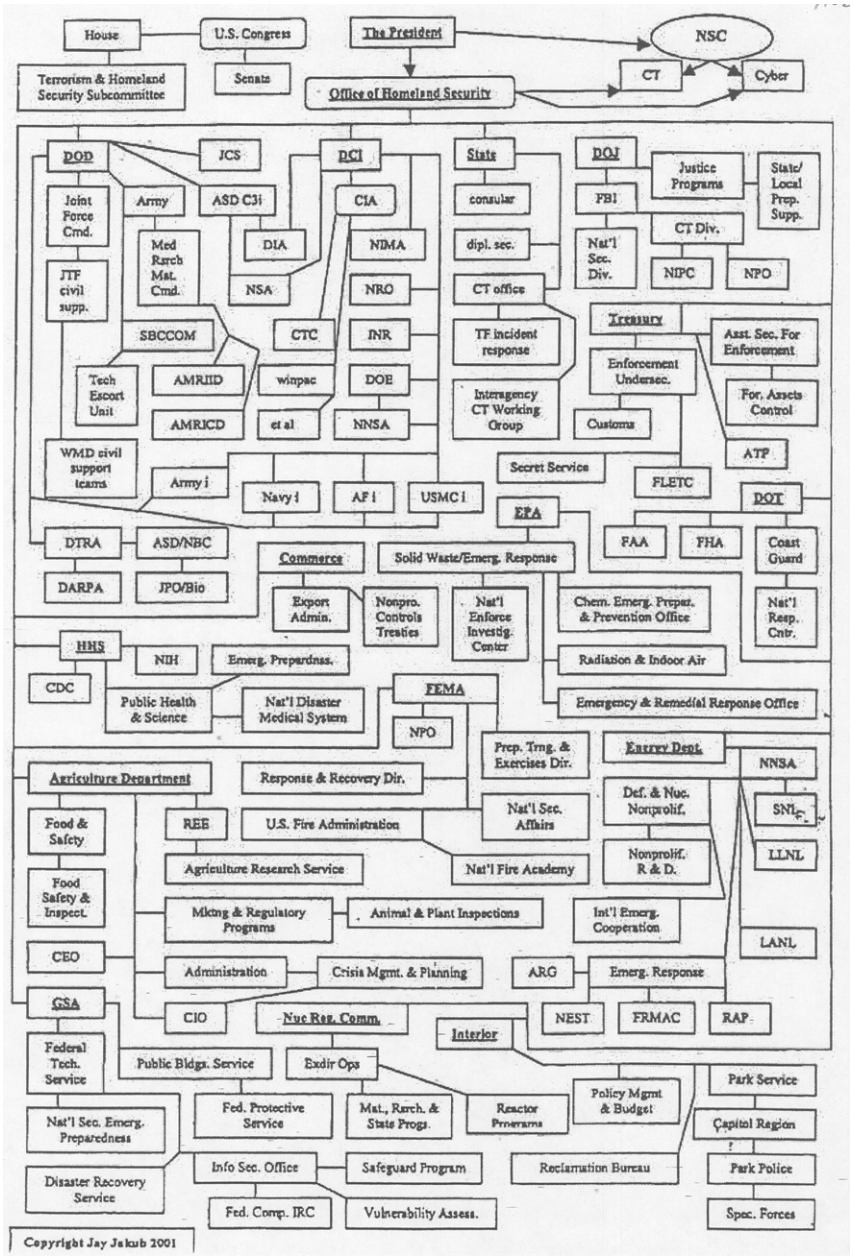
Unfortunately, because of a double schedule of meetings this morning, I am going to have to leave at 10:00, so I am going to try to shorten my remarks. We will get as much of the panelists' presentations in as possible and also some questions because this hearing, hopefully, will lay some groundwork for some very important legislation in the authorization bill that we hope to put forward here in this committee.

So, with that, let me just begin with a brief opening statement to say that there are many important things that we can do to combat terrorism, and this country is greatly challenged by what is before us. In my opinion, not only as chair of this subcommittee, but as a member of Armed Services and Appropriations Committees, I think one of the great ways that America can position its defenses is to strengthen our technology initiatives. Last October someone sent the deadly biological agent, anthrax, through the mail to various locations, including right here to the Senate. Our Nation now understands that these horrific actions represent a new generation of threats, very frightening to our security: terrorism and the possible use of weapons of mass destruction by terrorists in carrying out their attacks.

This has added a new and, I might say, urgent element to our national security efforts: protecting ourselves at home as well as our troops overseas. This complex homeland security mission involves military and civilian agencies at the Federal, State, and local levels and is now, in many large and small ways, a great challenge to the way that we have traditionally been organized.

Let me just share a chart that I really think we should kind of blow up and have in color to show the great challenges ahead of us.

[The information referred to follows:]



Senator LANDRIEU. I am sorry it is rather small. But when an agency was asked to chart all of the agencies of the Federal Government in charge of homeland security, this is what it looks like and some people thought this was a joke, but it is actually not. It is quite real. When you think about our challenges before us to co-

ordinate not only our Federal agencies but our State and our local agencies across many different levels of government, as well as coordinating that effort among all of the funding agencies, you can see the great challenges ahead. It was not even easy to coordinate that within the Defense Department, but now homeland security gives us even greater challenges.

One of our Nation's great strengths, however, in war or peace is our ability to develop and deliver new and effective technologies to the marketplace or to the battlefield. We have seen an impressive demonstration of this in our current military efforts to defeat terrorism, including unmanned aerial vehicles, laser-guided precision weapons, and instantaneous global communications. New technologies will also play an important role in homeland security.

Today's hearings will focus on two topics related to technology. First, we will consider the Pentagon's Science and Technology (S&T) research and development programs. These efforts serve as a foundation for technology and weapons that our military use today. I would note that these programs have also been the source of technologies we use in our everyday lives, which has been more than a dual benefit to our Nation, including the Internet, cell phones, and you could go on with a long, long list of such technologies.

Second, we will look specifically at the technology we have developed, and are still developing, to combat the two most serious threats we face: not only terrorism, but the potential use of nuclear, chemical, and biological weapons by terrorists or rogue nations. We are particularly interested to know what the Pentagon has done since September 11 to step up such efforts.

We have a very large and distinguished panel of witnesses today. I thank you all for being a part of it. Dr. Ronald Sega is Director of Defense Research and Engineering (DDR&E) at the Pentagon. He is responsible for the Department's S&T programs.

Dr. John Marburger is Director of Office of Science and Technology Policy, which oversees all Federal science and technology efforts, including defense.

Dr. Dale Klein is the Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs, a position responsible for the Department's efforts to combat offensive weapons of mass destruction.

Dr. Steve Younger is Director of the Defense Threat Reduction Agency (DTRA), which is focused on reducing threats from weapons of mass destruction. This agency provides support to warfighting commanders in getting technology and weapons to the battlefield.

Finally, Mr. Robert Waldron is the Assistant Deputy Administrator for Nonproliferation Research and Engineering in the Department of Energy's National Nuclear Security Administration (NNSA).

We will ask Dr. Sega to begin the testimony. I hope that you will address several important issues to include: the proper level of investment for these programs, given the great challenges before our Nation today; how we reach out to a larger community of small businesses to get the best new technologies to the Department of Defense and to the battlefield and to our homeland; and how to

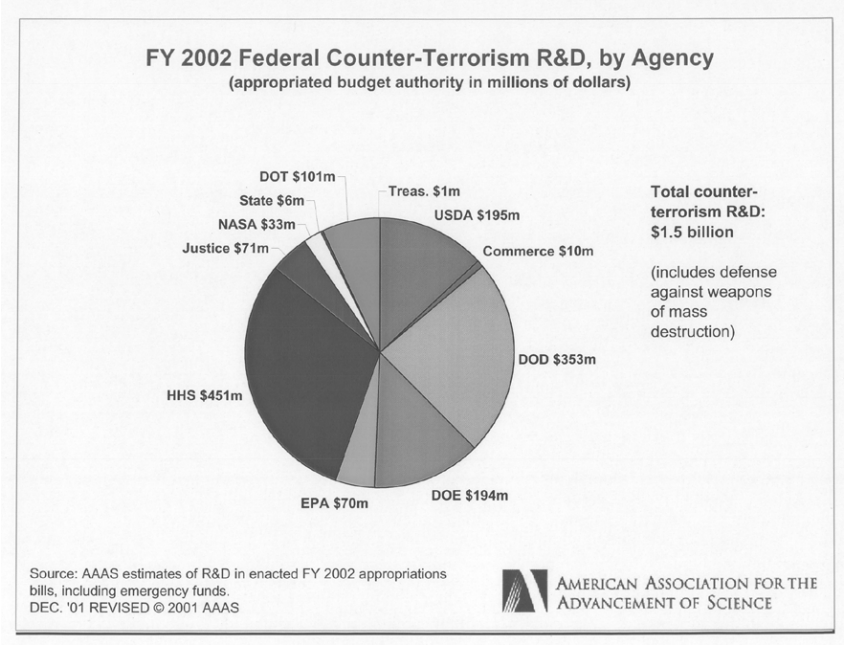
make sure that we are providing the best defenses that the American people would anticipate and expect.

After giving your oral testimony, we will have some questions for you that are intended to help us prepare for the upcoming authorization bill. Then Dr. Marburger, we hope that you will follow with your line of testimony. We have some questions prepared.

I also want to mention that we have asked the science and technology representatives from the military services and from the Defense Advanced Research Projects Agency (DARPA) to submit written testimony so that we can add to this record.

As I said, I am going to have to leave the hearing at 10 o'clock, but Senator Carnahan has agreed to chair this hearing in my absence.

Before I turn it over to your testimony, let me just also say for the record—and again, I wish I had this blown up and in color. This is the Federal counterterrorism research and development breakdown by agency. The Department of Defense has a large share of that. It is $353 million.



But I also call attention to the Department of Health and Human Services which has $451 million committed to this cause. In addition, the Department of Energy (DOE), with $194 million, are the three largest agencies, and the Department of Agriculture at $195 million for homeland defense and combating terrorism.

So, again, there are great challenges for coordination. This is a lot of money, perhaps not as much as necessary, but a lot. Getting the research and development dollars up to the levels and using that technology in smart and effective and nonduplicative ways, I

think, is what this panel is about; to help us to fine tune our authorization and legislation to make sure that end is accomplished.

So, with that, Dr. Sega, if you will begin. Thank you.

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

Dr. SEGA. Thank you, Madam Chairman. Thank you for the opportunity to testify on the Department's science and technology program. I have a prepared statement I would like to submit for the record and spend a few minutes discussing our overall research and engineering direction. Following that, it is my understanding that I will also make some remarks on combating terrorism, in particular, after we have the first session on science and technology.

First, I would like to thank the subcommittee for the leadership it has had in supporting science and technology for the Department of Defense.

The Department's goal of funding science and technology, as stated by Secretary Rumsfeld and Under Secretary Aldridge, remains at 3 percent of the Department of Defense budget. We support moving toward this goal, balanced with the needs of the Department, as reflected in the President's submitted fiscal year 2003 budget.

As DDR&E, as I started last August, we have approached science and technology in an integrated way, to look at the research across the services and agencies in the Department of Defense and reaching out to other Government agencies, to universities, and to small and large businesses.

We have looked at aligning our science and technology investment with the Quadrennial Defense Review operational capabilities and within that, looking at a balance between basic, applied, and advanced research so that the capabilities will continue on in the future, that we are, in a sense, loading in generations of technology from those that can be fielded in the very near future to those that we are preparing on a fundamental science base for the longer term.

In the area of transformation, we are moving in several areas but there are three main areas that cross the Department of Defense. I have aligned them in the following way. One is in surveillance and knowledge systems, and that includes sensors, Unmanned Aerial Vechicles (UAV), biosensors as one example, and high bandwidth communications, information assurance, knowledge and management systems in cyber warfare.

A second area is in power and energy. I believe this is an enabler across the board, moving toward a more electric force. In this area, power generation, whether it starts as nuclear, diesel, jet, or solar rays to go to electric power, and I think an enhanced emphasis on fuel cell work. Energy storage is important in terms of batteries, flywheels, capacitors, energetics, power management and control, energy conversion, catapults and the like, as well as directed energy, lasers, microwave, millimeter waves.

The third area is in a national aerospace technology area which includes hypersonics, access to space, and advanced space technologies.

Crossing those three are areas that form a base such as materials, nanotechnology and electronics. There are service-specific areas. I believe many of those were addressed in the testimony from the Departments.

On the September 19, we formed a DOD Combating Terrorism Technology Task Force. It included members from each of the services, special expertise for chem/bio defense, such as Dr. Anna Johnson Winegar, who is here today; an expertise in science and technology, Dr. Charlie Holland is here. In the weapons area, Special Operations/Low Intensity Conflict (SO/LIC), special access programs, Command, Control, Communications, and Intelligence (C^3I), DARPA, and DTRA are all represented to look at what technology could bring to our efforts to combat terrorism. I would like to speak more about that in the second half, but I would like to present one example that came out of that effort.

We met regularly for the fall time about twice every week, and 2 days after the first meeting of the 19, December 21, identified 150 technologies that were candidates to be brought to the field, whether in the U.S. or outside the U.S., within roughly a month or so. Three of those were accelerated on that second day. One of those was a thermobarics weapon program.

I have a film that I would like to show to sort of illustrate the flight test which occurred on December 14. This is a program under the leadership of Dr. Ruth Dougherty and her team at the Naval Surface Weapons Center at Indian Head that brought the chemistry forward with leadership of Dr. Steve Younger and his folks at DTRA for the integration of it, with the United States Air Force and Department of Energy, to go through a series of steps from fundamental chemistry, based on a good S&T base—and that is very important—to testing in the laboratory during the month of October, to static testing in Nevada during the month of November, to a full-up flight test, which is the subject of this film, on December 14, with the certification occurring a few days later, bringing science and technology to the field in 90 days.

If we could have the film. [Video.]

This illustrates a couple points. Technology transition can and should occur rapidly. Collaboration among agencies and services is the right way to go.

This is an F–15 Eagle, Strike Eagle. The explosive is inside of the main body, which is called a BLU–109. It normally holds tritonol. In this case, it is the thermobaric replacement explosive, now redesignated as a BLU–118B. The front end is a laser-guided system, and it is being lased off of a second aircraft. It is a GBU–24, and it will be going into a tunnel structure in the Nevada test site.

The next view of this will also be from the aircraft. It is an entrance into this tunnel complex that you see the cross hairs on. There will be some venting in the black in the middle of the screen, and then the tunnel is a U-shape and continues around sort of symmetric with the entrance to cover over a three football field length of tunnel area. Another view of the same kind of thing. So, it is going from the right to the top and out to the left. There was another area.

So, the propagation of the pressure and blast through the tunnel structure—if we could have the volume up, that would be great—is significantly higher than that of the standard tritonol fill.

So, from that initial detonation, then the propagation continues down the tunnel. This is a high-speed film, so it is slow motion, somewhat of a delayed fuse, so it goes in the structure. To the upper left, you will see that venting area, some black smoke coming up.

This is an advance that we have to increase the effect in enclosed structures. In the open area, it is actually not as effective. So, if you missed the enclosed structure, it actually causes less collateral damage. So, it gives the commander another option.

Now, the next view is from inside of the tunnel structure. The tunnel is that square area on the right. You get a sense of it propagating and continuing to combust down the tunnel structure. This is the back side. You can still see some force even after that distance of the tunnel that you would not see in a standard system. It started to snow that same day on December 14, in Nevada, and you could sort of imagine that same scene in another place.

But the main point here is technology transition, the value of a strong S&T base, and the value of collaboration, in this case the Air Force, the Navy, DTRA, and the Department of Energy and the contractor community.

This is an example of a quick reaction type of activity. Now it has transitioned into an Advanced Concept Technology Demonstration (ACTD) to further upgrade the chemistry and optimize the thermobaric explosive. So, you can evolve from something that is current year to something that is probably optimized further, but you have obtained an 80 percent solution right away, and you continue to work on the acquisition. So, partnerships are clearly important.

Another example I would like to present is this small infrared (IR) camera. It is an uncooled IR technology, developed by DARPA and then through the Army's Night Vision Laboratory, and finally through collaboration through a dual-use program with the Indigo Systems Corporation out of California. Now, I believe this is the smallest imaging IR system that we have today. There is a connector, RC–32, out the back side, so you can look at it either from an adaption onto a set of goggles or another imaging device. But this is now available in the commercial market for fire fighters. I believe that there were articles in the press over the last 3 or 4 years. One was the Bethesda Chevy Chase Rescue Squad using this here locally, as well as the soldiers in the field. So, going through areas that have a lot of smoke or fire types of things, this is very effective. It is being produced commercially so it lowers the cost to the Department of Defense as a buyer as well. But it was developed through the S&T programs of DARPA and the Army. It is a great little camera.

The final point I would like to make is on laboratories and people. We believe it is important to revitalize our laboratory efforts and oversight within the Office of the Secretary of Defense (OSD). The only office that I have initiated since August has been the Office of Laboratories and Basic Sciences, headed up by a Deputy Under Secretary of Defense (DUSD), and Dr. John Hopps is the

DUSD for Laboratories and Basic Sciences. He also has the responsibility for universities and work force. His background is as a faculty member at Ohio State and the Massachusetts Institute of Technology (MIT), extensive experience at Draper Laboratories, the National Science Foundation, and his most recent position as the provost at Morehouse College. So, he understands laboratories. That will be our focal point within DDR&E and an increased focus on this very important effort, revitalizing laboratories in terms of people and infrastructure. We really thank you for the support the Federal authorities provided in those areas.

The people part is very important. Without the people, there is not innovation, and that is our future.

I thank you for this time.

[The prepared statement of Dr. Sega follows:]

PREPARED STATEMENT BY DR. RONALD M. SEGA

Madam Chair and Members of the Senate Armed Services Subcommittee on Emerging Threats and Capabilities,

I appreciate the opportunity to appear before you today to discuss the DOD Research and Engineering (R&E) Program with particular emphasis on Combating Terrorism.

INTRODUCTION

First, I would like to provide you with an overview of the current Research and Engineering (R&E) Program in the Department of Defense (DOD). Many of the capabilities and systems that are in the field today are the result of a conscious decision, years ago, to invest in Science and Technology (S&T) programs. The future security and safety of our nation depends in part on a strong research and development foundation.

The DOD R&E program is being crafted as an integrated science and technology approach to align with the desired operational capabilities described in the Quadrennial Defense Review (QDR). One of the goals set forth in the QDR is to shift the basis of defense planning from the "threat-based" model that has dominated thinking in the past to a "capabilities-based" model for the future. This capabilities-based model focuses more on how an adversary might fight rather than who the adversary might be or where a war might occur. It recognizes that future security threats include more than large scale conventional. Instead, the United States must identify the capabilities required to deter and defeat adversaries who will rely on surprise, deception, and asymmetric warfare to achieve their objectives. Consequently, we are shaping our S&T program to focus on transformation, the need for "Jointness," and a capabilities-based planning.

Investments in S&T programs are necessary today to broaden the range of options available to the warfighter tomorrow. Advantages we now possess in key technology areas must be maintained, while pursuing new technologies. Our S&T investment must transcend specific requirements. For example, our efforts in advanced electronics should dramatically improve the performance of avionics, regardless of whether the aircraft is manned or unmanned. Missile guidance and targeting should be precise and accurate, regardless of the launch platform or target. Materials will need to be both lighter and stronger—to protect delicate instrumentation in a satellite or the personnel inside a vehicle. Nanotechnology will have application across many of our desired capabilities and our expectations are very high for this emerging technology. Whereas it is science that fuels the generation of technology, and it is the application of technology that enhances capabilities, it is our efforts in technology transition that take technology from the laboratory to the field in an efficient manner.

S&T SUPPORTING TRANSFORMATION

S&T is a key enabler of transformation. It not only provides the technology for future warfighting capabilities, but provides opportunities for changing doctrine that govern the way future forces fight. We are focusing on the areas of knowledge, speed, agility, and lethality to change the face of war. We must, through our S&T investments, continually enhance our technological advantage to provide significantly advanced capabilities to deter future threats and when deterrence fails, en-

sure that our response is effective with few U.S. and allied casualties and minimal collateral damage. The war in Afghanistan has gone well, but this is no consolation for the families of the military members who have lost their lives during the current conflict. The decisions we are asking you to make regarding investments in S&T programs will be important today and into the future—a future which we cannot predict, but a future for which we can be prepared.

COMBATING TERRORISM

Combating Terrorism technologies were a key component of our S&T program prior to the attack that occurred on September 11. However, since September 11, our effort in this area has dramatically intensified. Fortunately, the Department's S&T program had numerous program activities well underway, such as ACTDs, that when accelerated, helped to meet critical warfighter needs. I would like to briefly describe what we have accomplished in the aftermath of September 11, in providing combating terrorism technology capability to the warfighter. First, we established a DOD Combating Terrorism Technology Task Force (CTTTF) on September 19, that rapidly identified, prioritized, and integrated DOD S&T initiatives to help with combating terrorism. The Task Force included technology leaders from the Services and the Defense Agencies, with participation of the Joint Staff, the Department of Energy, and other federal organizations. Under Task Force direction, four working groups were established to identify needs and technology opportunities that crossed the spectrum of combating terrorism requirements. The working groups were functionally organized into four broad areas of combating terrorism: (1) Deterrence and Indications and Warning; (2) Survivability and Denial; (3) Consequence Management and Recovery; and (4) Attribution and Retaliation. Working groups identified applicable technologies that could help to mitigate capability shortfalls and potential remediation programs. Shortfalls and remediation programs were identified by the users who generated prioritized lists of investment strategies for near-, mid-, and long-term technologies.

Two of the projects identified for immediate investment were Nuclear Quadrupole Resonance (NQR) Detection Systems and Thermobaric Weapons.

Nuclear Quadrupole Resonance (NQR) technology was developed by the Naval Research Laboratory and is being used by the Federal Aviation Administration for detection of bulk explosives. There are many advantages of NQR over x-ray detectors but of particular significance is that little interpretation is required. The existing technology is now being modified for use in examining "bulk" packages.

A thermobaric explosive weapon system was accelerated, tested, and certified from the concept stage within 90 days. From "chemistry-to-weapon," the thermobaric explosive was developed and tested in a laboratory setting in October 2001, successfully flight tested in December, and made available to the warfighter earlier this year. This is an example of a successful collaborative effort that included the United States Navy, Defense Threat Reduction Agency, the United States Air Force, the Department of Energy and industry.

We also responded with assistance on the home front. A few weeks after the attacks on the World Trade Center and the Pentagon, letters containing *Bacillus anthracis* (Anthrax) spore powders were sent to several locations in the United States. An interagency technology working group was assembled to address the issues of Anthrax and the Postal Service. DOD expertise and facilities were made available to support this effort. Representatives from the Department of Defense, National Institute of Standards and Technology, Food and Drug Administration, and the House Mail Office met at the Armed Forces Radiobiology Research Institute (AFRRI) to discuss the use of radiation to kill the anthrax spores. AFRRI had established radiation kill data on surrogate spores such as *Bacillus anthracis* type Sterne, a vaccine strain. The spores of the *B. anthracis* Sterne are very similar, if not identical, to the *B. anthracis* Ames spores that were recovered by the FBI from the contaminated letters. Extending the previous radiation kill work for "Sterne" and other anthrax surrogate spore types, they confirmed the radiation sanitizing dose for the lethal "Ames" strain of anthrax.

Our Combating Terrorism activities continue and are reflected in planning efforts of the Services and Defense Agencies with continuing support of the Task Force.

INITIATIVES SUPPORTING THE QDR

As we further analyzed the QDR from the S&T perspective, we identified three particular areas that warrant special attention to support transformation; (1) integrated national aerospace framework; (2) surveillance and knowledge systems; and (3) energy and power technologies. The technology programs in these areas have broad application towards transformation. They also have intrinsic jointness charac-

teristics. Additionally, we have identified information operations, space, robotics, hard and deeply buried targets, advanced energetics, advanced electronics, hypersonics, and military medical as other joint areas of importance. Within our fiscal year 2003 request, you will see many programs that form the foundation for these efforts. In the coming months, we will work with you to fund a balanced S&T program to enable continuing transition of needed technologies to our warfighters.

I have been working with the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence, other Government organizations, universities, and industry to develop technologies to protect the critical defense infrastructure. For example, many of the targets for cyberattack are in private hands: electric power and telecommunications grids, and financial and transportation systems. We must match the pace brought forth by the information age with persistent work towards reducing vulnerabilities and mitigating consequences. Viruses and denial-of-service attacks are examples of the pervasiveness of the threat, and the extent of our interconnection. Every gain, every achievement, and every breakthrough in information technology should be accompanied by the notion that it is or could be a target. Our nation must pursue cybersecurity aggressively—to protect not only our military systems and capabilities, but our critical infrastructure as well.

PLANNING AND EXECUTION

We continue to seek ways to strengthen the S&T strategic planning process. Components of this process include the Joint Warfighting Science and Technology Plan and the companion Defense Technology Area Plan and Defense Technology Objectives. These documents represent the collaborative efforts of the Office of the Secretary of Defense, the Joint Staff, the military services, and the defense agencies in planning the S&T program. These documents and the supporting individual plans of the military services and defense agencies guide the annual preparation of the DOD budget and program objective memoranda.

Technology development is normally recognized by the end products, but is managed as an investment continuum that spans basic research through advanced development with close attention to technology transition. We must seek a balance across this continuum. Basic research lays the foundation for tomorrow's innovative development. That part of basic research conducted in the colleges and universities pays dual dividends—providing not only new knowledge but also producing the scientists and engineers for the future. At each level through applied research and advanced development, we make investment decisions in pursuit of the most promising payoff areas.

TECHNOLOGY TRANSITION

Technology transition has been the topic of much discussion, within the Department and Congress. The rate of change of technology influences our program, and at the same time, that creates unique technology transfer and transition opportunities. A "Quick Reaction" ability to respond to an immediate need would be an important addition to the array of tools we have to support technology transition.

During my confirmation process last summer, I was told of a program Dr. John Foster established when he was the DDR&E to respond quickly to the unknown. In the fiscal year 2002 budget request, the Quick Reaction Special Projects (QRSP) was submitted to address this goal, but was not funded. Over the last 6 months, I have met with many of you and your staff to discuss the merits of the program, and I think we all have a better understanding now of proposed quick reaction support program and of its need. There are three potential triggers for invoking this program: (1) to take advantage of technology opportunities in rapidly evolving disciplines; (2) to reduce the unanticipated risk in acquisition programs, such as information technology or biotechnology; and (3) technology maturation in support of urgent real-world DOD needs. Nothing echoes the need for such funding better than September 11, 2001. For example, the only immediate option we had available at that time to transition the Thermobaric Weapons and the Nuclear Quadrupole Resonance (NQR) Detection Systems from developers to the users was to reprogram/decrement existing programs. We could better accommodate changes in technology and the world situation with additional execution budgetary flexibility. We have requested the Quick Reaction Special Projects again in fiscal year 2003, and I urge your support.

The ACTD program is a "mid-term" tool supporting transition. These demonstrations involving the CINCs, Service Users, and Technologists are a formal preplanned part of the S&T program that facilitates the rapid transition of cutting edge technologies into defense acquisition systems. The Predator, which originated in the Defense Advanced Research Projects Agency (DARPA), is a product of the

ACTD program and is in use today in Afghanistan. On March 5, 2002, the Under Secretary of Defense for Acquisition, Technology, and Logistics, Pete Aldridge announced the fiscal year 2002 selection of 15 new ACTDs.

Large acquisitions follow the process described in the Department's 5000 series acquisition policy documents. The S&T Program is being called upon to fulfill an important role in the acquisition decision making process. In the acquisition policy documents, the S&T community is viewed not only as a source of technology and capabilities, but a source of expertise for determining the technical maturity of key system technologies. Prior to Milestone B and Milestone C decisions, the acquisition program offices and the S&T community prepare and submit to OSD for review a technology readiness assessment. This requirement not only provides important information for decision making, but necessitates an increased collaboration between the technologists and the developers. This collaboration is strengthening the communication between the two communities and we believe this will contribute to shortening the acquisition cycle time. For example, the Joint Strike Fighter used the technology readiness assessment as part of the decision making process.

The Services' S&T Executives and their Service laboratories provide a stable, mission-oriented (Service specific) focus to the Defense S&T program. The mission of the Defense Advanced Research Projects Agency (DARPA) is to support high-risk, high-return research that bridges the gap between fundamental discoveries and military use. A DARPA role is to predict what a military commander might need in 20 years, and then create that future by changing people's minds about what is possible. Over 50 percent of our basic research is conducted at universities, another 30 percent in federal laboratories and the balance by industry and nonprofit institutions other than universities. As we move forward through our applied research efforts, our federal laboratories take a more prominent role, and in the advanced research phase, industry becomes the major player. The fact that our laboratories have some participation in all three phases is also key to providing them with the technical agility to facilitate technology transition. Throughout the process we leverage international S&T where feasible to meet the Department's needs as well as ensuring strong defenses for our allies.

SCIENCE AND TECHNOLOGY WORKFORCE

The quality of our S&T workforce and the management of the laboratory infrastructure in which they work are very important factors in the overall R&E equation. They too are critical elements for transformation. Our S&T workforce has been downsized considerably in the last 12 years. This has left us with a very knowledgeable workforce, but one that is also reaching retirement age. We are at a critical point that requires a focused effort to bring stability to the workforce that will attract and retain talent. To lead this effort, I have established an office, reporting directly to me, for Laboratories and Basic Sciences. We are applying our energies to ensure we are capitalizing on the authorities you have given us to demonstrate innovative ways for improving the workforce. The issue is not people alone. Also, the infrastructure supporting these men and women is in need of updating. We are in the early stages of developing a comprehensive plan to address the total workforce. Over the next several months, we will work closely with you as we develop a plan that will ensure we have the workforce and supporting infrastructure required to maintain technological superiority.

PARTNERSHIPS

The Department's R&E program is dependent upon active partnerships with activities internal and external to the Department. Our customer partners are the warfighter and the Joint Staff. Our focus is on their known needs and the technology developments we must invest in today to ensure their future needs are met. The internal DOD partnerships include the Services, Defense Agencies, and other OSD organizations that guide and execute the S&T program as well as critical external interactions with other government agencies, universities, industry, international partners, and Congress.

OUTREACH

In response to the September 11 attacks, the Department released a Broad Agency Announcement (BAA) that was open from October 23 through December 23, 2001. The BAA sought ideas in the areas of combating terrorism, location and defeat of hard or difficult targets, protracted operations in remote areas, and countermeasures to weapons of mass destruction. Anyone, from individuals to large corporations, was encouraged to apply. The Department received approximately 12,500 responses, including approximately 1,200 from 85 other countries. The DOD Tech-

nical Support Working Group (TSWG) has completed their review of the Quad Charts submitted, and have requested approximately 600 White Papers that will be considered for contract award. Announcements from the TSWG are posted on the Web at *www.bids.tswg.gov*.

Broader opportunities for supporting the Department's science and engineering programs are announced as Requests for Proposals or Requests for Quotations on a wide array of subjects . They are published in Federal Business Opportunities; the government's designated point of entry on the Internet for providing public access to notices of procurement actions. FedBizOpps is found at *www.fedbizopps.gov*. The appropriate points of contact (POC) for submitting unsolicited proposals are available in the handbook, "Selling to the Military." The handbook is available at: *www.acq.osd.mil/sadbu/publications/selling*.

CLOSING

As stated in the Quadrennial Defense Review, "a robust research and development effort is imperative to achieving the Department's transformation objectives." It further states that "the Department must maintain a strong science and technology (S&T) program that supports evolving military needs and ensures technological superiority over potential adversaries." Funding of the fiscal year 2003 President's budget request for S&T is needed to support these objectives that help provide for the future security and safety of our nation. We have appreciated your previous support and look forward to working with you on this request. Thank you for the opportunity to appear before you today.

Senator LANDRIEU. Thank you, Dr. Sega. I really appreciate your bringing some examples on film and actually here to give us a real feel of the kinds of things that are being developed. They let us see the effectiveness by which the research and development dollars and what we fight for actually translates into victory on the battlefield and victory here at home, which is important.

Let me ask, and then we will start our second part of the panel, but I would just like to get two or three questions to you for the record.

Last year, you are probably familiar with the legislation that this committee and the Senate passed and the version of the technology bill that was passed by the House in an effort to try to improve the ways that the Department of Defense can make sure it is getting the very best technology, whether it is developed in-house or taken off the shelf.

We never could resolve the differences between the Senate approach and the House approach. I think the Department of Defense had initially supported the Senate's version and then pulled back its support. As a result, after a lot of work over many, many months and a lot of diligent negotiation, we ended up without a bill.

So, could you help us understand why the Department pulled its support of that effort, what you would like to see this committee propose in terms of this transitioning issue so that we can be better prepared this year for that debate?

Dr. SEGA. Madam Chairman, as I understand, the question is in and around technology transition?

Senator LANDRIEU. Yes.

Dr. SEGA. Technology transition has many facets to it. I believe that we are moving forward in a very positive direction where the communication between those developing the technology, those acquiring the technology, those who will be eventually responsible for the logistics and maintenance, the testing community, and the users are engaged from day one until the end of the life of a particular system. That part is very important.

Now, there are several mechanisms, depending on the size and complexity of the system. The DOD 5000 series, which is continuing to evolve, is looking at some of the larger systems, longer-term systems, such as the Joint Strike Fighter. In this case, the science and technology community was asked to do a technology readiness assessment prior to a Milestone B decision of the Joint Strike Fighter. That program also brought technologies that were being developed, both inside of DOD and outside, forward until they had to make a decision on what to pick for the selection of the Joint Strike Fighter. It is also planned at the beginning that technologies will spiral into that during its development so that if there are good ideas—and there are, and we need to seek those good ideas out, regardless of where they start from—that there is an avenue of doing that. I believe one of the issues was the mechanism by which we bring those new ideas in, not that it was not a good idea.

The second nearer-term part is those that involve ACTDs, advanced concept technology demonstrators. An example of that would be the Predator vehicle where that is 1 to 5 years in duration, and then a question is how does that then transition, after it is demonstrated, to a fielded system in sufficient numbers to help the combatant commanders.

The third period is the current year efforts and in that time frame recommending the support of the quick reaction special projects fund. It would take care of things such a thermobaric weapons that we did not anticipate during the budget cycle of 18 months or so, or information technologies that evolve very rapidly or biotechnology kinds of things or our work for doing the anthrax kill curves out at AFRRI, which was done through Dr. Jack Marburger's committee and brought the Postal Service and other people together. So, the flexibility to act quickly is important.

We also initiated a broad area announcement through the Technical Support Working Group, and we received 12,500 submissions from the opening of this broad area announcement on October 23, to its closing on December 23. This is an interagency announcement, and we have gotten through about three-quarters of those by this point. Some of them were not directly in the Department of Defense's area, and we referred those to the National Institutes of Health, for example.

So, we have talked since that time of how do we take the ideas—and many of those were from small companies, some of them from universities, some of them from individuals, large companies. They came from everywhere, including outside the United States. So, there is a positive energy out there to create new ideas and bring them forward.

So, I would ask, as we work together with the committee and the staffs, that we allow the speed, agility, and knowledge that we are trying to get out of our systems to also be part of the process by which we allow these technologies to enter into our system.

A quick reaction type of approach would favor those that have the innovation and the speed in which to react. That tends to be the smaller businesses. So, I think a mechanism that allows that and an expanding of the quick reaction special projects fund would be at least one good step in that direction so we could move quickly.

In fact, my role as DDR&E is evolving toward a chief technology officer role for the Department of Defense. So, it is looking at a broader range of technology issues. So, I feel responsible as well.

Senator LANDRIEU. Let me just commend you and say that I am very pleased to hear that you understand the great need. You also understand the enthusiasm with which the American people are responding to your call, which was open just a short period of time, and you had somewhere between 12,000 and 13,000 responses.

Now, the challenge is how do we take those ideas, submitted as you said by some very small companies, some individuals, and translate them into tapes that we saw right here, things that actually work to save lives or destroy the enemy or meet our military goals both abroad and at home. There is some urgency about that. If we could identify the right things, we could save a lot of money, save a lot of time, a lot of lives, and bring security to the American people, which they are really longing, to think that they are prepared to the highest level for whatever might occur.

So, the great challenge for us is to design an authorization or initiative to help you to design something that can wade through those new ideas. To have a process where we just do not have to open it and close it, but it remains open so we bring all these new ideas.

In my view, I think the Department of Defense should try to position itself because I know the Department does not think it is always very well funded. However, in comparison to other agencies that struggle with budget numbers, I think, it particularly at this time, will be given a lot of support to help coordinate that effort and then push out some of the technologies that are not specific to defense to Health, to Energy, to other Departments, such as Agriculture.

So, if you would, not to take much time, but if you would agree this morning to help work with us on some legislation, submit some ideas, build on the work that was done because there is a great push in the House and the Senate to open this up to small businesses, to get these ideas quickly, and then turn them into things like that camera or the cave-busters that we saw on the video.

Dr. SEGA. Madam Chairman, you have my enthusiastic support.

Senator LANDRIEU. Great. Thank you so much.

Let's begin with the second panel.

The staff is reminding me I have to ask something about the personnel. You mentioned about the challenges of maintaining high level personnel, that this is part of the challenge of technology transition. Over the last few years, this committee has created a set of pilot programs so that DOD can cut red tape, adopt more businesslike practices and hire adequately paid scientists so that our DOD labs can perform their mission of supporting the Armed Forces.

It is my understanding that in 3 years almost nothing has happened, although everyone seems to think the programs are a good idea, but we just have not been able to move off first base.

Can you explain why it seems like to us—and maybe it is not true—that there has been a lack of progress, and if not, what progress has been achieved in those particular areas?

Dr. SEGA. First I would like to thank the subcommittee for the leadership in providing those legislative authorities.

If I could read just a sentence out of a memorandum for the Secretaries regarding section 245. This is June 21, of last year from Under Secretary Aldridge, Under Secretary of Defense Chu, and Acting Director for Operational Test and Evaluation Fraim, in which it says, "The purpose of this memorandum is to remove, to the extent permitted by law, any existing DOD and component impediments, including regulations, policies, procedures, and practices that impede one key to achieving this goal, the exercise of expediting hiring authority by the directors of the laboratories and test and evaluation centers selected to participate in the section 245 program." So that is one indication that we are serious.

The second indication, in my opinion is providing increased focus into that area with Dr. John Hopps' position as the DUSD for Laboratories and Basic Sciences. We are moving forward on this review and implementation. I have forwarded a request through our Department's staffing process to extend section 245 of the fiscal year 2000 National Defense Authorization Act. So, we are taking this seriously and we are moving out.

Senator LANDRIEU. I do think it is very important. It is clear to me from what I have researched and been told that we just are not making the kind of progress we should in that area.

I would like to ask you, Dr. Marburger. You used to run a Department of Energy lab in New York. How does the Department of Energy handle these hiring issues? What are some of the ways or strategies that you have used to hire them? Also, I would like to ask Mr. Waldron for any of your comments on keeping the talent and expertise that we need.

Dr. MARBURGER. The situation is somewhat different in the Department of Energy laboratories because they are operated by contractors who have a different regulatory environment and different sets of restraints on hiring practices. I believe that although there are difficulties in attracting the best talent to these laboratories, they are probably somewhat different in character from those in the Department of Defense laboratories.

Senator LANDRIEU. Mr. Waldron.

Mr. WALDRON. Our problem is similar to Defense in that we are not in the private sector like the laboratories are. We do have some authorities with excepted service that the Department is using. Within the National Nuclear Security Administration's enabling legislation, we were provided with, I believe it was, 300 excepted service positions that we are embarking on filling to try and bring some more additional expertise into the Department.

Senator LANDRIEU. But how many have you filled to date since that act was passed?

Mr. WALDRON. I do not know, ma'am. I can check and get that back to you.

Senator LANDRIEU. Dr. Sega, do you know how many positions you filled to date in the last 3 years using that new authorization?

Dr. SEGA. There are several authorizations that I am familiar. In section 342, I believe in DARPA, for example, there were 40 authorizations provided. Today they have 28 filled and 2 have been made offers. So, in the case of the Defense Advanced Research

Projects Agency, we are at about the three-fourths level of those new authorizations. They are appreciated I assure you. We could not do our work without them at DARPA. I can get back with you on the service numbers.

[The information referred to follows:]

To date, none of the service positions have been filled. The Department and the Military Departments have been working to define the requirements as well as specific locations for each of the positions authorized. We are nearing completion of this necessary first step and will soon be in the process of recruiting and staffing these critical positions before the end of the year.

Please note the reference to section 342 on page 33 of the April 10, 2002 testimony is incorrect. The correct section is 1101 of the National Defense Authorization Act for Fiscal Year 1999.

Senator LANDRIEU. OK. I know there are several programs. That is good to hear that of that program we have 28 positions out of 40 filled, but we understand there are other programs where there has been absolutely no filling of those positions in 3 years. So, we have to think about new systems of using our private contractors in the appropriate way, while having the in-house expertise to really mobilize the private sector small business community that is out there and individuals with these new ideas moving this technology in and then moving it out for the defense of this Nation. Truly there is some urgency in regard to this and we just have to be hitting on all cylinders.

If there is something that we need to do in a better way to help you, then we will, and if not, then we are going to just urge you—and direct, if we have to—to get these positions filled and to get these agencies stood up the way they need to be.

Let us begin the next panel. Dr. Marburger, please.

STATEMENT OF HON. JOHN H. MARBURGER III, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Dr. MARBURGER. Yes. Thank you, Madam Chairman and members of the subcommittee for the opportunity to speak to you today about the efforts of Office of Science And Technology Policy (OSTP) in the Executive Office of the President in combating terrorism and weapons of mass destruction.

I agree that the challenge of coordination of the activities of many agencies in these tasks is very great, but it is not impossible.

You have already mentioned the budget allocations for the war against terrorism, counterterrorism activities. I will just recall that out of the President's $2.1 trillion proposed budget for fiscal year 2003, $112 billion is for R&D, the largest research and development budget ever proposed, and $37.7 billion is devoted to homeland security. The R&D portion of the combating terrorism budget is estimated to be $3 billion, which is as much as triple the level of comparable terrorism R&D for the previous year 2002. At $2.4 billion, the largest portion of this funding is devoted to the area determined to be in the greatest need, and that is protection against biological weapons.

These funds, of course, have been requested by the President on behalf of the agencies that will carry out the R&D programs that address the needs of the homeland security effort, including of course the Department of Defense.

Immediately after September 11, the key science agencies assessed their capabilities and began implementing programs that responded to needs that were immediately apparent at that time. Dr. Sega has already described how the Department of Defense mobilized its science and technology capabilities very rapidly and effectively, and we continue to work with them and take advantage of structures such as the Technical Support Working Group.

OSTP's role is to track and coordinate such cross-cutting activity, and this morning I will describe very briefly how that has been done. My written testimony will have more detail, and I will just hit the highlights here. In the rest of this morning's panel, you will hear more examples of techniques and systems under development. There is a very intriguing tabletop full of hardware here to my right that I am sure will be of interest to all of us.

While our office plays an essential role in helping the President ensure coordination among agencies conducting R&D applicable to national security, our efforts do reach beyond the Federal Government. My staff and I work not only with the White House, Congress, and Federal agencies, but also with the science community, higher education, the private sector, and State and local governments. OSTP has worked to define effective relationships with each of these sectors in connection with the war against terrorism.

Since the inception of the Office of Homeland Security, OSTP has accepted responsibility to coordinate the various R&D activities associated with the homeland security mission. My Assistant Director for Homeland and National Security in OSTP has also filled the post of Senior Director for Research and Development within the Office of Homeland Security. This reporting relationship brings the resources of the science and technology community to bear on homeland security issues in an efficient and timely manner.

The Office of Homeland Security also has access to all of OSTP's scientific networking and talents, while OSTP can stay abreast of the issues confronting the Homeland Security Office.

We also facilitate research and development across Federal agencies primarily through the mechanism of the National Science and Technology Council. Following the terrorist attacks of September 11, I created a rapid response team within this structure which draws on technical experts within relevant Federal agencies, including the Department of Defense, to address critical, time-sensitive technical issues. The best early example of this was our assembling of a technical team to assist the United States Postal Service in evaluating the effectiveness of various proposals for sanitizing mail contaminated with anthrax spores. Dr. Sega mentioned important participation by AFRRI, the Armed Forces Radiobiology Research Institute, in producing the kill curves for anthrax for that effort.

I also established an Antiterrorism Task Force under the National Science and Technology Council structure which has four working groups: one on biological and chemical preparedness; one on radiological, nuclear, and conventional detection and response; one on the social, behavioral and educational aspects of terrorism; and finally one on vulnerable systems infrastructure. That last working group is intimately connected with coordination efforts of Special Advisor to the President for Cyberspace Security, Richard

Clarke, and together we co-chair a research and development working group focused on this important homeland security mission.

Madam Chairman, these are examples of the kind of interagency coordination that OSTP provides. There are many other interagency groups that we often form ourselves and participate in, including the Non-Proliferation and Arms Control Technology Working Group, led by the Department of State, and the Counterproliferation Program Review Committee, chaired by the Department of Defense. These groups serve to coordinate programs in the treaty verification and counterproliferation areas. Both of these groups have developed expertise that is relevant to the war against terrorism.

My office and I, however, are also working closely with the Nation's science and technology community. Our Antiterrorism Task Force is deliberately designed to be compatible with a similar structure formed last fall by the National Academy of Sciences. This arrangement allows OSTP to communicate effectively with some of the best and most experienced scientists in the Nation, many of whom had been thinking about domestic terrorism prior to September 11.

The President's Council of Advisors on Science and Technology, which I co-chair with Floyd Kvamme from the private sector, is identifying ways in which the Nation's private R&D sector can be better engaged in the fight against terrorism. I believe we do face a tremendous challenge in incorporating the excellent ideas that are pouring forth from the private sector into a coherent homeland defense strategy.

We also maintain regular contact with numerous science, engineering, and technology societies, as well as with higher education organizations, establishing points of contact and giving them information about how to couple into this complex array of Federal programs.

As these examples indicate, OSTP is fully engaged with the White House, the Federal agencies, and the Nation's science and technology community in coordinating the range of science and technology efforts underway. Although sobered by the threats we face and the battle we are engaged in, I am optimistic that by relentlessly pursuing our objectives, the Nation and the world will be made not only safer and more secure, but also better and more productive.

I appreciate the long history of support that you and this subcommittee have afforded this enterprise and I look forward to working with you in the future. Thank you very much for this opportunity to appear before you today.

[The prepared statement of Dr. Marburger follows:]

PREPARED STATEMENT BY DR. JOHN H. MARBURGER III

Madam Chairman and members of the subcommittee, I appreciate the opportunity to appear before you today to discuss the efforts of the Office of Science and Technology Policy (OSTP) in combating terrorism and weapons of mass destruction.

INTRODUCTION

The federal research and development (R&D) budget is an important tool for accomplishing national objectives in the war on terrorism. The President's proposed budget for 2003 calls for total federal spending of $2.1 trillion. Of that amount, $112

billion is for R&D and $37.7 billion is devoted to homeland security. The R&D portion of the combating terrorism budget is estimated to be $3 billion, which is as much as triple the level of comparable combating terrorism R&D for fiscal year 2002. At $2.4 billion, the largest portion of this funding is devoted to the area determined to be in greatest need—protection against biological weapons.

These funds have been requested by the President, on behalf of the agencies that will carry out the R&D programs that address the needs of the homeland security effort. Immediately after September 11, the key science agencies assessed their capabilities and began implementing programs, some of which are mentioned below, that responded to needs that were immediately apparent. OSTP's role is to track and coordinate such cross-cutting activity, and I will describe how that has been done. Before I discuss these organizational details, let me draw your attention to a few areas of technology that are relevant to combating terrorism. Other speakers today will provide more concrete detail.

A major role for technologies in combating terrorism is the detection of chemical, biological, radiological, nuclear or conventional weapons of mass destruction. In order to protect against them, or respond to their use quickly enough to mitigate their consequences, we need sensitive, effective, and affordable detection systems. We need detectors that show a high probability of detecting threats, while at the same time low rates for false alarms. These systems should be cost-effective, and easy to operate and maintain, if we are to deploy them in large numbers and in civilian venues. We have some capability today, but significant performance improvements are needed.

An example of technology being developed includes work at the Department of Energy on new detectors and algorithms focused on nuclear weapons material. This new technology can detect nuclear materials, while at the same time suppressing the effect of background radiation that leads to false alarms in current detection systems.

Another example where cutting-edge science is being used to combat terrorism is in the detection of biological agents. Substantial efforts are underway that use "polymerase chain reaction" techniques in very sensitive and highly selective detectors. This technique multiplies the DNA of specific pathogens in order to detect their presence in even a very small sample.

There are, of course, many other important and technologically exciting areas where the rich scientific and technological base within the United States is being deployed in the war on terrorism. These include better vaccines, treatments and decontamination methods to combat biological weapons, new methods for mitigating the health consequences associated with the use of radiological weapons, and biometric techniques that address the need to authenticate the identity of foreign visitors at our borders. The testimony of my colleagues from agencies where the actual work is done will provide many more examples of techniques and systems under development.

ROLE OF OSTP IN COORDINATING FEDERAL R&D

While OSTP plays an essential role in helping the President ensure coordination among agencies conducting R&D applicable to national security, our efforts reach beyond the federal government. My staff and I work not only with the White House, Congress and federal agencies, but also with the science community, the private sector and higher education. OSTP has worked to define an effective relationship with each sector.

The White House and the Office of Homeland Security

Since the inception of the Office of Homeland Security (OHS), OSTP accepted responsibility to coordinate the various R&D activities associated with the OHS mission.

My Assistant Director for Homeland and National Security has filled the post of Senior Director for Research and Development within OHS. This provides OHS seamless reach-back into the scientific talent resident in OSTP staff, and provides OSTP awareness of the various issues OHS is confronting, while bringing the resources of the science and technology community to bear on homeland security issues in an efficient and timely manner.

Working closely with OHS, an interagency working group called the Counter-Nuclear Smuggling Working Group has been created to develop a fully coordinated program for addressing the threat of nuclear smuggling across borders, both overseas and in the United States.

This working group will develop a strategic plan with a unified set of program goals and priorities, including within its scope the programs that implement and deploy current capabilities, as well as programs that research and develop new capa-

bilities. This group is co-chaired with the National Security Council and has been constituted under the Office of Homeland Security's Research and Development Policy Coordinating Committee.

The Federal Agencies and the National Science and Technology Council

OSTP facilitates R&D across federal agencies primarily through the National Science and Technology Council (NSTC). Following the terrorist attacks of September 11, I created a Rapid Response Team within the NSTC structure. This team draws on technical experts within relevant federal agencies to address critical time sensitive technical issues. An example of this was OSTP's assembling of a technical team to assist the United States Postal Service in evaluating the effectiveness of various proposals for sanitizing mail contaminated with anthrax spores.

I also established an Antiterrorism Task Force under the NSTC. That Task Force has produced four working groups:

- The Biological and Chemical Preparedness Working Group coordinates federal antiterrorism R&D efforts and is responsible for setting a 5-year research agenda in that area by August 1 of this year;
- The Radiological, Nuclear and Conventional Detection and Response Working Group performs the same function within its focus areas;
- The Social, Behavioral and Educational Working Group addresses social science R&D relevant to terrorism; and
- The Protection of Vulnerable Systems Working Group is concerned with the Nation's physical infrastructure and is intimately connected with the coordination efforts of the Special Advisor to the President for Cyberspace Security Richard Clarke. Together, we co-chair a Research and Development Working Group focused on this important homeland security mission.

In support of this activity, at my request the RAND Corporation is conducting a survey of each agency to create an inventory of antiterrorism activities. This survey will provide a snapshot of efforts underway throughout the federal enterprise, identifying gaps or duplication of effort.

OSTP also is engaged fully in such interagency groups as the Non-Proliferation and Arms Control Technology Working Group, led by the Department of State, and the Counterproliferation Program Review Committee, chaired by the Department of Defense. These groups serve to coordinate programs in the treaty verification and counterproliferation areas.

The Science and Technology Community Outside of the Federal Government

My office and I are working closely with the Nation's science and technology community to bring its resources to bear on national and homeland security issues. For example, NSTC's Antiterrorism Task Force is deliberately designed to be compatible with a similar structure formed by the National Academy of Sciences. This arrangement allows OSTP to communicate effectively with some of the best and most experienced scientists in the nation—many of whom had been thinking about domestic terrorism prior to September 11.

I also am working with Floyd Kvamme of the President's Council of Advisors on Science and Technology, which we co-chair, to study ways in which the Nation's private R&D sector can be better engaged in the fight against terrorism.

OSTP also maintains regular contact with numerous science, engineering and technology societies, as well as with higher education organizations, such as the American Council on Education and the Association of American Colleges and Universities.

As these examples indicate, the Office of Science and Technology Policy is fully engaged with the White House, federal agencies, and the Nation's science and technology community in coordinating the variety of science and technology efforts underway.

CLOSING

As noted earlier, current interagency processes, whether through the NSTC, the OHS Policy Coordinating Committees or other existing structures within the executive branch, are intended to avoid unnecessary duplication, while allowing for the exploration of alternative approaches to the complex problems associated with homeland security. Within the Nation's overall homeland and national security enterprise, I expect that science and technology will continue to play a pivotal role; it represents *our* "asymmetric" advantage. Although sobered by the threats we face and the fight we are in, I am optimistic that by relentlessly pursuing this advantage, the nation and the world will be made not just safer and more secure, but also better and more productive. I appreciate the long history of support you have af-

forded this enterprise, and I look forward to working with you in the future. Thank you for the opportunity to appear before you today.

Senator LANDRIEU. Thank you.

Let me say that there is a vote ongoing. I am going to leave at 10:00 to go vote and Senator Carnahan will be here to conduct the last hour. Again, the reason that I have to leave is we have an Appropriations Committee hearing on homeland defense and it is compulsory attendance this morning. As a member of Appropriations, though it was scheduled after this one, I just have to go.

But, Doctor, let me ask you. All that you shared with us is encouraging. In some ways though it is a little daunting to see how the White House efforts under your direction are being coordinated among different agencies and, considering we have now a Director of Homeland Defense, how the technology and research under homeland defense is being coordinated with your position at the White House.

Given that you outlined general categories that were different than the original three outlined by Dr. Sega, which were surveillance, power and energy, and aerospace—and I am assuming if I asked the Department of Energy their broad categories of combating terrorism for research and development, it would yet again be a different set of categories—how really is it going to be possible for our small business community and general community to coordinate the submission, evaluation, and distribution of these new technologies to get it to the battlefield, whether abroad or here at home?

So, my question is, what are you doing not so much under your own jurisdiction, but how are you coordinating specifically? Maybe if you could give us a specific example, it would be helpful.

Dr. MARBURGER. First of all, in my written testimony, I mention a task that the RAND Corporation is undertaking for us to produce an inventory of programs and activities in each Federal agency that relate to terrorism both at home and abroad. They are creating a taxonomy of these programs that is comprehensive and will enable us to identify overlaps and gaps in our coverage.

The categories, however, are defined to be compatible. Each agency has its own expertise and its own set of missions that must be accomplished in support of the overall, let us say, homeland security mission. It is expected that their categories will focus on those missions, but they are encompassed within the more general categories under which we have divided the tasks in our very high level coordinating task forces. The complexity can be arranged hierarchically, and we have representatives in OSTP who help us to understand the agency-specific missions that we coordinate. So, I believe that although the activities are complex, one can navigate through them, and part of our task is to help the private sector identify where to plug in.

The most important mechanism that we have discovered at this point is the Technical Support Working Group, and I believe Dr. Sega can describe its operation very well.

Senator LANDRIEU. If you would briefly, and if the other panelists would want to just add anything to this challenge of coordination. For the record, if you could submit those mission statements and those categories so that we can share those as we continue this

effort to really bring an understandable framework across at least the Federal level, and then in addition to the local and State officials responsible. Doctor?

[The information referred to follows:]

The following clarification is submitted by Dr. Marburger for the record. The National Science and Technology Council (NSTC), established by Executive Order 12881 on November 23, 1993, provides a mechanism in the Federal Government for interagency coordination of science and technology efforts. The Office of Science and Technology Policy (OSTP) supports and oversees activities of the NSTC. The Task Force on Anti-Terrorism Research and Development was formed soon after the 2001 terrorist attacks to coordinate antiterrorism R&D efforts across Federal agencies. Below is a description of the missions of each of the working groups within the Task Force and the agencies involved. This is in response to Sen. Landrieu's request for more information on the relevant R&D agencies and the nature of the antiterrorism missions to which these agencies contribute.

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National Science and Technology Council

Task Force on Anti-Terrorism Research & Development

Formed in December 2001; chaired by Director, OSTP; five working groups.

1) Biological and Chemical Preparedness R&D Working Group

The Biological and Chemical Preparedness (BCP) Working Group brings together Federal agencies that fund and oversee BCP research and development (R&D) efforts or that use the results of such activities. BCP for combating terrorist threats to U.S. citizens and residents (human health), and to animal and plant species of economic or cultural importance to the United States will be the overarching goal of the Working Group's efforts. Issues to be addressed by the BCP Working Group include identifying current BCP R&D activities that can inform the Federal antiterrorism agenda (e.g., assessment of existing identification and detection technologies, databases and bioinformatics programs); identification of technological preparations and response options (e.g., vaccines, treatments, neutralization methodologies, automated response planning systems); determining how R&D efforts can be better linked to current "operational" antiterrorism activities; examining the scope of and linkages between current public and private R&D agendas; assessing the research infrastructure (e.g., capacity, core competency, sources of current expertise); and identifying priorities for strengthening antiterrorism programs. The Working Group will work actively with appropriate groups chartered by the OHS and NSC, and with the National Academies of Science and professional organizations to coordinate efforts and to enlist the participation of appropriate National experts.

Chairs: Robert Foster, DOD; John LaMontagne, NIH/NIAID; Rachel Levinson, OSTP.

Members: DOD, HHS, CIA, DOC, DOE, DOT, EPA, NSF, USDA, DOJ/FBI, VA, STATE, DOI, NASA, Treasury, OMB, NSC, OHS, OSTP

2) Radiological, Nuclear, and Conventional Threats Detection and Response R&D Working Group

The RNC group is tasked:

- to understand the radiological, nuclear, and conventional threat and associated U.S. vulnerabilities;
- to develop a prioritized set of goals for detecting and responding to that threat;
- to understand the technical alternatives for detection and response; and
- to develop a 5-year R&D program aimed at satisfying the performance goals.

The near term work program includes:

- surveying the threats;
- reviewing current agency requirements for prevention, detection, response, treatment, decontamination, modeling and simulation, and other required activities;
- assessing likely progress toward meeting those requirements under current R&D programs.

Chair: Parney Albright, OSTP/OHS

Members: CIA, DOT, DOC, EPA, DOD, NSF, DOE, NSC, DOJ, NRC, DOS, OMB

3) Social, Behavioral, and Education Sciences R&D Working Group

The Social, Behavioral and Education Sciences (SBE) Working group brings together agencies who oversee SBE R&D efforts that are relevant to antiterrorism activities, as well as agencies with programmatic activities related to the agenda of the working group. Issues to be addressed by the SBE working group include identifying current SBE R&D activities that can inform the federal antiterrorism agenda (e.g., terror management, decision-making analysis, crisis intervention care, etc.), determining how such efforts can be better linked to current antiterrorism planning and response activities, and drafting a coordinated and integrated interagency SBE antiterrorism R&D agenda and budget. The Working Group will actively work with the National Academies of Science and SBE professional organizations to coordinate efforts and to enlist the participation of academic researchers and policy analysts. The group will produce a prioritized portfolio review and recommendations for areas requiring additional R&D funding.

Chairs: Norman Bradburn, NSF/SBE; Raynard Kington, NIH/OBSSR; James Griffin, OSTP.

Members: OSTP, NSF, NIH, DOD, DHHS, VA, NIJ, CDC, OHSA, and ED, with new members being added from the CIA, EPA, NIOSH, DARPA and FBI.

4) Protection of Vulnerable Systems Working Group

The goal of the Protection of Vulnerable Systems Working Group is to improve, through an effective program for research and development, on our nation's capability to protect its key physical infrastructure from terrorist attack. Systems of concern are those of which damage or denial would cause serious harm (physical, economic) to large regions of the nation or the nation as a whole.

The working group will address technical issues related to vulnerable systems, with specific attention on producing a coordinated research and development agenda for detecting and mitigating attacks on vulnerable infrastructure. Products of the working group may also include interagency coordination of budget proposals and recommendations for Presidential decisions, executive orders, legislation, and international agreements.

Example systems of concern include, but are not limited to:

- Nuclear reactors and radioactive waste storage facilities
- Dams
- Major agricultural and food distribution processing sites
- Major oil and gas pipelines and storage facilities, LNG tankers
- Major chemical production plants and facilities
- Electrical power generation and major grid elements
- Water supply systems
- Major transportation nodes; hazmat transportation
- Mail and package delivery
- Physical infrastructure associated with telecommunications systems
- National treasures and symbolic sites

In addition, interdependencies among these systems will be considered.

The working group will assess and prioritize measures to increase the protection of vulnerable systems, including 1) preparation and denial (to increase target hardness and system resilience), 2) detection of an imminent attack or that an attack is underway, and 3) consequence management.

Several Sub Working Groups will be established a priori: Water Supply System Safety (EPA lead); Dams (DoI and Corp of Engineers, co-leads); Nuclear Reactors and Radioactive Waste Storage Sites (NRC lead); Transportation (DoT lead); Oil and Gas Transport and Storage (DoE lead); Major Chemical Production Plants and Facilities (OSTP and EPA, co-leads); Agricultural and Food Distribution Nodes (USDA lead); Electric Power Grid (DoE lead); Telecommunications Physical Infrastructure (DoC lead); Mail and Package Delivery (OSTP lead); and Interdependencies (OSTP lead).

These subgroups should develop or update vulnerability and risk assessments; provide updates on the status of earlier initiatives; and address preparation and denial, attack

warning, and consequence management in terms of current capabilities, realistic performance goals, and potential R&D initiatives.

The Working Group's work program:

- Review vulnerabilities
- Review current programs, capabilities, and agency goals
- Review current relevant R&D programs
- Provide draft guidance to FY2004 budget process
- Formulate long-term research agenda

Chair: Parney Albright, OSTP/OHS

Members: USDA, US Army CoE, CIA, DoC/Critical Infrastructure Assurance Office, DoD, DoD/DTRA, DoD/DARPA, DoE, DoE/NNSA, DoE/OS, DoI, DoJ/FBI/ National Infrastructure Protection Center, FEMA, NRC, NSC, OHS, OMB, OSTP, Treasury/Customs, DoT, DoT/FAA, DoT/USCG, NSF.

5) Rapid Response Working Group

The Rapid Response Team consists of greater than 25 Federal agencies with expertise and technologies related to homeland security. From the agency points of contact list, small working groups are established on an *ad hoc* basis to fulfill the mission of the response team working group. The mission is to form expert subgroups in response to timely, emergent issues which require the scientific and technical expertise of the Federal government's agencies. The agency points of contact have the authority to request their agency personnel for aid in rapidly responding to questions, proposals or directives from the OSTP Director and other White House Offices. The subgroups, through the OSTP representative, will report their findings/ recommendations to the OSTP Director for the appropriate action. For example, the OSTP Irradiation Technical Team elicited help from the AFRRI/DOD, NIST, USDA, FDA, and DOE to address through experimental design and make recommendations to the USPS on the sterilization of the mail contaminated with *Bacillus anthracis*. The team continues to function in scientific evaluation of the mail irradiation issue and in ongoing experiments related to the use of X-rays in decontaminating larger packages. Likewise, the OSTP Ethylene Oxide (EtO) Technical Team was assembled with scientific experts from DOJ, EPA, FDA, CDC, CIA, AFRRI/DOD, and OSHA in order to determine the technical parameters and standards of EtO sterilization for decontaminating mail packages and items of the biopathogen.

Chair: Lawrence Kerr, OSTP/OHS

Members: AFRRI, CDC, CIA, DARPA, DOD, DOEd, DOE, DOI, DOJ, DOT, EPA, FBI, FDA, FEMA, HHS, NASA, NOAA, NIC, NIOSH, NIST, NRC, NSF, OHS, OMB, OSHA, State, USDA, USPS, USSS, VA

5/6/02

Dr. SEGA. Yes, thank you. The three overall technical areas that I described were for the entire Department's science and technology program.

In the areas of combating terrorism, the task force that I described earlier identified four categories: deterrence and indications and warning, survivability and denial, consequence management and recovery, and attribution and retaliation. So, we focused on those areas to look at near, mid, and longer-term investment strategies.

When we released the first broad area announcement, the scope was divided into four areas so that the investigators or the small businesses, universities and so forth would know what areas that this pertained to. The first was combating terrorism. The second was location and defeat of hard or difficult targets. The third, protracted operations in remote locations. The fourth, countermeasures to weapons of mass destruction. I believe we have submitted and released the second broad area announcement. It will have a slightly different focus. Then a third is planned. So, we bring together more focus in each of these areas for the broad area announcements so we can work through the submitted proposals, but we tie them back to those four areas of combating terrorism that are cross-cutting, and they align reasonably well with the activities that we have joined in with OSTP.

Senator LANDRIEU. Well, I just think it is a very important effort and we will continue to explore those details with you.

Dr. Klein?

Dr. KLEIN. Let me give you an example of some of the coordination. Obviously, as the Assistant Secretary for Nuclear, Chemical and Biological Defense Programs, we look at a lot of weapons of mass destruction activities to protect the warfighters and the military installations, equipment, and so forth. We have had a lot of meetings with Homeland Security to find out where we can take applications that we have on the military side that can assist on the civilian side. So, we work closely with General Lawler at the Office of Homeland Security and others in terms of how can we take technologies that are already on the military side and communicate those and transform those to the civilian side.

We have two programs that are underway, one that is handled by Dr. Younger on some sensors that we can put in civilian activities through the Defense Threat Reduction Agency and others within the Chemical and Biological Defense Program. So, we serve on a lot of panels and we have a lot of communication, and we are trying to coordinate.

I think just generally speaking I believe the coordination among the Federal agencies is probably among the best that they have been for a long time. I think the events of 9/11 enhanced that. We have a ways to go and we are continually working on that problem to make it better.

Senator LANDRIEU. Anyone else? Dr. Younger or Mr. Waldron?

Dr. YOUNGER. No.

Mr. WALDRON. No.

Senator LANDRIEU. I am going to excuse myself and go over to vote. I have been joined by my most able ranking member, Senator Roberts, who chaired this subcommittee for many years very ably and has been very interested and focused on the science and technology and coordination issue, particularly as it relates to combat-

ing terrorism. So, I am going to leave this subcommittee in his able hands and will be in touch with you all.

Senator ROBERTS. Before you do, I would ask unanimous consent that my statement be made part of the record and any questions that I may be unable to ask be submitted for the record.

Senator LANDRIEU. Without objection.

[The prepared statement of Senator Roberts follows:]

PREPARED STATEMENT BY SENATOR PAT ROBERTS

Good morning and thank you Madam Chairman for calling this important hearing. Before I proceed with my opening statement, I would like to take a moment to extend my sincere appreciation to our witnesses.

Each of you have found yourself in the service of our government at an extremely important time in our Nation's history. We realize that since September 11, many of you have been working long and exhaustive hours coordinating and executing the war on terrorism. Your contributions to this war have been substantial. It is with our most sincere appreciation of your service that we welcome you and look forward to your testimony.

Since September 11, this committee has been focused on a number of issues vital to the global war on terrorism. This morning's hearing provides us with the opportunity to examine an area of critical importance to both our national defense and the global war on terrorism—technologies to combat terrorism and weapons of mass destruction.

Often new technologies are showcased as simply "gee whiz" capabilities of our soldiers. But the important story lies beneath the wizardry.

The real story is the commitment of our nation to a strong and sustained technology base and a thriving culture of innovation. In order to stop terrorists, who have proven to be unconventional in their delivery, nimble and patient, our technological efforts must be agile, imaginative and exploit the best minds in the world.

September 11 demonstrated what many knew all along and that is: *the threat has changed.* This requires the way we do business to change as well.

- The Department of Defense can no longer rely on the standard of being technologically superior, it must be technologically agile.
- The Department can no longer rely on the slow maturation of technologies to combat terrorism and weapons of mass destruction, it must exploit technologies at all stages of development.

Maintaining a culture of discovery and innovation is more important than ever to our national security. In addition, we must begin to understand not only the technologies necessary to combat terrorism and weapons of mass destruction, but also the technologies required to protect our homeland, our prosperity and our way of life.

It is apparent by the breadth of witnesses before us today that the technologies required to effectively combat terrorism and weapons of mass destruction reside in numerous defense agencies and across the Federal research agencies. I look forward to your testimony regarding the fiscal year 2003 budget request for your respective agencies and the coordination efforts underway in order to leverage breakthrough technologies.

Again, thank you Madam Chairman for calling this important hearing.

Senator ROBERTS. Is it your wish, Madam Chairman, to simply go ahead with the testimony? I think Dr. Younger or Mr. Waldron still have to testify. Is that correct?

Senator LANDRIEU. Dr. Klein and Dr. Younger and Mr. Waldron, yes.

Dr. Sega needs to finish. He has some wrap-up testimony that he is going to share.

Senator ROBERTS. Right. So, it would be your wish that we proceed with their testimony, then move to the second round of questions, and then the distinguished Senator from Missouri will return. Is that correct?

Senator LANDRIEU. That is correct.

Senator ROBERTS. Thank you.

Senator LANDRIEU. Thank you.

Dr. Sega.

Dr. SEGA. In the earlier testimony, I talked about the DOD Combating Terrorism Technology Task Force and the membership that it contained within the Department of Defense. I want to also emphasize that the task force was joined with representation from the Joint Staff for a user perspective, from the Department of Energy and the intelligence community, and we reached out to other organizations outside of the Department of Defense because we believe that is very important and also outside of the U.S. in certain partnerships. In fact, we hosted a NATO research and technology organization meeting on combating terrorism. So, the effort started as a core, but within just a couple of weeks went beyond the Department of Defense to other Federal agencies and then began to encompass folks in the United States and then outside.

There are some examples of combating terrorism technologies that I would like to show very briefly just to emphasize the work that is being done and how these apply not only inside the Department of Defense but some have tremendous applicability outside.

The first is a result of an Advanced Concept Technology Demonstration, and it is kind of like a palm pilot. I will turn it on and then pass it around. It is a rapid terrain visualization, and it brings together imagery from a flying aircraft in this case to the point where it processes it and you have a detailed high definition image in three dimensions. It was used at the World Trade Center to understand the debris volume, and the geometry there was such that it had worked itself kind of more in the subterranean area. It was also used in Salt Lake City in support of the Winter Olympics. It can be used also in the field, which was the initial design, to understand terrain, and we continue to evolve that for linkage to other systems such as global positioning systems. So, this is an example that came out of an Advanced Concept Technology Demonstration. There are currently 30 ACTDs in use in Operation Enduring Freedom or Operation Noble Eagle and another 8 have been accelerated into kind of a more of a quick reaction program.

Three others that I have on the table are DARPA related efforts. One is a translator, and this has the ability to translate into Pashto.

Senator ROBERTS. I am still looking at the world. Pardon me. [Laughter.]

Dr. SEGA. Urdu, Dari.

Senator ROBERTS. There is a message here from your wife, if you want to hear it. [Laughter.]

Dr. SEGA. That is very good. I will see if I can bring it up on this one as well. [Laughter.]

Arabic. So, this was actually in Afghanistan roughly 72 hours ago.

Senator ROBERTS. What is that again? I am sorry.

Dr. SEGA. This is a translator. So, it translates into these languages. As I pass this on, the one that is highlighted happens to be, "The doctor will be here soon." But one pushes the button, and when it is set up, it will read back the phrase in the particular language. You can scroll through and look at the different phrases that are in there. We are rapidly expanding that to have a number

of languages that are input into the system. So, communication to people in a different language is now enabled by a system such as this.

Senator ROBERTS. So, if the problem was in the Balkans and Bosnia and/or Kosovo the lack of language specialists to do certain things, with this gizmo—pardon me for referring to it as a gizmo—you could use this, i.e., "the doctor will be here soon," "turn around slowly"—[Laughter.]

Dr. SEGA. Some of these you do want to get right. [Laughter.]

Senator ROBERTS. It says, "Welcome, Senator Carnahan" here. [Laughter.]

You can turn around as fast as you want, Senator. [Laughter.]

But at any rate, with this, with almost any language in the Mideast where we are having a lot of difficulty obviously with linguistics—what is this called? This is from DARPA?

Dr. SEGA. Yes, and it is a translator.

Senator ROBERTS. Right. We have these now being used in Afghanistan.

Dr. SEGA. Yes, 28 units are currently in Afghanistan.

Senator ROBERTS. We in Kansas could use this for translating what the Missourians are up to. [Laughter.]

Dr. SEGA. The next item. We would have liked to bring one that was used in Afghanistan, but the folks in the field would not let the DARPA person bring them back because they were of such utility. This is a disinfectant pen. The way this works, there is a salt but it is a mixed chemical oxidant solution that either kills or inactivates microbial pathogens. From a container of water—and it can be a canteen—putting the water in here—and we could do that if you wanted—and then screwing it on the top here, and then shaking it a few times and then one complete shake here, and then bringing this back out, this small quantity of water, and back into the canteen itself and just a little shake of the canteen and set it for 15 minutes, the water is potable. This container will do and repeat that for about 300 canteens. So, this is very important for the folks in Afghanistan. I believe 20 have been delivered and the current cost is about $700, but we are looking at bringing this cost down hopefully down to around $100. But this is an impressive technology as well that is being used.

Senator ROBERTS. Is there a time frame there where this will be made available to the troops in the field? I know it is available.

Dr. SEGA. Yes, and I think they have the capacity to go up to about roughly 500. So, I think they are in the process of ordering additional numbers of these.

But this came out of a very rapid acceleration of a DARPA effort to bring this item, among others, to the field quickly. So, it is more of the prototype residuals that we are trying to produce and then bring it into a more aggressive manufacturing mode.

The third is a micro air vehicle. I believe that this has 100 or 200 hours on it. This vehicle can fly for about 30 minutes at a top speed of about 50 knots, and it uses a fuel very similar to radio-controlled models. The next version will be able to fly for about an hour, perch, stare, and operate autonomously for about 200 hours. The following one will use not the fuel that I just described of radio-controlled modelers, but rather either diesel fuel or JP–8 and

the electronics will have batteries. So, this has had significant field testing and it will provide again the soldier a look in the vicinity to fly above and around. So, they have their own UAV, if you will, for supporting primarily a lowest level fighting team, a platoon or a squad.

I hope that we removed the fuel from it so the inadvertent switch throws will have it remain on the tabletop. [Laughter.]

Senator ROBERTS. Well, we have made our water potable up here. So, this will be the second step. I will just hang on, Jean, and we will go to the top. [Laughter.]

Dr. SEGA. Another follow-up. At the very end of the fiscal year 2002 budget process, $15 million was added to quick reaction munitions funds, and I would just like to report work is being done and the static test was performed on Monday of application of the thermobaric effort which we showed a film earlier on to application of the Hellfire missile, as well as work on infrared sensor seeker technology for the 2.75-inch Low-Cost Guided Imaging Rocket (LOGIR). It actually uses some of the work that was developed by the automotive industry. So, we are moving forward rapidly and I think putting those funds to good use.

I would like to now pass on the discussion on combating terrorism to Dr. Klein.

STATEMENT OF DR. DALE KLEIN, ASSISTANT TO THE SECRETARY OF DEFENSE FOR NUCLEAR, CHEMICAL AND BIOLOGICAL DEFENSE PROGRAMS

Dr. KLEIN. Thank you. Madam Chairman, Senator Roberts, I would like to thank you for the opportunity to appear here today. I currently serve as Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs, and in that capacity, I serve as the principal staff advisor to the Secretary of Defense on nuclear, chemical, and biological defense matters. I am responsible for the following Department of Defense areas: chemical and biological defense programs, nuclear matters, and the Nuclear Weapons Council, nuclear treaty programs, counterproliferation of weapons of mass destruction, chemical stockpile demilitarization, and operation of the Defense Threat Reduction Agency.

Dr. Steve Younger, the Director of the Defense Threat Reduction Agency, will discuss some ongoing activities in his agency momentarily.

I am here today to focus primarily on the committee's interest on the research and development efforts to combat chemical and biological terrorism. If you have questions regarding our nuclear activities, I will certainly be happy to address those as well.

Let me just say that the unprecedented events of September 11 have clarified the threat of terrorism to both civilians and the military. For several years, the Department of Defense has played an active role in developing countermeasures to potential terrorist attacks involving weapons of mass destruction. The anthrax-contaminated letters focused attention on the use of biological weapons as an instrument of terrorism.

In my written testimony, which I wish to submit for the record, I discuss the Department of Defense chemical and biological defense program, the science and technology programs, and key ini-

tiatives intended to combat terrorist attacks as identified in the fiscal year 2003 budget request. Detailed information is also available in the Chemical and Biological Defense Program Annual Report to Congress.

In addition to research and development programs, the Department of Defense is working closely with other Federal agencies as defined in the Interagency Federal Response Plan to ensure a well-coordinated response to terrorist threats. We are working closely with these agencies to provide unique science and technology resources which support both warfighting and homeland security needs.

The Department of Defense is exploring an array of scientific approaches to counter biological warfare, biological terrorism threats, chemical warfare and chemical terrorism threats which can have application to homeland defense. We will continue to work closely with other agencies to ensure that the warfighter is protected with the best available technologies and that U.S. citizens are provided as great a degree of protection as possible.

Thank you for the opportunity to speak here today, and I will be happy to respond to your questions. I believe Dr. Younger will also comment on the Defense Threat Reduction Agency.

[The prepared statement of Dr. Klein follows:]

PREPARED STATEMENT BY DR. DALE KLEIN

INTRODUCTION

Madam Chairman and distinguished committee members, I am Dr. Dale Klein, Assistant to the Secretary of Defense (Nuclear and Chemical and Biological Defense Programs). I serve as the principal staff advisor to the Secretary of Defense on nuclear, chemical and biological defense matters. My office is the single focal point within the Office of the Secretary of Defense responsible for oversight, coordination, and integration of the joint Chemical and Biological Defense Program.

The unprecedented events of September 11 have clarified the threat of terrorism to both civilians and the military. For several years, the Department of Defense has played an active role in developing countermeasures to potential attacks by terrorists using weapons of mass destruction (WMD). The anthrax contaminated letters focused attention on the use of biological weapons as an instrument of terrorism. In my testimony today, I wish to discuss the Department of Defense Chemical and Biological Defense Program, and focus on the science and technology programs and key initiatives intended to combat terrorist attacks as identified in the fiscal year 2003 budget request. Specifically, I will address the following topics:

- The Department's technology priorities and objectives for combating terrorism and WMD.
- The capabilities the Department is trying to achieve with these technology programs.
- How technology priorities are established and how the relevant organizations play in this process.
- Major technology challenges we face and how we are addressing them.

DOD TECHNOLOGY PRIORITIES AND OBJECTIVES FOR CHEMICAL AND BIOLOGICAL DEFENSE

The vision of the DOD Chemical and Biological Defense Program (CBDP) is to ensure U.S. military personnel are the best equipped and best prepared force in the world for operating in future battlespaces that may contain chemically and biologically contaminated environments. The capabilities developed and fielded by the CBDP focus on addressing the needs of the warfighter. As the events of the past few months have shown, the future battlespaces for our warfighters are evolving. Likewise, civilian organizations may increasingly turn to the Department of Defense to leverage technology development efforts to support the needs of homeland security. The fiscal year 2003 President's Budget Request for the DOD Chemical and Biological Defense Program includes $933 million for research, development, test,

and evaluation (of which $576 million is for the science and technology base) and $436 million for procurement for a total of $1.369 billion. The specific funding allocations are detailed in the Annual Report to Congress on the Chemical and Biological Defense Program as well as in the detailed budget requests submitted to Congress. This funding provides support for essential research and development activities to address future warfighting needs.

The objective of the CBDP is to ensure our forces can maintain freedom of action during deployment, maneuver and engagement, while providing multi-layered defenses for our forces and facilities at all levels. Programs for chemical and biological defense are categorized broadly under three operational principles: *Contamination avoidance, protection, and restoration. Contamination avoidance* provides automated capabilities to detect, locate, identify, quantify, sample, and plot the extent of all suspected threat agent hazards, and medical surveillance capabilities. *Protection* includes all medical and non-medical means taken to protect the warfighter primarily from biological agent hazards and to a lesser degree, chemical agent hazards while maintaining normal operational mission tempo. The focus of protection is to prevent exposure or the effects of exposure, and includes medical capabilities, such as vaccines, and nonmedical capabilities such as masks for respiratory protection. *Restoration* capabilities include medical and non-medical measures required to restore the joint force, units, facilities, and equipment to near-normal operating conditions after being challenged by a biological or chemical agent hazard. These measures include non-hazardous decontamination operations, effective supply and sustainment of all defense assets, and effective medical diagnostics and post-exposure countermeasures required to allow rapid determination of agent exposures and subsequent treatment. *Battlespace management* supports all three principals. *Battle management* includes capabilities to use medical and non-medical information throughout the joint battlespace; and to analyze this information; to predict current and future operational impacts of hazards and to model mission operations within the context of the contaminated environment.

DOD TECHNOLOGY INITIATIVES FOR COMBATING CHEMICAL AND BIOLOGICAL TERRORISM

The administration has provided a significant addition of funds for two key initiatives—(1) Biological Counterterrorism Research Program, and (2) Biological Defense Homeland Security Support Program. These two initiatives will be implemented by the Department of Defense in support of the President's direction and the overall interagency effort. In DOD, funds for these initiatives are in addition to the core programs of the CBDP. Another key effort is the CB Defense Force Protection and Homeland Security Initiative.

Biological Counterterrorism Research Program

This defensive program will establish a biological terrorism threat assessment research center for biological counterterrorism at the U.S. Army Medical Research and Materiel Command, Fort Detrick, Maryland. A panel of senior scientists from DOD, federal labs, academia, industry and intelligence communities will develop concept and scope of threat assessment research. The research program will initiate competitive extramural contracts during design and construction phase. The unique facilities at Fort Detrick will support DOD and national requirements for analysis of emerging biological threats and assessment of countermeasures against those threats. The fiscal year 2003 program will:

- Conduct a technology survey and identify gaps.
- Award extramural research with emphasis on identification of virulence factors, pathogenic mechanisms and structural biology.
- Establish research programs in aerobiological research, forensic genomics and certified forensic biological threat agent capability.
- Initiate planning and concept development for necessary infrastructure.
- Develop applied microbial threat assessment research to assist in the development of the Counter Terrorism Research Program and to establish a management element for the Program; develop program policy, strategic plan, short through far term investment strategies.
- Develop environmental and access control point monitoring.
- Develop enhanced medical surveillance technologies.
- Demonstrate an enhanced signatures database and conduct baseline studies.
- Develop improved biological defense data mining, fusion, and analysis architectures.
- Conduct Baseline Self Assessment (BSA), Mission Area Assessments (MAAs), and Requirements Analysis and Process Development.

Biological Defense Homeland Security Support Program

This program initiates a comprehensive program to build a National Biological Defense System. It aims to create and deploy a national, multi-component, multi-organization defense capability targeted to urban areas, other high-value assets, and special events. It seeks to provide an integrated homeland security capability to detect, mitigate and respond to biological-related incidents. Capabilities would include:

- Enhanced biological detection capabilities and the fusion of medical surveillance systems, wide-area environmental sensors, access control points and information systems.
- Deployed systems will exploit existing technology supplemented with new capabilities resulting from accelerated development.

DOD Force Protection and Homeland Security Initiatives

In addition, the Chemical and Biological Defense Program plans to establish a fully-equipped DOD test-bed in an urban environment, an enhanced monitoring system for the National Capital Region and an initial capability in two additional urban areas in order to enhance the protection of DOD assets against terrorist attacks with chemical or biological weapons. Specific research and development activities in fiscal year 2003 include:

- Enhanced biological detection capabilities and the fusion of medical surveillance systems, wide-area environmental sensors, access control points and information systems.
- Requirements analysis, system integration, and program support for DOD installation and urban test beds.
- Environmental and access control point monitoring for the integration of point, standoff, and transportable detection technologies.
- Demonstrate initial mining, fusion, and analysis module, incorporate modeling and analysis of threat transport prediction, adopt command, control, and communications infrastructure, and integrate information networking.
- DOD test bed design, environmental testing, and test bed trials.
- Initiate the integration of point-of-care diagnostics, syndromic reporting and medical surveillance mining.
- Integration of signature source term cataloging into system of system technology architecture.
- Consequence Management in support of the National Guard's Weapons of Mass Destruction-Civil Support Teams (WMD–CSTs), including initiating evaluation, purchase, and testing of commercial-off-the-shelf products for the Table of Distribution & Allowances (TDA) for WMD–CSTs.
- Integration, demonstration, and testing of: (1) CB collection, detection, and identification technologies, (2) reagents and antibodies for biological detection, and (3) an automated biological agent testing laboratory.
- Initiate systems engineering studies for deployment of sensors in the National Capital Region.
- Conduct Ambient Breeze Tunnel testing and characterization of system and components.
- Conduct background aerosol and indoor building flow character and testing.
- Conduct wargames/tabletop exercises for Concepts of Operations (CONOPS) development.
- In support of Consequence Management—Initiate development of a Unified Command Suite (UCS) and Mobile Analytical Laboratory (MAL) block upgrades to support WMD–CSTs.

This program also provides resources in the DOD Chemical and Biological Defense Program to complete fielding and modernization of (1) Weapons of Mass Destruction-Civil Support Teams, and (2) Reserve Component Reconnaissance and Decontamination Teams. Full funding includes the following in the fiscal year 2003 budget:

- Type-classified protection, detection, and training equipment.
- Development and fielding of upgraded analytical platforms for the detection, identification, and characterization of CB and radiological agents used by terrorists in a civilian environment.
- Development and fielding of communication capabilities that are interoperable with other federal, state, and local agencies.
- Testing and evaluation to ensure that the systems are safe and effective.
- Program management funds to successfully execute the CBDP Consequence Management RDA program.

Another key element of the Biological Defense Homeland Security Support Program is the *Joint Service Installation Protection Project* (JSIPP). The JSIPP is a Pilot Project designed to increase CB defense capabilities at DOD Installations. The JSIPP is intended to provide a robust CB defense capability integrated into installation force protection and anti-terrorism plans. The project will refine concepts of operations and resource requirements for expansion across DOD. The two key components of this project are the: (1) Chemical Biological Installation Protection Program, and (2) Chemical, Biological, Radiological, Nuclear and High-Yield Explosives(CBRNE) Emergency First Response Program. The project will equip nine diverse DOD Installations with:

- Contamination Avoidance, Protection, and Decontamination Equipment Packages.
- Emergency response capability for consequence management.
- Integrated Command and Control Network.
- Comprehensive training and exercise plan.

Finally, the fiscal year 2003 budget includes procurement funds to support homeland security biological defense. Procurement will support the following:

- *First Responders*—procures emergency first-response capability for consequence management—supports organizing, equipping, training, and conducting exercises for first responders.
- *Installation Force Protection Equipment*—procures CBD equipment packages for nine installations; buys Dry Filter Units, Joint Portal Shield biological agent detectors, Automated Chemical Agent Detectors, Remote Data Relays, Ruggedized Advanced Pathogen Identification Device (RAPID), and operational fielding support.
- *WMD Civil Support Teams*—procures new equipment training support, required equipment and required Operational Assessments for 32 WMD–CSTs.
- *Homeland Security Initiative*—procures a dual-use operational capability for integrated bio-surveillance, detection, and alerting in the National Capitol Region within 12 months.

DOD INTERAGENCY COORDINATION ON CHEMICAL AND BIOLOGICAL-TERRORISM RELATED RESEARCH AND DEVELOPMENT

Within DOD, the key organizations responsible for the management and transition of science and technology efforts for chemical and biological defense are (1) the Joint Science and Technology Panel for Chemical and Biological Defense, and (2) the Joint Medical Chemical and Biological Defense Research Program. These organizations help to ensure effective coordination of efforts among the Service Laboratories and Defense Agencies, including the Biological Warfare Defense program of the Defense Advanced Research Projects Agency (DARPA). In addition to management responsibilities, DOD provides many unique resources that can be used in the development of countermeasures to biological terrorism. Some of these unique resources include high containment (biosafety level 4) laboratories, aerosol exposure test chambers, live agent test facility, simulant test grids, and personnel with exceptional scientific expertise.

The Department of Defense has established a set of requirements for the successful completion of military operations in chemical and biological environments. We submit an Annual Report to Congress documenting our progress in meeting these requirements. My office regularly coordinates its efforts with the Department of Energy and the intelligence community through the Counterproliferation Program Review Committee, which reports annually to Congress on its progress (provided as a classified document to Congress).

In order to meet the challenge of biological warfare across the spectrum, our program must address the need for both materiel improvement and operational concepts to use the new and improved equipment. In order to address the issue of bioterrorism, we have documented gaps in previous exercises and these will be the focus of reprioritized efforts within the Department of Defense. One of the lessons of previous exercises was that to work effectively during an actual crisis, various governmental agencies must actually exercise beforehand or their "cultural differences" will overcome any plan. We will continue to work with the Office of Homeland Security and other agencies to ensure good working relationships. One specific area we will focus on is to help define what support the Department of Defense can provide and work with other agencies to define what support they request and need.

While the DOD can provide unique expertise and materiel support, it is not charged with lead Federal agency responsibilities as described in the interagency Federal Response Plan. In the area of domestic terrorism medical response, the De-

partment of Health and Human Services takes charge and requests support as needed. However, the Department of Defense provides materiel support to other organizations.

Congress has provided a number of statutory methods for the Department of Defense to support other federal, state, and local agencies in preparing for and responding to weapons of mass destruction (WMD) terrorism. Requests may come to the department for operational support or for the purchase of equipment. These requests are approved on a case-by-case basis. My office has responded to a number of requests from other-federal agencies for individual and collective protective equipment and access to vaccines, while the operational support provided by the Department is coordinated through the Secretary of the Army. The Department will continue to provide this support within statutory and regulatory limits and balance requests against the readiness of military forces to accomplish their warfighting mission.

DOD can offer many of its systems, either those in the field or in development, and expertise that may prove useful to civil agencies. DOD's chemical and biological detection equipment could be applied in civilian situations, as can many of our medical countermeasures. However, the provision of materiel alone does not enhance capability, it needs to be accompanied by valid operational concepts, training, and maintenance.

Our Armed Forces are trained primarily to fight foreign adversaries. However, our forces also maintain significant capabilities to support homeland security, through such operational units as the Chemical and Biological Rapid Response Team, the Technical Escort Unit, the WMD-Civil Support Teams, and the Marines' Chemical and Biological Incident Response Force (CBIRF).

In order to enhance our Nation's overall capabilities the Department of Defense participates in programs to support the transition of military equipment and concepts to civil agencies. Specifically,

- The Technical Support Working Group (TSWG), rapidly prototypes emerging technologies for high priority federal interagency requirements;
- The Interagency Board for Equipment Standardization and Interoperability (known as the IAB), is a partnership with federal, state, and local agencies focused on the capabilities necessary for fire, medical, and law enforcement responses to WMD terrorism;
- The Domestic Preparedness Program (now a Department of Justice program), mandated under the 1997 Nunn-Lugar-Domenici legislation, trained and equipped municipalities to address WMD terrorism;
- Interagency agreements with Department of Justice's Office Domestic Preparedness to purchase equipment; and
- Medical training programs from the U.S. Army Medical Research Institutes of Infectious Diseases and Chemical Defense.

These efforts represent the Department's procurement and research support to address bioterrorism. As federal agencies assess their needs, DOD anticipates additional requests for support.

CONCLUSION

For operational responses to biological terrorism, the Department of Defense is working closely with the lead federal agencies as defined in the Federal Response Plan to ensure a well coordinated response. As I discussed, the Department of Defense is exploring an array of scientific approaches to counter biological warfare and biological terrorism threats. We are working closely with several other federal agencies to provide science and technology resources to support warfighting and homeland security needs. We will continue to work closely with other agencies to ensure that the warfighter is protected with the best available technologies and that U.S. citizens are provided as great a degree of protection as possible. Thank you for the opportunity to speak here today, I would be happy to respond to any questions.

STATEMENT OF DR. STEPHEN M. YOUNGER, DIRECTOR, DEFENSE THREAT REDUCTION AGENCY

Dr. YOUNGER. Thank you, Madam Chair and Senator Roberts for the opportunity to share with you some of the contributions of the Defense Threat Reduction Agency to our Nation's warfighting capability. I will summarize my written statement and just include a few remarks now.

The mission of DTRA is simple to understand but it is critically important, and that is, to reduce the threat of weapons of mass destruction. That is what we do. We reduce the threat of weapons of mass destruction, or so-called WMD. The events of September 11 demonstrated very graphically that the urgency for this mission has increased since the end of the Cold War. Any country with even a minimal technological capability can produce certainly chemical weapons and probably biological weapons, and we know that there are a number of countries who are still pursuing nuclear weapons. It is no longer a case of WMD "over there." Our job is to make sure that these weapons are not used against us, and if they are, that the consequences of their use is minimized.

We are a combat support agency. That means we are the near-term integrator between people in the laboratory and people who wear muddy boots. That is, we connect existing technology with near-term warfighter needs. The combatant commands look to us for assistance in dealing with the full range of WMD needs, chemical, biological, nuclear, and radiological and large quantities of high explosives. Studies have shown that it is hard for the individual combatant commands to provide all of the expertise that they need in responding to WMD and that is where we come in. We have liaisons with all of the CINCs and rapid connection back to the expertise that we have in DTRA and other parts of the Department of Defense and the Government. We are a team player. We bring together expertise from across the DOD and other U.S. Government entities, industry, academia, and also our allies and friends around the world to meet those needs.

Our products range from consequence prediction, what would happen if one of these weapons was used, to consequence management, from targeting to the development of the weapons that are used on those targets. Within hours of the attacks on September 11, we were providing data on the smoke plumes from the attack, and within weeks we had accelerated the development of the thermobaric weapon and other weapons that are currently in Afghanistan.

WMD is a complicated topic and we have a complicated tool box to respond to that. We do the arms control inspections to make sure that other countries are doing what they told us they were going to do when they signed treaties. We execute the cooperative threat reduction program to help countries of the former Soviet Union take apart weapons. We have an uncooperative threat reduction program consisting of the development of new warheads particularly for hardened and deeply buried targets. Then in case something gets through, we help execute the chemical and biological defense program to make sure that our forces can operate in a chemical or biological environment. Finally, we help to ensure that our Nation's nuclear arsenal, that ultimate deterrent against aggression, is ready if it is required.

Here are few examples of what we have accomplished recently. We have a hard and deeply buried targeting cell at the Defense Intelligence Agency, so we have assisted in targeting in the Balkans, in Iraq, and more recently in Afghanistan. I should add we have had people on the ground in Afghanistan going through caves, looking at possible weapons of mass destruction activities there.

We led the development of the thermobaric warhead and you have seen the movie on that. But we also did the conventional air-launched cruise missile penetrator, the advanced unitary penetrator, and the hard target smart fuze that knows where it is in the structure and knows when the warhead should blow up.

By the way, we also build bunkers so that we understand what the enemy target looks like, what kind of construction techniques are used, and then we put a weapon on it to make sure that we can blow up the kind of bunker that they are building.

We provide support to the warfighter and more recently support to homeland security in predicting the spread of WMD agents and we have recently done a study of the effect of a nuclear, a chemical, or a biological attack on American cities. I have to say that the results of those studies have been sobering.

We are fielding an unconventional nuclear warfare defense test bed at four military installations that eventually will prove technology and integrate it into a working protective system capable of detecting a terrorist nuclear device.

We are working with the warfighters to develop means for ensuring the continued use of ports and airports despite potential enemy use of chemical or biological weapons.

We do vulnerability assessments of key leadership facilities, including a number of facilities on Capitol Hill. I am particularly proud that the force protection technology that we developed helped save lives at the Pentagon on September 11.

We are a combat support agency, but there is a lot that we can bring to homeland security. We are applying training and planning related to nuclear weapons accident response to broader WMD terrorism scenarios. I mentioned that we had simulated what would happen in the event of a nuclear, chemical, or biological weapon used in an American urban area. Well, we found that a lot of these scenarios follow the same track. So, we are developing a set of play books. What should you do, what is going to happen, what is the sequence of events, what is the State government going to do, the local community, the first responders, some of the things the first responders should not do? If it is a nuclear accident, heroic firemen should not rush into the high radiation area because they will not be able to do anything and they will themselves be irradiated. But there are other things we can do. We are looking at education of the population and various other kinds of things based on the experience we have in dealing with nuclear weapons accidents.

Finally, I will touch on our budget. Thanks very much for supporting our full fiscal year 2002 request. In 2003 we are looking at $1.17 billion, which is a slight rise in combat support and radiation hardened electronics and hardened target defeat programs.

Thanks very much for allowing me to be here today, and I am proud to lead a great team that we think is doing important work for the country.

[The prepared statement of Dr. Younger follows:]

PREPARED STATEMENT BY DR. STEPHEN M. YOUNGER

Madam Chairman and members of the subcommittee, I am pleased to be here today to testify on the contributions of the Defense Threat Reduction Agency (DTRA) to our Nation's warfighting capability. I will summarize my statement and ask that it be included in its entirety in the record.

DTRA Reduces the Threats Posed by WMD

The mission of DTRA is simple to understand but critically important to the nation and indeed to the whole world—to reduce the threat of weapons of mass destruction, or "WMD." As the events of September 11, 2001 and what followed amply demonstrated, the urgency for this mission has only increased since the end of the Cold War. Whereas during the Cold War we had a small number of potential adversaries to worry about, today we face clear and present threats from many nations and groups who see weapons of mass destruction as a means to level the playing field against the United States and our interests. Any country or group with minimal technological capability can manufacture chemical and biological weapons and an increasing number of states are pursuing a nuclear capability. The awful events of September 11 showed that terrorists will use our own strengths against us. It is no longer a case of WMD "over there." The job of DTRA is to reduce the threat of WMD against us, and that if they are used against us, that we contribute to minimizing the consequences.

Organizationally, we report to Dr. Dale Klein, the Assistant to the Secretary of Defense (Nuclear, Chemical, and Biological Defense Programs), but we work closely on a day-to-day basis with OSD, the Chairman of the JCS, the CINCs and the Services. To make sure that we are coupled into the needs of the CINCs, we have liaison officers assigned to the commands allowing real time reachback to DTRA capabilities.

DTRA Is A Combat Support Agency

DTRA is a combat support agency. We are the near term interface between the laboratory and people who wear muddy boots. Sometimes our timelines are as short as a few hours, as is the case when we model the effects of a WMD event on a specific location using real time weather and geography. At other times we execute development programs that span several years. The Combatant Commands look to us for assistance in dealing with and overcoming the full range of WMD threats—chemical, biological, radiological, nuclear, and high explosive. Recent studies confirm that it is difficult for every command and the Services to have all of the WMD expertise that it needs to carry out its mission. DTRA provides essential support for the needs of the CINCs and the services.

DTRA Integrates and Focuses WMD Expertise from All Sources

We do this by integrating and focusing WMD expertise from all sources—the Department of Defense, other U.S. Government entities, industry, academia, and from our allies and friends—into products that meet their needs. Our products range from consequence prediction to consequence management, from targeting to the weapons that are being used on target. We provide WMD expertise, technology, and support to plans and operations. For example, within hours of the attacks on September 11 we were providing data on smoke plumes from the World Trade Center. Within weeks we had accelerated the development of the new thermobaric weapon so that it would be ready for use in Afghanistan. We have people on the ground in that country looking for WMD activities in caves. We have people in laboratories and test ranges figuring out what to do if or when we find such activities.

Although the Agency was established in 1998, it was built upon organizations with decades of experience in nuclear weapons effects, chemical and biological agent defeat, weapons effects against hardened facilities, the protection of structures against high explosives attacks, vulnerability assessments, and implementation of arms control treaties and other cooperative threat reduction programs. This blend of expertise positions DTRA at the crossroads of WMD threat reduction.

As an integrator of technology and operational concepts, DTRA works closely with the required expertise wherever it may reside. We work very closely with the Research, Development, Test and Evaluation (RDT&E) organizations of the Services. We have many enduring and emerging partnerships with the Department of Energy and its National Labs. We also depend very heavily upon the talent and skills of the private sector and academia. Virtually every DTRA RDT&E program employs a team approach.

The development of the thermobaric warhead exemplifies the benefit of this team approach in accelerating development of technology needed by the warfighter. This program originated as a response to the terrorist acts of September 11, 2001. DTRA was tasked by OSD to form and lead an interagency team to produce a thermobaric weapon that would hold tunnels and caves at greater risk, thereby eliminating sanctuaries for terrorists in Afghanistan. The DTRA-led team produced, tested, and delivered a very effective capability in a mere 60 days. DTRA's proven experience with ACTDs was key to precisely choreographing the various program partners through the developmental process. Team members in addition to DTRA included Navy, Air

Force, and DOE organizations. DTRA integrated all efforts and coordinated the testing activities. The Navy's explosive experts at the Naval Surface Weapons Center (NSWC), Indian Head, MD, provided an effective new composition explosive fill that significantly enhanced blast pressure and range. The Air Force Precision Strike Program Office at Eglin AFB, FL, led the Air Force team performing weapon system integration, safety, and flight clearances. They also produced a modified fuze for a new warhead. NSWC Indian Head conducted static testing of the new fuze/weapon configuration to demonstrate reliable initiation of the new explosive. Static and flight tests were conducted in full-scale tunnel facilities at DOE's Nevada Test Site. The Air Force 422nd Test and Evaluation Squadron at Nellis AFB, NV, flawlessly executed the flight test to demonstrate the viability of the new weapon in a dynamic environment.

Since then, the Air Force has completed verification and validation of technical data and operational flight clearances required to field the BLU–118 warhead. A small number of these weapons is now available for operational use.

DTRA Spans the Full Spectrum of WMD Threat Reduction

DTRA is unique in that it spans the full spectrum of WMD threat reduction. We do the on-site inspections to make sure that other countries are abiding by their agreements. We execute the Cooperative Threat Reduction Program to help countries of the Former Soviet Union dismantle weapons. We support the Chemical and Biological Defense Program to ensure proper protection for our forces. We develop new technology, such as advanced penetrators, a sort of "non-cooperative threat reduction program." DTRA is the center of expertise for our understanding of weapons effects, especially nuclear effects. For example, our understanding of the science of blast and shock effects on rock and concrete provides the basis for developing more effective bunker and tunnel defeat weapons—as well as for the operational concept for using such weapons in combat. We build bunkers just like the adversary and then develop the best way to destroy them. We are the glue that binds together WMD expertise from all sources into focused programs that provides accelerated responses to the needs of the warfighters.

We also help to ensure that our Nation's nuclear arsenal—the ultimate deterrent against aggression—is safe and effective. DTRA performs nuclear safety and surety assessments, assists with emergency response capabilities, and provides targeting support. In partnership with the U.S. Strategic Command and the Services, we developed the DOD Nuclear Mission Management Plan that serves as a guide for managing DOD's nuclear responsibilities.

DTRA Is Making A Difference

I would like to give you several examples of how DTRA has improved the combat capability of our Nation. My examples will include offensive and defensive contributions, and programs that have dual applicability to homeland security.

- DTRA assisted the CINCs in identifying and successfully striking hardened and deeply buried targets in the Balkans, Iraq, and Afghanistan.
- DTRA led the development of new hardened target defeat weapons including the Conventional Air-Launched Cruise Missile penetrator, the Advanced Unitary Penetrator, the Hard Target Smart Fuze, and the Thermobaric warhead.
- DTRA provides direct support to the warfighter in predicting the spread of WMD agents following the use of such weapons against our forces—or the release of an agent following an attack by U.S. forces on enemy facilities.
- DTRA is fielding an unconventional nuclear warfare protection system at four military installations. This project, to be completed in 1 year, will take currently available technology and integrate it into a working protective system capable of detecting a terrorist nuclear device.
- DTRA is working with the warfighters to develop the means for ensuring the use of ports and airfields despite enemy use of chemical and biological agents.
- DTRA performs vulnerability assessments of key leadership facilities and military bases. Recently, we performed vulnerability assessments of Capitol Hill for various terrorist threats. I am particularly proud of the fact that force protection technology developed by DTRA saved lives at the Pentagon on September 11.

DTRA Is Contributing to Homeland Security

Although DTRA remains focused on the needs of the warfighter, much of our expertise is applicable to homeland security. We are applying training and planning

related to nuclear weapon accident response to broader WMD terrorism scenarios. In particular, we are developing "play books" that will aid civilian leadership in preparing for and responding to the issues and events following the use of WMD in urban areas. We are supporting the Office of Homeland Security to develop a near-term biological defense system. Consistent with our approach of harnessing national WMD expertise to address challenges, we are developing a program for near-term improvements in detection of biological agents and consequence management.

Other DTRA activities that can contribute to homeland security include support to operational responses following detection of WMD weapons, prediction of WMD agent dispersal, consequence management, vulnerability assessments, integrated WMD training and exercises, and contingency planning.

Where We Are Headed

DTRA's focus remains on combat support—providing technology, operational concepts, and other support for the warfighters' response to WMD. We continue to support the U.S. nuclear deterrent. We will develop new technologies and means for dealing with unconventional nuclear threats; develop enhanced lethality, long-range precision strike weapons; expand support to contingency planning and current military operations; and develop the means for ensuring the use of ports and airfields in WMD environments.

Thank you Madam Chair, for the opportunity to be here today. I am proud to lead a great team on an important mission for the nation. I would be happy to answer your questions and to provide additional material at your request.

Senator CARNAHAN [presiding]. Thank you, Dr. Younger.

Mr. Waldron.

STATEMENT OF ROBERT E. WALDRON, ASSISTANT DEPUTY ADMINISTRATOR FOR NONPROLIFERATION RESEARCH AND ENGINEERING, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Mr. WALDRON. Thank you, Madam Chairman and Senator Roberts. For the record, I am Robert Waldron. I am the Assistant Deputy Administrator for Nonproliferation Research and Engineering at the National Nuclear Security Administration, and I will briefly summarize my statement.

The environment is considerably different from when I testified before you last year in terms of both the national security posture and our budget request. Last year we discussed the potential of a terrorist act, while now it is a shocking reality. Thanks to the administration and to Congress, our budget request this year is up $113 million over last year's request in terms of actual R&D funding, an increase of 66 percent.

The NNSA's nonproliferation and verification research and development program develops technologies for application by the operational users whose mission it is to strengthen the United States' response to current and projected threats to national security posed by the proliferation of nuclear, chemical, and biological weapons and the diversion of special nuclear materials. The technologies are developed for a wide range of government users, including the DOD and the intelligence community.

Our laboratories possess the vast majority of our Nation's expertise in nuclear weapons design and production. Because of this expertise, the labs have historically supplied the technical capability for the U.S. Government to detect and characterize nuclear weapons and materials. The goal of our R&D program is to conduct the applied research needed to develop the technologies necessary to detect WMD while maintaining the required technology base. A robust technology base is key to our ability to have the flexibility to

respond to other agencies' changing operational requirements and changes in national policy.

The importance of stemming proliferation of weapons of mass destruction and the NNSA's role in related technology development is unquestioned. The nonproliferation and verification R&D program fills a gap between basic research and users' application-specific acquisitions, as well as providing the nuclear technical expertise not resident in many agencies charged with homeland security.

Our tie to the operational community is strongest in the nuclear explosion monitoring area where we have an almost 40-year history of close cooperation. We provide remarkably capable and robust hardware for space systems and are enabling the Air Force Technical Application Center's modernization of their seismic monitoring capability.

In addition to connections to individual operational organizations, we also work very closely with our friends at the Defense Threat Reduction Agency. Our collaborations with DTRA include a variety of cooperative mechanisms from developing joint technical road maps for chem/bio to characterizing gamma ray detectors and discerning specific radiation signatures to support DTRA's base and port defense demonstration project as part of our homeland security initiatives.

While we have very close ties to individual developers and operational users within the DOD and the intelligence community, we have reinvigorated a previous relationship with the U.S. Customs Service because of homeland security. The goal is to support their development of operational concepts to interdict nuclear materials at international borders with new and existing radiation detection and transportation security technologies.

An area of significant multi-agency homeland security collaboration is in genetic sequencing of microbes with possible terrorism implications. The effort is being coordinated through OSTP's Interagency Microbe Project Working Group. It involves the National Science Foundation, the National Institutes of Health, Centers for Disease Control, Department of Energy, DARPA, USAMRIID, Central Intelligence Agency, and the Department of Agriculture. This is a real success story as multiple agencies are pooling their resources to attack a specific part of the bioterrorism threat in a coordinated effort.

Another success story of our chem/bio program has been the transition of decontamination technology we developed to the private sector. Commercial vendors now produce the decontamination foam that was used to clean up some of the House offices.

We are also working on transitioning technology developed for nonproliferation applications to support the warfighter. We are finalizing a classified Memorandum of Understanding (MOU) with multiple DOD organizations for a joint user and multispectral demonstration program using our multispectral thermal imager demonstration small satellite.

The NNSA nonproliferation and verification R&D program remains essential to the agencies responsible for non- and counterproliferation and now homeland security being ready to fulfill their operational missions. The program is well coordinated with individual users and other developers.

There is no simple solution to the problem and we alone cannot solve it. With the continued support of Congress and through collaboration with DOD and others and the necessary advances in technology and analysis techniques, we will make the necessary improvements in our ability to detect and understand these threats and to protect the American people.

I will be pleased to answer any questions you may have.

[The prepared statement of Mr. Waldron follows:]

PREPARED STATEMENT BY ROBERT E. WALDRON

Madam Chairman and members of the subcommittee, thank you for the opportunity to testify again this year on the Department of Energy (DOE) National Nuclear Security Administration's (NNSA) Nonproliferation and Verification Research and Development Program. The environment is considerably different this year in terms of both our national security posture and our budget request. Where last year we discussed the potential of a terrorist act, it is now a shocking reality. Thanks to administration and congressional action our budget request this year is up $113 million over last year's request in terms of actual R&D funding—an increase of 66 percent.

The NNSAs Nonproliferation and Verification Research and Development (R&D) Program develops technologies for application by the operational users whose mission it is to strengthen the United States response to current and projected threats to national security posed by the proliferation of nuclear, chemical, and biological weapons and diversion of special nuclear material. The technologies are developed for a wide range of government users including the Department of Defense (DOD) and the Intelligence Community.

Our laboratories possess the vast majority of our Nation's expertise in nuclear weapons design and production. Because of this expertise, the labs have historically supplied the technical capability for the U.S. government to detect and characterize nuclear proliferation activities in their early stages. The goal of our R&D program is to continue to provide the technical solutions to enhance U.S. national security. In order to meet this goal, the emphasis is on maintaining the technology base and conducting the applied research needed to develop the technologies necessary to detect and deter nuclear proliferation, to meet U.S. nuclear explosion monitoring goals, and to develop and demonstrate chemical and biological detection and related technologies to enable us to better prepare for and respond to the threat of domestic chemical and biological attacks. To address the broad array of mission challenges our program objectives are to:

- Develop and demonstrate technologies needed to remotely detect the early stages of a proliferant nation's nuclear weapons program.
- Develop, demonstrate, and deliver technologies to detect, locate, identify, and characterize nuclear explosions underground, underwater, in the atmosphere, and in space.
- Develop and demonstrate technologies to improve our national capability to detect nuclear materials, to counter nuclear smuggling, and to identify the origins of nuclear materials.
- Develop and demonstrate technologies and systems that dramatically improve our ability to detect the proliferation or use of chemical and biological agents, and to minimize the consequences of potential terrorist use of chemical or biological agents.

COLLABORATION

The importance of stemming the proliferation of weapons of mass destruction and the NNSA's role in related technology development is unquestioned. The Nonproliferation and Verification R&D program fills a gap between basic research and users' application-specific acquisitions as well as providing the technical expertise not resident in many agencies charged with homeland security. Longer term technology needs are not always well understood nor well documented, but are based upon DOD or Intelligence Community realization that there are gaps in capability and that current technology will eventually become obsolete and/or understood by adversaries, thus new capabilities must be constantly pursued.

As I noted earlier, maintaining the nonproliferation technology base is a goal of our program. It is key to our ability to respond to other agencies' changing operational requirements and changes in national policy. With our emphasis on the technology base and not having day-to-day operational mission responsibilities, we are

able to take a longer-term focus and stay the development course while maturing the technology and to pursue revolutionary, higher risk solutions that frequently push the state of the art. Having NNSA fund this type of R&D allows us to marshal multi-disciplinary, inter-laboratory teams from the national laboratories to address these very challenging technical, science, and engineering problems.

Leveraging our past nuclear testing program, NNSA has the responsibility to apply the scientific understanding gained during testing to develop the sensor capability for the U.S. national nuclear explosion monitoring system to meet U.S. goals to detect very low yield nuclear explosions underground, in the atmosphere, in the oceans, and in space with space-based and ground-based sensor systems. Our commitment to this responsibility was recognized during a recent U.S. Nuclear Detonation Detection System National Review where senior members from the Office of the Secretary of Defense, Strategic Command, Space Command, State Department, multiple Air Force Organizations, and NNSA recommended that all space-based nuclear explosion detection sensor work be funded by a single organization. This budget request reflects that recommendation with a $15 million transfer from the Air Force to our program to produce the electromagnetic pulse sensor for the next generation of Global Positioning Satellites.

Our tie to the operational community is strongest in the nuclear explosion monitoring area where we have an almost 40 year history of working together. We provide remarkably capable and robust hardware for space systems, as well as expert advice in analyzing the data they produce, and are enabling the Air Force Technical Applications Center's modernization of their seismic monitoring capability. Our relationship with the operators of the space and ground nuclear explosion monitoring systems is close and productive, and they acknowledge us as critical to the success of their efforts.

In addition to our connections to individual operational organizations, we also work closely with other developers like the Defense Threat Reduction Agency (DTRA). Our collaboration with DTRA includes a variety of cooperative mechanisms from developing joint technical roadmaps for chem/bio to characterizing gamma ray detectors and specific radiation signatures to support the DTRA base and port defense demonstration project as part of our homeland security initiatives.

While we have very close ties to individual developers and operational users within the DOD and the Intelligence Community, because of homeland security issues we have reinvigorated a previous relationship with the U.S. Customs Service. The goal is to support their development of operational concepts to interdict nuclear materials at international borders with new and existing radiation detection and transportation security technologies. Part of our support includes the establishment of a nuclear testbed to evaluate detection concepts and technologies against actual nuclear materials in maritime and airborne shipping containers. Technologies developed and demonstrated to detect nuclear weapons can also detect less catastrophic, but equally disruptive, radiologic dispersal devices.

An area of significant multi-agency homeland security collaboration is in genetic sequencing of microbes with possible terrorist implications. The effort is being coordinated through OSTP's Interagency Microbe Project Working Group. All agencies (NSF, NIH, CDC, DOE, DARPA, USAMRIID, CIA, and Agriculture) doing genetic sequencing are participating and agreeing on what should be sequenced, to what level and quality, and who will do the sequencing. This is a real success story as multiple agencies are pooling their resources to attack a part of the bioterrorism threat.

Another success story of our chem/bio program has been the transition of some decontamination technology we developed to the private sector. Commercial vendors now produce the decontamination foam that was used to clean up some of the House offices.

We are also working on transitioning technology developed for nonproliferation applications to support the warfighter. We are finalizing a classified MOU with multiple DOD organizations for a Multispectral Thermal Imager Joint User Multispectral Demonstration program using our MTI technology demonstration small satellite.

TECHNOLOGY CHALLENGES

I have noted a few of our successful transitions and collaborations, now let me briefly highlight some of the technical challenges we face.

Nuclear Explosion Monitoring: The primary challenges we face are in our ability to detect smaller nuclear detonations and discriminate them from natural and industrial activity. This challenge is extreme as the potential for false alarms goes up significantly as we lower our detection threshold. Most of the solutions are very

computationally intensive whether ground-based processing or satellite on-board processing.

Homeland Defense: In the chem/bio area, the chief challenge facing researchers is biological detection, specifically distinguishing a threat pathogen from its harmless, very close relatives. This is a key reason why the interagency microbe sequencing collaboration is so important. As these distinctions are developed, we must develop detection methods to exploit these differences and rapidly identify threat pathogens.

For the nuclear realm, the ability to detect plutonium and highly enriched uranium at stand-off distances and with sufficient speed so that commerce is not impeded is driving us to explore not only new radiation detection materials, but also new detection system concepts. In addition to new detectors and materials, we are confronted with the need to develop new concepts for networking a collection of sensors into an integrated architecture for layered defense networks and perimeter monitoring systems.

Proliferation Detection: Now let me move to our technology supporting national efforts to detect and understand WMD proliferation at its source. The challenge is to catch clandestine WMD programs at the earliest stage of development. Potential adversaries, terrorist or nation states, are well aware of our traditional monitoring methods and have taken steps to disguise suspect activities. Our challenge is to obtain sufficient information to enable us to distinguish steps in a weapons production program from closely related legitimate industrial activities. New sensors that detect new kinds of signatures are necessary, and advanced processing and exploitation methods must be developed to make sense of this data.

Our ability to successfully address these challenges is rooted in the technology base that this program maintains at the DOE national laboratories. Its foundation comes from the historical expertise of the DOE's nuclear weapons program and intimate involvement with both DOD organizations and the Intelligence Community. This technology base ensures that we can respond rapidly to solve urgent needs and to changing national priorities.

CONCLUSION

The NNSA Nonproliferation and Verification R&D Program remains essential to the agencies responsible for non/counterproliferation, and now homeland security, being able to fulfill their operational missions. The program is well coordinated with individual users and other developers.

Our technology will get even better—because it must. Rogue countries, terrorists and the suppliers of the nuclear, biological, and chemical tools of their trade are using increasingly sophisticated means to evade detection. Our methods and technology must outpace this growing threat.

There is no simple solution to this problem, and we alone cannot solve it. With the support of Congress and through continued collaboration with DOD and others and the necessary advances in technology and analysis techniques, we can make a quantum leap in our ability to detect and understand these threats to the American people.

I would be pleased to answer any questions you may have.

Senator CARNAHAN. Thank you, Mr. Waldron and all of you, for being here today. This is an unusually large turnout for a committee hearing, and that shows the importance of the topic on which we are working today.

I will make an opening statement, after which Senator Roberts will ask a few questions. He has to leave. So we are glad to have him do that before he leaves, and then we will return to the questioning.

Senator CARNAHAN. Long before September 11, Defense Secretary Rumsfeld announced his intention to transform the military into a lighter, faster, and more lethal fighting force. This process has only become more essential as the United States combats terrorists around the globe. We are battling an obscure enemy, waging a shadowy war, both at home and abroad, and it is important that our national defense address these so-called asymmetric threats.

To meet these new challenges, it is imperative that our Armed Forces be well equipped with the latest technology available. This

will take sizeable investment in science and engineering research and, with it, a strong commitment to supporting our Nation's laboratories, universities and research businesses. It is essential that the United States prepare its military capabilities with an eye to the future. We are only in the initial stages of development in such important fields as cyber warfare, chemical, biological, and nuclear defense, nanotechnology, unmanned aerial vehicles, and directed energy lasers.

Since assuming office, Secretary Rumsfeld has been an advocate for research and development. In fact, he has said that science and technology accounts should total at least 3 percent of the Nation's defense budget. But this year, the proposed 2003 defense budget came up short on this goal, accounting for only 2.6 percent of the budget, and the Pentagon's 5-year projections for the science and technology budget are cut even more dramatically. By 2007, the science and technology budget is expected to account for only 2.28 percent of the budget.

I recently worked with Senators Conrad and Nelson to highlight this serious problem in the 2003 budget resolution. This legislation now calls for the science and technology account to reach Secretary Rumsfeld's goal of 3 percent in the next 5 years. This will give the research community the tools needed to develop the high-tech defense we need against America's enemies.

Years ago I recall newspaper accounts describing the ominous glow of Russia's Sputnik as it orbited the earth. This specter of the Soviet superior technology blind-sided our political and military leaders and sparked a tremendous revolution in America's space and military science efforts. We were not going to let our enemies challenge us either from the heavens or from any corner of the earth.

Today we face a new enemy. Advances in technology are just as important now as they were then. Last October, we in the Senate observed firsthand America's vulnerabilities to emerging threats. When letters filled with anthrax were mailed to Members of Congress, 50 of my Senate colleagues and I, as well as our staffs, were displaced from the Hart Building for over 3 months. Experts from several governmental agencies responded to the attacks, but the technologies they used were both arcane and time consuming. To detect the presence of anthrax, adhesive strips were laid out to conduct spore counts. To decontaminate the building, decades-old equipment was used to spread chlorine dioxide gas throughout the building. The cleanup of the building took months and even more months were needed to be certain that it was safe for reentry. We must, in the future, be better prepared.

Because it still takes years for high-tech tools and weapons to evolve from concept to use, we need a system in which new technologies can rapidly progress through the acquisition system. One pace-setter in this effort is Clean Earth Technologies in St. Louis, Missouri. This small business is developing cutting edge decontamination equipment that will eradicate chemical and biological agents quickly and effectively. This morning I look forward to learning of other emerging technologies, many of which you have already shown us today, and how they can be used to detect, deter, and, if necessary, destroy weapons of mass destruction.

Thank you very much.

Senator Roberts.

Senator ROBERTS. Thank you, Madam Chairman, and thank you for an excellent statement.

Many are called, few are chosen. Thank you, gentlemen, for the job you are doing. You are making a difference. Prior to September 11, this subcommittee had a series of hearings inviting the previous administration's people in charge. Some of you I have already visited with in the past, and I want to thank you for the progress that we are making. Obviously, we would like to do more, but I do want to thank you for your efforts.

I have a table of organization question for Dr. Sega, Dr. Klein, and Dr. Younger. You are the DOD posse that has come down to testify here today, and for some time I have been concerned that we do not have somebody who would be in charge of SO/LIC, an Assistant Secretary, if you will. I think the official question prepared by staff says as follows. Each of you play an important role in the overall Department of Defense combating terrorism program. What official in the Department is responsible for providing you with overall guidance, priorities, goals, and budgets with regard to your responsibilities in the area of combating terrorism?

I asked a previous panel about 2 years ago to sit in the order of their rank, and nobody knew where to sit. I am still concerned about that. I understand that the Secretary of the Army may have this responsibility, but I know John White is very busy running the Army. I know that Doug Feith is the Under Secretary of Policy. His plate is full. Who do you report to? How do you feel about that? This is a little touchy question I presume, but do you feel that you have a sense of confidence in terms of direction in regards to policy? I will start here with Dr. Sega. I will pick on you first.

Dr. SEGA. Senator Roberts, the short answer to your question is: it is evolving. The task force that is currently under policy to develop doctrine in the Department of Defense is a work in progress, and it is anticipated that will interface with our national efforts on the doctrine side.

On the technology side, the establishment of a DOD Combating Terrorism Technology Task Force, which included SO/LIC, the agencies, DARPA and DTRA, special focus areas in the chem/bio area, in the weapons area and science and technology area, the service executives were brought together in that forum to make sure that we had no unintended redundancies of effort in the areas of developing the technologies for combating terrorism. We included people from the Joint Staff to make sure that we had that input. I personally have been down to Joint Forces Command (JFCOM), Special Operations Command (SOCOM), U.S. Central Command (CENTCOM), and met with the Vice Chairman of the Joint Chiefs of Staff on the area of integrating technology into the effort.

The combating terrorism piece is part and parcel of what we do. So, some of the areas may not be absolutely identified as combating terrorism, such as establishing robust networks upon which we can put surveillance detectors. They may be invisible. They may be near-IR. They may be chemical, biological, or radiological kinds of things. So, I think it is important that we have an integrated approach to developing the capacity to combat terrorism within the

context of the greater efforts so that there are the proper synergies, so we do not have the duplication on this combating terrorism technology.

Senator ROBERTS. Pardon me for interrupting.

Dr. SEGA. Sure.

Senator ROBERTS. I have no doubt that you are doing an excellent job. It is just I want to know who you report to.

Dr. SEGA. It is easy for me directly. It is to Under Secretary Aldridge in terms of acquisition, technology, and logistics.

Senator ROBERTS. Dr. Klein, who do you report to?

Dr. KLEIN. I also report to Under Secretary Aldridge.

But let me answer your question a little bit. I think one of the areas that might have led to some frustration for you last year is that my position had not been filled for about 3½ years.

Senator ROBERTS. That is true.

Dr. KLEIN. The Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs. So, I have now been on my job since November 15, and it has been a challenge.

But I think my guidance and my direction is quite clear. My office is responsible to address the weapons of mass destruction. DTRA, the Defense Threat Reduction Agency, reports through me. So our guidance, our mission, our functions, our roles are quite clear.

On nuclear matters, I also have the charter of going directly to the Secretary of Defense if there are safety and security issues on the nuclear issues according to the charter. So, I think my guidance, who I report to, what the job requires is quite clear.

I think it is less clear as we are trying to get better coordination and a better handle on how the Department of Defense interfaces with the Office of Homeland Security. I think to support the warfighter, to support our missions on the Department of Defense, I know exactly what my role, responsibilities, and duties are and who I report to. We always need to do better coordination than we probably do, but my mission is quite clear and I know what the charge is.

On homeland security, we are trying to understand how do we interface in that area. Mr. Cambone in policy is coordinating a group to get the Department of Defense—and he reports to Mr. Feith—to see what role the Department of Defense should play and could play in homeland security.

My personal opinion is that we have a lot of technologies in the Department of Defense developed to support the warfighter, the men and women in uniform, that can be transferred over to the civilian side, but we have to understand what role and how we do that. So, there is a working committee. We are in five groups on how we organize and how we perform in the homeland security. SO/LIC is a part of that. Policy is a part of that. Dr. Sega's group is part of that. DTRA is a part of that. So, we are all looking at that role. But I think in terms of weapons of mass destruction for the warfighter, men and women in uniform, our task is clear.

Senator ROBERTS. Dr. Younger, do you want to add anything?

Dr. YOUNGER. I report to Dr. Klein; I work with Dr. Sega. We chair the Counterterrorism Technology Task Force, and speak fre-

quently with SO/LIC. As a matter of fact, I am talking with them today, and we coordinate with Secretary White's office.

Senator ROBERTS. Dr. Sega, you mentioned in your earlier comments something about NATO and working with NATO. Senator Lugar, the distinguished Senator from Indiana and one of the godfathers of the CTR program and a foreign relations expert, went over and made a speech—I am not sure where he made it, he made it overseas—to NATO—referred to the November expansion meeting and indicated that it was his hope that NATO would step up to the challenge of terrorism. If they did not step up, then all the other issues that we had talked about before that we thought were rather nettlesome, or at least a challenge, expansion and the investment on the part of the NATO countries, a collective defense, what does Article 5 mean, and do we go outside the region, et cetera, et cetera, pale in comparison to the need for better cooperation and understanding of the challenge of international terrorism.

With the strategic concept of NATO that was adopted—what—2 years ago, now encompassing everything from crime, drugs, environment, an incredible array of things that NATO is allegedly in charge of, how do you see this in terms of NATO? What was the response? You mentioned NATO and that really perked up my interest. Are they on board? Is it a cooperative kind of attitude? Where are we with this?

Dr. SEGA. The results of that 3-day workshop on combating terrorism—the final report should be out soon—aligned fairly closely to the categories of deterrence, indications and warnings, survivability, denial and consequence management and recovery that we had set up earlier in the Department of Defense. So, there was enthusiasm for sharing technical information on systems such as detector systems and surveillance systems and working together on the technical level. Again, the scope of that meeting was restricted to research and technology, and it was a positive meeting. We need to take the next steps in technology, but that was the focus of the workshop.

Senator ROBERTS. I am going to ask Dr. Marburger a question in regards to a GAO report that will be forthcoming in about a month. The GAO report dealt with primarily a number of programs that we are involved with in combating the illicit trafficking of the special nuclear materials and any kind of radiological materials. The GAO will report—it is not final yet, but basically that we have six Federal agencies, the Department of Defense, Department of Energy, Department of State, Customs Service, FBI, and Coast Guard, that all spent approximately $90 million over 8 years from 1993 to 2001 to assist 30 different countries in this area. Assistance included radiation detection equipment, mobile x-ray vans, inspection tools, patrol boats, training, and then obviously after September 11 there is a very renewed focus on detecting the transport of these materials into and within the United States.

The preliminary findings of this report are not that we have a better system in Russia than we do in this country. It's that we have a situation where we have asked, and some of the responses may be classified in regards to what kind of smuggling has gone on, where it has gone on in other countries, but we are going to get into a real dichotomy of public awareness—and that is the best

way I can describe it—if we have assisted to the tune of 90 million bucks over 8 years with six different Federal agencies and a hodgepodge—and I do not mean to be using that too much as a pejorative—and then we find we have these kind of systems in different countries, but in our own country, we are not even close. We have not started.

Now, I understand that you, Dr. Marburger, and others within the Office of Science and Technology Policy, OMB, CIA, National Institute of Standards and Technology (NIST), DOD—some of these acronyms I do not even know—et cetera, et cetera—we have a whole bunch of people who are participants—have now set up a working group to try to get at this problem. Can you just touch on this? I am going to try to talk the chairman into having a hearing on this as soon as the GAO report comes out. But can you indicate to us how things stand? I understand you are on top of this. You are aware of this problem. It is a problem of real concern, but you set up a working group and you are well on your way toward addressing this concern.

Dr. MARBURGER. That is true. This is an area in which a lot of agencies have capabilities to bring to bear and part of their mission is to address it. Coordination is required. I would, in answer to your question, draw attention to the bottom of page 2 of my written testimony. I did not mention this in my oral testimony. But let me just read that section on this part of the record.

Senator ROBERTS. All right.

Dr. MARBURGER. "Working closely with Office of Homeland Security, an interagency working group called the Counter-Nuclear Smuggling Working Group, has been created to develop a fully coordinated program for addressing the threat of nuclear smuggling across borders, both overseas and in the United States.

This working group will develop a strategic plan with a unified set of program goals and priorities, including within its scope the programs that implement and deploy current capabilities, as well as programs that research and develop new capabilities. The group is co-chaired by OSTP and the National Security Council and has been constituted under the Office of Homeland Security's R&D Policy Coordinating Committee."

This is the kind of interagency activity that OSTP does create to provide for coordination, and I am confident that it will bring increased coordination of these programs and hopefully eliminate any duplication that may be discovered in this process. So, we are clearly organized to address at least some of the issues that were raised in the GAO report.

Senator ROBERTS. The report is not out yet. I understand that, and we are trying to find out what is going to be classified and what is not going to be classified. We will probably have to have an open and closed hearing, if in fact we get to that. But it is going to be of some note that our Customs Service and other agencies that would be involved have not installed any portal monitors at U.S. border crossings very similar to what we do in the second line of defense programs in installing them in Russia. That just does not add up. Now, I am not blaming you for this. I am just saying we had six Federal agencies, 90 million bucks, 30 countries. It is

a hodge-podge, and we are not doing in this country what we are doing in other countries. That is not right.

I know you are on top of it. I know you have set up a working group. I really appreciate it. I think this subcommittee will obviously look into it further.

Madam Chairman, that is all my questions. Oh, I am sorry. Mr. Waldron, you mentioned agroterrorism. No, you did not. You mentioned the Department of Agriculture. I am mentioning agroterrorism.

We had a hearing here 2 or 3 years ago where agroterrorism was probably very high risk for the State of Missouri, for the State of Kansas, and others, but very low probability. After September 11 and additional intelligence reports, we think that that probability is now pretty high. If you look at the 15 pathogens that the former Soviet Union was producing, 15 or 20 years ago for their plans on attacking the North American food supply, and the security of those pathogens today, which is very questionable, think how easy it would be for a terrorist to use this kind of thing to attack the American food supply. We are very concerned about that. USDA is reprogramming funds. We have an agroterrorism section as part of the bioterrorism bill.

Would you want to comment on that in any way? I am not sure. You mentioned the USDA, so I am sort of picking on you here. But I am very concerned about this. It would obviously affect the DOD in terms of crisis management. We need a lot more first responder training at our land grant schools. Would you care to comment on that possible threat?

Mr. WALDRON. My mention of the Department of Agriculture was in the genetic sequencing of pathogens and how we have all pulled together to work on prioritizing what pathogens will be sequenced, a standard that everything will be sequenced to, deciding whether or not we want to fully sequence certain pathogens or if it is a near neighbor, they can just do a partial sequence. It is everything from agricultural foot and mouth—hoof and mouth disease——

Senator ROBERTS. We have foot in mouth up here. [Laughter.]

Mr. WALDRON. Well, I had it here too.

But also wheat rust and things like that. So, it is a group that is working together under OSTP's leadership to try and sort out and really rationalize what it is we are doing in terms of genetic sequencing. That is the only thing that I can really comment on on agroterrorism. I know nothing else about it other than——

Senator ROBERTS. Other than the fact you think it is a top priority and we ought to pay very full attention to it.

Mr. WALDRON. Yes, sir.

Senator ROBERTS. Anybody else have any comment on this? I am a little far afield here.

Dr. MARBURGER. Well, I will just make a statement from OSTP's perspective on agroterrorism. It is part of the general topic of bioterrorism as we see it. The salience of this issue is very high in the U.S. Department of Agriculture. I met with and addressed an advisory group to the Department of Agriculture just a few weeks ago, and this was the main topic of their agenda. I believe that there is a good deal of interagency cooperation on this issue. I have spoken directly with the Secretary of Agriculture on the issue and I

am aware of what is being done. I think you would be pleased at the amount of activity.

Senator ROBERTS. Thank you, Dr. Marburger.

Senator Carnahan, I am concerned about this. We come from farm country, and if you look at what could happen not only to this year's crop but next year's crop and our Nation's food supply, it would be economic chaos in our country. Think of what would happen if we had the National Guard handing out food supplies at supermarkets in the inner cities. It is that serious. So, on that basis, I have a very strong interest in agroterrorism and am very concerned about it.

I am now finally through with my questions, Madam Chairman, and I thank you for your patience. I thank the panel. You are making a difference and I appreciate it very much.

Senator CARNAHAN. Thank you, Senator Roberts, for adding not only to the levity of the hearing, but also to the usefulness of this occasion as well.

As has been pointed out earlier today, the budget resolution calls for science and technology to account for 3 percent of the defense budget by 2007. Dr. Sega, this reflects the stated goals of our Secretary of Defense, as well as the recommendation of the 1998 Defense Science Board Task Force. Could you please tell us how this 3 percent figure was determined and how achieving this goal would help us to have the lighter, faster, more lethal force that Secretary Rumsfeld speaks of?

Dr. SEGA. My understanding is the 3 percent number was related to the Defense Science Board study of technology industries, and their investment in science and technology was roughly 3.4 percent of normal total revenues. So, they benchmarked their activity in science and technology—and sometimes it is a slightly different category of research and development and exactly what is in research and development against a number such as total revenues. That is from the Defense Science Board. I believe from that report, the judgment was made that about 3 percent is about right for the Department of Defense in its efforts to make sure that we have technological superiority for the future.

The current budget does represent about $1.1 billion more from the requested figure in fiscal year 2002, the requested in fiscal year 2003. I believe it is still the goal, as recently stated by Under Secretary Aldridge last month, that we are pursuing a goal of 3 percent of the DOD budget. We balance that against needs in the Department, and we still hold that as a target.

I think the investment needs to be done smartly. We are aligning that with the goals and capabilities as outlined in the QDR. We are paying special emphasis in the areas of science and technology on combating terrorism, on aligning with the transformational direction of the Department, and on joint kinds of activities. So, where those three are intersecting, we think that the value is the highest per dollar spent in science and technology endeavors. That is where we are heading.

Senator CARNAHAN. Thank you.

Dr. Klein, in the wake of the September 11 attacks and the subsequent anthrax attacks, I offered an amendment to the 2002 defense authorization bill. This provision required that the Defense

Department develop plans to protect its members from biological and chemical attack. September 11 certainly demonstrated that today's battlefields are not just abroad and we must be prepared to defend our personnel who are working at the Pentagon, our military posts, and National Guard armories throughout the country.

Could you please describe the distinction between collective and individual protection and explain the importance of such protection in the United States?

Dr. KLEIN. Senator Carnahan, I think as you pointed out 9/11 brought the chemical and biological threat close to home. From the Department of Defense's perspective, they have maintained a fairly rigorous program for biological protection and chemical protection for the warfighter for quite some time. They have masks. They have procedures. They have chemical suits and programs. We are always trying to move ahead into the forefront of how to make it better, how to make it more economical, and how to make the distribution better.

Dr. Anna Johnson-Winegar, who is behind me, is the Deputy Assistant to the Secretary of Defense for the Chemical and Biological Defense programs. We have a very active program both on the science and technology side, as well as the acquisition side. We have a program that approves specific equipment that meets the needs for chemical and biological defense programs. We are also active in the vaccine program, trying to develop new techniques and new programs. Being from Missouri originally, I am familiar with Fort Leonard Wood. I have talked with Brigadier General Nilo at Fort Leonard Wood. So, we are looking at all kinds of activities for which we can support the warfighter in situations in which we may not expect.

We are also developing a lot of sensors. The sensor technologies have application both for the military side, as well as the civilian side. One of the things that we have asked the Defense Threat Reduction Agency to look at is what do you do if a sensor goes off. How do you respond? What kind of play books?

So, we have a very active program on chemical and biological defense programs. We are moving on different fronts, but I think as Secretary Rumsfeld indicated, we have to be quicker, smarter, more reactive in today's threats.

Senator CARNAHAN. Thank you.

For either Dr. Sega or Dr. Klein, I note that the fiscal year 2003 defense budget request has some significant research and development increases that appear to be 1-year funding, which means of course that the requested level of funding will not be sustained in the out-years. The chemical and biological defense program is one of those examples where a 1-year surge of more than $380 million this year will drop next year, and the funding level is planned to be more than a half a billion dollars lower in fiscal year 2007. It appears that in order to achieve results in research and development, it is important to have a sustained funding level over time rather than these 1-year injections of funding that will not be sustained in the future.

Do you agree that predictable, sustained funding is needed to achieve our objectives in science and technology development? Could you explain what you expect to achieve with this spiking of

funds in fiscal year 2003 and why the research and development funding is planned to be dropped by more than half a billion dollars in fiscal year 2007?

Dr. KLEIN. Madam Chairman, it is obviously very clear that I agree that we need sustained funding particularly when you look at research and development activities. Spiked funding in R&D is difficult to handle in particular programs that take a long time to develop results.

What we are doing with the spiked funding for the current fiscal year that is being provided in the area of the chemical and biological defense program, we have two major programs that are underway. Part of the program is handled by the Defense Threat Reduction Agency. Part of it is being handled by the Army and part of it by the Chemical and Biological Defense Program in the Office of the Secretary of Defense. We have a plan that addresses what we will deliver, what we will accomplish if it is 1-year funding. But we would prefer to have a sustained program so that we can develop technologies and procedures that would carry us forward into the out-years.

For example, we are developing nine programs at some of our defense facilities—three Army, three Navy, three Air Force—where we will develop a sensor program. So, this is a definite program of which we wanted to do a pilot study on how do we detect and how do we respond to an event. So, we do have certain things that we can accomplish, defined goals, but I would support your comment that to have a long-term program, we need sustained funding. Spiked funding is difficult for us to hire the people to carry it out, and it is difficult to plan long-term. So, I support a long-term approach.

Senator CARNAHAN. So, do you think this funding is going to be able to be spent efficiently in such large amounts over such a short period of time?

Dr. KLEIN. We have made sure that the answer to that question is yes. We looked at what deliverables will we accomplish for this 1-year funding, and we have definite accomplishments that we intend to do. We are very aware of that. We do not want to appear before a future committee and be asked why we wasted the money. So, we have a plan for which we will have deliverables and it will be spent wisely. I do believe that if we had sustained funding in this area that we would do a better job.

Senator CARNAHAN. Thank you.

Dr. Marburger, every day since September 11 my staff and I have been approached by small companies and inventors with ideas on how to combat terrorism and to protect our Nation. They have often been frustrated that we have not had a hearing on this, that they get lost in the Government system, and they just do not feel like their concerns are met.

What would you recommend we tell these interested parties who often have very novel and new ideas on defense? Is the bureaucracy, do you feel, adapting to handling these ideas?

Dr. MARBURGER. Senator Carnahan, I believe that the correct word is "adapting." I think we do have good mechanisms for a fairly large subset of the issues that these companies are bringing forward. Dr. Sega has referred to and described the activities of the

Technical Support Working Group which has a screening process that pulls together panels of experts from relevant agencies to look at these ideas. They have processed literally thousands of these requests, and as we receive them either directly to my office or through Homeland Security, we do a preliminary check and pass on many of them to the Technical Support Working Group, where they receive the same treatment. So, there are other mechanisms that we are looking at that would address some of the proposals that are not appropriate for that Technical Support Working Group.

I must admit that we still are struggling to cope with very generic or general proposals that are coming from the private sector addressing the vulnerabilities of large systems such as mail, or communications, or energy transportation around the country. These are systems that do not readily yield to individual technologies deployed on a small scale, and I believe that we will have to wait for further strategic planning to have an interface with companies that are bringing forward these kinds of ideas.

However, we are quite receptive to them. I have visited companies myself. We often arrange for meetings between representatives of companies that seem to have good ideas and agencies. At the present time, I would say that the best interface for these companies are the traditional ones—the agencies that do large procurements in these areas and that have missions that are clearly related to the functions that the industry would like to perform. So, the Department of Defense, the Department of Energy, National Institutes of Health all have funding programs and review processes that are appropriate for many of these.

My office tries to sort these out and direct them to the right places. At the present time, I would say that if a small company has a problem interfacing, they should send a letter describing their product and what they would like to do either to the Office of Homeland Security or to us, and we will see to it that it gets plugged into the right place.

Senator CARNAHAN. Thank you.

Dr. Sega, do you have any comments you would like to make on this?

Dr. SEGA. Yes, Senator Carnahan.

Regarding the small companies, I think it is very important that we have mechanisms and systems to bring forward the ideas that they have. They also tend to be faster in terms of being able to react. We have in the President's budget submitted again a quick reaction special projects fund which is the current year funding that can respond to ideas in technology areas that we did not anticipate 18 months prior. I believe that just by the very nature of these small companies, they end up being much more competitive for needs that are fast, as well as the generation of new ideas.

In the Broad Area Announcement, there are things that we had never thought of that came forward, and we look forward to continuing that process, but we also need a vehicle that allows some of the flexibility to respond to things that we never thought about.

Senator CARNAHAN. Thank you.

Dr. Younger, your agency has a close working relationship with the combatant commands, and they rely upon you for special sup-

port. What are the capabilities that the combatant commands most want or need help with? Are there one or two areas where the need seems to be the greatest?

Dr. YOUNGER. I think the most popular service we provide today is vulnerability assessments. We send teams out who use a consistent process to assess the vulnerabilities of installations around the world to terrorists or other threats. We have an increased number of requests for such assessments. By the way, it is a quality measure that we are invited back to do the assessments. This is a service that we provide rather than a report card. So, that is probably the service that is in greatest demand.

We perform a similar service called the balanced survivability assessment, which can address whether you continue to do your mission given some postulated threat or given a chemical or a biological event, and we help suggest ways that they can do better.

We have also provided a number of short-term modeling studies of what would happen if there were a major chemical event at a local facility or what would happen if there were an event at a nuclear power plant. What would the consequences be? How could I continue to operate? So, we have done a number of modeling studies for the combat commands as well.

Senator CARNAHAN. Thank you.

Mr. Waldron, your office in the NNSA funds work that is designed in many instances to be used by others. Why does NNSA fund this work rather than the user community itself?

Mr. WALDRON. Well, I think a lot of that goes to the expertise that is resident at the national laboratories. Also, it is part of our mission in nonproliferation, developing technologies. A lot of those we are able to spin off to other agencies.

But I think another thing that we really bring by being the agency that is funding these activities is that we are able then to marshal these interdisciplinary teams that are at the national laboratories as well as to pull together a combination of laboratories to work on a single project. A lot of times that is much more difficult for these other agencies to do, and sometimes if the agencies go directly to a laboratory, it might not be the prime laboratory that that I would suggest that they go to. But it is the other agencies' prerogative to go to whichever national laboratory they would like to get the work for others, as we characterize it, done.

Senator CARNAHAN. How do you coordinate with the other various agencies? How do you ensure that NNSA research meets the user requirements?

Mr. WALDRON. We coordinate through an awful lot of the mechanisms that have been mentioned here. We participate on the Nonproliferation and Arms Control Technology Working Group. I am one of the co-chairs. We participate with the Technical Support Working Group. I am on the standing committee with Dr. Klein for the Counterproliferation Program Review Committee. So, we have all those mechanisms as well as some MOUs that I mentioned in my testimony. Also, I did not mention that we have an MOU with various law enforcement agencies, Customs, FBI, et cetera, and we get their needs, not necessarily firm DOD requirements, but we get their needs for improved capability from these various agencies. So,

that is what helps formulate our program and identifies the various capability needs that people want.

One thing that we are doing right now that we have just kicked off with Transportation and the Transportation Security Administration and the Customs and Coast Guard is working with them to do some modeling about how you can look at protecting our land from nuclear materials coming in, and looking at maybe a layered kind of defense where some of it is done overseas, as well as here, and integrating the smart highway system into these kinds of things.

Senator CARNAHAN. Thank you.

Dr. Klein, Fort Leonard Wood plays an important role in deciding how our soldiers in the field use some of the technologies that you develop. How do you work with them to ensure that the Army's Chemical School is aware of new technologies being developed, and how do you know what our soldiers really want in new technologies?

Dr. KLEIN. Well, Senator, in terms of finding out what the soldiers need and want, we have a lot of communication through the various commanders. So, we get feedback. We have typically a lot of meetings in the chemical/biological area.

In regard to Fort Leonard Wood, I personally met with Brigadier General Patricia Nilo to find out what areas she is involved in and what programs we might expand, where the skill sets are.

So, we have a lot of meetings. We have our professional staff go out to these various sites through communications. So, I would say the way we find out what people need is they tell us typically what they would like, and then we try to have a science and technology base that will provide them the best protection available.

Senator CARNAHAN. Thank you very much. I appreciate all of you being here today. As one final thought, I might say that I will be sponsoring a science and technology conference at Fort Leonard Wood in August. I would appreciate any support your offices could provide to get the right people and technologies to the conference. You are all certainly welcome to send a representative as well. I was hoping that you would be able to lend your support to that effort.

Again, I thank you for being here and helping us to have a better understanding of this critical and complex topic. I know that there will be Senators who will be submitting questions for the record, and we would appreciate your timely response to those.

With that, the subcommittee is adjourned.

[The prepared statements of Dr. Andrews, Admiral Cohen, Mr. Engle, and Dr. Tether follow:]

PREPARED STATEMENT BY DR. A. MICHAEL ANDREWS II, DEPUTY ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH & TECHNOLOGY

INTRODUCTION

Madam Chairman and members of the committee thank you for the opportunity to describe the fiscal year 2003 Army Science and Technology (S&T) program and the significant role S&T has in accelerating the pace of the Army's Transformation.

We want to thank the members of this committee for your important role in making today's Army the world's preeminent land combat force and your support of our Transformation goals. Your continued advice and support are vital to our success.

TRANSFORMATION

We are a Nation and an Army once again at war. This new century brings a new kind of war—the worldwide war against terrorism. Events since September 11 have reinforced the need to continue and accelerate the Army's Transformation to a more strategically responsive Objective Force. The versatility, agility, lethality and survivability by our forces in Afghanistan provide a glimpse of the full spectrum capabilities we are seeking to achieve in the Objective Force. A clear example of this is the new lightweight ballistic protection worn by our soldiers during combat operations in Operation Anaconda. The new Interceptor armor jackets, credited with saving many lives and minimizing combat injuries, were produced through the Army Manufacturing Technology (MANTECH) Enhanced Manufacturing Processes for Body Armor Materials project, through the U.S. Army Natick Soldier Center, Natick, Massachusetts.

The Army's Transformation is well underway and the S&T program is in the third year of executing its focus on achieving Objective Force capabilities and re-shaping Research and Advanced Technology programs to support the Army Vision. We are transforming today's Army to an Objective Force that provides the Joint Force Commander with versatile early entry capabilities, without extensive logistics "tails," fixed forward bases but still having the combat power to "finish quickly and decisively."

THE ROLE OF ARMY S&T

The goal of the Army's Science and Technology (S&T) program is to provide technical solutions for the Army's Objective Force. We are committed to providing this technology to accelerate the Transformation. The largest single S&T program that we have is the Future Combat Systems (FCS). FCS represents a true paradigm shift in how we fight—perhaps as significant as the introduction of the tank or the helicopter. FCS is the single largest S&T initiative, representing over 40 percent of all S&T funding. In the Army's quest for true innovation, it has partnered with the Defense Advanced Research Projects Agency (DARPA) to explore innovative FCS concepts and technologies. FCS is not "a platform." It is a system of battlefield capabilities in which the whole exceeds the sum of its parts. Fielding FCS will blur current distinctions between heavy forces and lighter forces, while providing lethal overmatch. Some of the key challenges include:

- Survivability: Survivability is the primary technology challenge because our combat systems must weigh less than 20 tons to be rapidly deployable. This forces us to find new ways to protect our soldiers. To survive a first round engagement, to "See First" and "Understand First," individual FCS platforms will require advances in Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C^4ISR) as well as integrated platform protection systems. Technology options under development include advanced communications and sensor systems that will increase situational awareness and allow us to "see first" and farther than the enemy; active protection systems which are designed to degrade, deflect or defeat incoming threats before they can hit our vehicles; signature reduction techniques that will make us harder to see and therefore harder to hit; and lightweight armor that weighs 1/4 of the current armor, but provides the same protection.
- Lethality: Although our systems will be lighter weight, they must maintain the lethality overmatch of current systems. Desired capabilities include lethal and non-lethal, line-of-sight and non-line-of-sight, gun, missile and directed energy weapons that will provide for the destruction or incapacitation of multiple targets. Options under development include the precision and loiter attack missile systems that will allow us to conduct precision engagements against the enemy at much greater ranges than he can; lightweight, lower caliber guns and ammunition capable of precision direct and indirect fire at long ranges, potentially enabling us to combine capabilities of the traditional tank and artillery piece into one system; extremely lethal compact kinetic energy missiles that ensure overmatch against advanced protection systems, and directed energy systems like lasers and high-power microwaves for lethal and non-lethal applications.
- C^4ISR: Network centric operation is the linchpin for FCS and the Objective Force, providing the foundation for comprehensive situational awareness and the capability for instantaneous prioritization, distribution and engagement of multiple threats. On-the-move, distributed command and control, multi-function sensors and sensor fusion algorithms, and development of a seamless Tactical Internet among leaders, soldiers, platforms, and sen-

sors are critical to achieving these goals. Options under development include digital, secure on-the-move communications for collaborative planning and execution, positive command and control, and shared situational awareness; enhanced radar and sensor systems for longer range detection, accurate identification and precise localization; information assurance to counter information attack and avoid deception, denial and disruption; and aided target recognition to reduce the target identification and weapon engagement timeline—the sensor to shooter latency.

• Power Generation and Management/Electric Propulsion: The Objective Force will require efficient power generation and management systems to remain lightweight, but still function at a fraction of the logistics burden of the current force. Fortunately, the Army can leverage commercial investments, and is engaging with industry to achieve mutual development benefit. Options under development include hybrid electric drive for high acceleration, design flexibility and increased fuel efficiency; fuel cells for efficiency, quiet operation, reduced environmental impact and potential water generation; advanced diesel engines scaled for FCS-class vehicles with higher power density and greater fuel efficiency; low power demand electronics to increase energy efficiency; and efficient power management designs.

• Human Engineering: Future leaders and soldiers will face increased challenges because of the variety of missions and complexity of tasks that they must accomplish. We must minimize this complexity while ensuring our soldiers are better trained and rehearsed for the full spectrum of missions they may be required to perform. Options under development include human/machine interface designs that decrease task complexity and execution times, improve performance levels, and minimize physical, cognitive, and sensory demands; associate systems to complement human operators, offload routine tasks and enhance high priority task performance; and embedded/deployable training and mission rehearsal environments.

UNMANNED SYSTEMS

Over the past 2 years, the Army has increased its investment in unmanned systems technology to support Congress' desire for fielding substantial unmanned capability among future operational ground combat vehicles. The Army has implemented a bold robotics technology investment strategy to provide these unique capabilities for the Objective Force. The Army has also structured the FCS program with phased unmanned system upgrades to support the introduction of progressively more robust unmanned ground combat capabilities.

As part of its on-going partnership with DARPA, the Army is sponsoring the development of FCS concepts that involve significant unmanned capabilities. The collaborative Army/DARPA FCS program will define and validate FCS design and operational concepts, including the role of unmanned ground vehicles (UGVs) and unmanned air vehicles (UAVs). Further, in February of 2002, the Army has established a new Unmanned Combat Armed Rotorcraft technology development Memorandum of Agreement. The Army strategy is to begin fielding substantial unmanned capabilities through the FCS program and synergistically integrate manned and unmanned systems throughout the Objective Force.

Additional Army technology investments that have direct relevance for FCS and the Objective Force are being made with DARPA. They include the Organic Air Vehicle (OAV) and a UAV rotorcraft with a large payload, long endurance and a vertical take off and landing capability (the A–160 Hummingbird), advanced command, control and communication technologies, and novel sensor systems. These technologies hold the potential to permit the FCS, and its associated dismounted forces, to operate in complex terrain by exploiting organic, non-line-of-sight fire capabilities through remote sensing and communications relays.

OTHER S&T PRIORITIES

Beyond the FCS, our S&T program must continue to support the full range of capabilities required for the remainder of the Objective Force. Some key areas of investment include:

• Objective Force Warrior: Integrated soldier system of systems to provide leap-ahead capabilities for the dismounted soldier with dramatic weight and power reduction—with a goal of providing full warfighting capabilities at 40 lbs. or less. The system of systems will provide seamless connectivity with other soldiers, weapon systems, FCS, and robotic air/ground platforms to achieve overmatch for the full spectrum of future operations.

• Medical Technology: Individual health monitoring, medical and dental preventive treatments, including: vaccines and drugs against malaria, hemorrhagic fever, and scrub typhus, to significantly reduce Disease and Non Battle Injury (DNBI) casualties. In addition, these technologies seek to reduce the medical footprint. Innovative products include far-forward stabilization and resuscitation, hemorrhage control, minimize neural injury, decrease the mortality rate, and speed soldiers' return-to-duty.
• Advanced Simulation: Modeling and simulation technology, such as an innovative partnership with the entertainment and game industries through the University of Southern California (the Institute for Creative Technologies or ICT) to accelerate the development of compelling immersive environments for training, mission rehearsal, and concept development. Another project, the Joint Virtual Battlespace (JVB) program, is an enabling technology for evaluating how FCS contributes to the total capability of the Objective Force, and how the Objective Force plays in a joint force. JVB, combined with virtual prototyping, also seeks to provide an effective means to take time out of the Operational Test and Evaluation process.
• Rotorcraft Technology: As the DOD lead for Rotorcraft Science and Technology, the Army is investing in the critical technologies to increase performance and reduce logistics demands for both manned and unmanned rotorcraft. Most significant is the new thrust to develop an Unmanned Combat Armed Rotorcraft capability.
• Micro Electro-Mechanical System Inertial Measurement Unit (MEMS IMU): The Army has recently solicited 50 percent-cost share proposals to develop a low-cost, gun hardened and high accuracy MEMS IMU for gun-launched guided munitions, tactical missile and other military applications. The focus is to produce a MEMS IMU that will be bought by the DOD in bulk, thereby giving the economy of scale necessary to yield an inexpensive unit price. The goal is a military tactical-grade IMU that meets 90 percent of DOD munition and missile needs at a low-performance unit price, available from two, or more, commercial contractors.
• High Energy Lasers: As we move to a more all-electric force this "electric" laser approach will be a key enabler to achieve unprecedented combat overmatch on the battlefield. The Army S&T program continues to investigate high energy solid state laser technology options for potential application on the tactical battlefield. In this effort, we are seeking to identify the most promising solutions to ensure speed of light engagement and laser weapon lethality throughout the spectrum of battlefield environments of weather, dust, and obscurants.
• Basic Research: As the Army's mission challenges have increased, it has become even more important to maintain world-class quality in the basic research program. Investment in knowledge and understanding of fundamental phenomena to enable future technological development includes: support for academic research through the Single Investigator Program (e.g. microturbines, materials science, solid-state physics); investment in paradigm shifting centers (University Affiliated Research Centers (UARCs) such as ICT); support of industry-led centers through the Collaborative Technology Alliances (Communications & Networks, Advanced Decision Architectures, Power and Energy). A specific new thrust was added in 2002 with the selection of the Massachusetts Institute of Technology (MIT) to serve as the Army-sponsored University-Affiliated Research Center (UARC) for the Institute for Soldier Nanotechnologies (ISN). The ISN will provide the Army with a corps of expertise in the development and application of nanotechnology for the soldier; including the creation of uniforms and materials that could help heal soldiers, protect against bullets, chemical agents or monitor a soldier's life support processes. Soldiers are at the center of Army Transformation. New technologies and developments by ISN in nanotechnology will bring significant progress in the Army's transformation of soldier equipment. The 2003 budget request includes funding for the creation of the Army Institute of Biotechnology Center, to identify, conduct research and transition militarily relevant biotechnology.

S&T WORKFORCE

We cannot achieve our goals without the top caliber scientists and engineers (S&Es) who develop these technologies for our soldiers. Recruiting and training S&Es remains a challenge. We are working to identify innovative approaches to recruiting, retaining and refreshing the Army S&E workforce. I will be sharing these

insights across the department. I want to assure this committee that I am committed to ensuring the quality of our S&E workforce. Our soldiers depend on them.

The Army is responding to previous authorities such as Section 1113. There has been significant interest from our laboratories in the positions available under this legislation. We have provided criteria to the Army labs in concert with the needs of the Army transformation in those technical areas of highest interest. The Army labs have responded with candidate positions. We expect that the hiring of these personnel will begin in May.

TECHNOLOGY TRANSITION

Successful transition of Army Science and Technology is central to enabling the Army vision. The Army S&T community has been challenged to develop a revolutionary warfighting capability within an accelerated timeframe. To accelerate technology transition, the Army adopted new and aggressive management practices and methodologies to manage risk. The Army has adopted Technology Readiness Levels (TRLs) as the method to measure the maturity of the technologies being developed. TRLs were identified in the recommendations put forward in the 1999 General Accounting Office Report[1] citing best practices for the management of technology development. The GAO stated that critical technologies and/or subsystems should be at a high level of maturity prior to making the commitment for development and production of a weapons system. The Army has adopted this approach and is using TRLs to track and communicate technology maturity levels to the acquisition community. We can take time out of the transition process by maturing technology in the S&T phase to TRL 7—system prototype demonstration in an operational environment. By doing this, we spend more in S&T, but save time and money in Systems Development and Demonstration (SDD), then proceed faster to production.

Risk management is another tool designed to improve the transition of advanced technologies to the warfighter by providing the gaining acquisition Program Manager with a risk assessment and risk mitigation plan for S&T programs. While Technology Readiness Levels assess the estimated maturity of a technology, the risk management process focuses on identifying, tracking and managing potential cost, schedule and performance risks. In fiscal year 2001, the Army Science & Technology (S&T) community implemented a pilot program to perform risk management on selected S&T efforts. Lessons learned from this pilot program will be used to tailor the risk management process that will be applied to all Science and Technology Objectives efforts preparing to transition to acquisition.

PROMOTING TRANSITION FROM NON-TRADITIONAL DEFENSE CONTRACTORS

The Army is continuing in its efforts to promote technology transition from nontraditional defense contractors. Legislation in fiscal year 2002 directed the Army to establish a venture capital fund similar to that established within the Central Intelligence Agency (CIA) to identify, develop, and field new technologies as rapidly as needed to support the transformation. The Army has engaged the RAND Corporation to assist the effort in establishing such a fund in concert with the guidance from Congress. We expect that the Army will be ready in short order to announce its approach to the congressional directive.

TECHNOLOGY TO COMBAT TERRORISM

Defense Emergency Relief Funds will support S&T developments to combat terrorism in the area of Deterrence, Indications and Warning (DIW), and retaliation and recovery. Included are the development of improved sensors, sensor suites and resultant operational modalities in the following areas:

- Remote/Perimeter Sensing—Increase the capability of distributed remote sensor systems by the addition of extremely compact day/night thermal imaging capability and improved long range command, control and reporting capability. Camouflaged, remotely emplaced imaging sensors capable of radio frequency (RF) transmitting day/night "snapshots."
- Urban/Cave Assault Kits—Develop and fabricate individual soldier systems to allow soldier maneuverability and weapon aiming in constrained areas in true dark. Based on micro thermal imaging cameras mounted on soldier helmets and weapons with imagery presented on a helmet-mounted display.

[1] *"Best Practices: Better Management of Technology Development Can Improve Weapon Systems Outcomes,"* GAO/NSIAD–99–162, July 1999.

• Blue Force Awareness—Develop and evaluate techniques to improve soldier navigation and location capabilities in complex urban and field environments. Included are dead reckoning navigation and blue force situation monitoring in the absence of viable Global Positioning System signals, ultra-wide band tags for intra-unit soldier awareness and real-time blue force identification of moving vehicles through modification of existing radars for tactical unmanned aerial vehicles (TUAVs).
• Counter Terrorist Echelon Surveillance—Extend the range of surveillance and identification of potential terrorist activity at the individual soldier, light vehicle and airborne platform (TUAV) echelons. Incorporate short wave infrared imaging techniques to extend identification ranges out to current detection ranges, automated gimbal scan electro-optical imaging from ground vehicles fused with moving target indicator (MTI) radar for faster cueing of suspect activity and lightweight/high performance day/night thermal imaging from a TUAV platform for wide area/change detection assessments including recently deployed land mines.

CONCLUSION

The Army must have a diverse S&T portfolio that is responsive to current and future warfighter needs. The S&T community seeks technological solutions that can be demonstrated in the near term, explores the feasibility of new concepts for the midterm, and explores the imaginable for an uncertain far-term future. Since the Army vision was announced in October 1999, the Army S&T effort has been reshaped, refocused and reinforced to speed the development of those critical technologies essential to transform the Army into the objective force. The Army S&T community has accepted the technical challenges embraced in the Army Vision. We have committed our energies and our vital resources to accelerate the pace of Army Transformation!

PREPARED STATEMENT BY REAR ADM. JAY M. COHEN, USN, CHIEF OF NAVAL RESEARCH, OFFICE OF NAVAL RESEARCH

Madam Chairman, distinguished members of the subcommittee, thank you for this opportunity to discuss the use of Naval Science and Technology for combating terrorism and weapons of mass destruction. You and the other members of the Senate Armed Services Subcommittee on Emerging Threats and Capabilities have been leaders in calling attention, both nationally and in the Department of Defense, to the changing nature of national security challenges facing our great nation.

I would like to discuss the Navy's science and technology efforts, especially programs developing new technologies to combat terrorism and weapons of mass destruction, as well as our fiscal year 2003 budget, our technology transition initiatives, and our plans to revitalize our labs and retain our top notch personnel.

You have challenged us, and we have challenged ourselves, to transform the Navy's ability to be even more responsive and more capable of meeting any current and future crisis. In the war against terrorism, S&T is the enabler which links innovative research to warfighter and homeland defense requirements. From discovery to deployment, innovation and experimentation facilitate the transition of successful concepts from lab to Fleet/Force.

Science & Technology in the War Against Terrorism

The campaign in Afghanistan has already seen the use of new weapons rapidly developed in the laboratory. For example, the PBXIH–135 thermobaric explosive developed at Naval Surface Warfare Center Indian Head (an explosive that produces extremely high temperatures and blast overpressures) was used to fill Air Force BLU–109 2000-pound bombs. The Defense Threat Reduction Agency tested the new weapon at Department of Energy ranges in Nevada, and it was ready in time to be used with devastating effect against al Qaeda caves in Afghanistan. This is just one example of how science and technology (S&T) organizations can swiftly collaborate to provide concrete deliverables in a wartime emergency. In addition, it shows how Naval science and technology interact effectively with other services, defense agencies, and federal departments.

The thermobaric weapon story is instructive in other ways. The labs delivered it in less than 3 months. The call for new warfighting capabilities was issued on September 19, 2001, and the weapon was sent to the Afghan theater in mid-December. Such speed was possible because the science was done before the need became urgent. This basic fact about how science transitions to operational capabilities explains why a relevant, balanced Navy and Marine Corps program plans to deliver

across three phases: (1) Today's Navy and Marine Corps (dominated by emergent needs of the warfighter), (2) the Next Navy and Marine Corps (defined by requirements), and (3) the Navy and Marine Corps After Next (shaped by technological possibilities discovered through research in areas of Naval relevance).

Another example of the benefit of Naval basic research is Nuclear Quadrupole Resonance (NQR) Technology. NQR technology "sniffs out" explosives. The Naval Research Lab developed nuclear quadrupole resonance, a technology that has now been adapted to the detection of landmines, unexploded ordnance, and terrorist bombs. Because this technology gives us the means of detecting explosives directly (and not simply detecting metallic objects, as is the case in conventional detection systems) we are now able to see through clutter that presently obscures many mines and bombs from older sensors. The ability to detect widely-used plastic explosives (RDX) was demonstrated in Bosnia; and the Naval Research Lab has more recently demonstrated the ability to detect TNT.

Another example highlighting the value of our long-term sustained research investment involves an Office of Naval Research (ONR)-sponsored scientist at the University of Wisconsin who was working on high-frequency (terahertz) radar phenomena in the Naval basic research program. The morning anthrax was detected in the mails, it occurred to his ONR program manager that this technology had potential utility for rapid detection of biological agents. At the program manager's suggestion, the scientist quickly determined that in fact his high-frequency radar could identify anthrax inside a sealed envelope in real-time. This technology gives a go/no-go readout and can be developed into a system for use by personnel with minimal training. The DOD Counter-Terrorism Task Force has selected this system for accelerated wartime development; we expect to deploy it by fall 2002.

Naval funded research also identified a polymer produced by marine algae that, when used to dress wounds, can actually stop gushing arterial bleeding. Since the polymer does not contain any of the proteins normally associated with clot formation, it doesn't pose the disease-transmission or immune response risk of other hemostatic technologies. This lifesaving technology is the grail of combat trauma medicine, and provides an excellent example of a basic research result transitioning directly to the operational forces. The hemostatic dressing has passed initial FDA trials and is being accelerated into the military inventory under the DOD Counter-Terrorism Task Force.

In the aftermath of September 11, when the DOD Counter-Terrorism Task Force solicited all military services and defense agencies for warfighter/homeland defense enhancements deliverable in 30 day/1 year/1–5 year timeframes, one-third of the funded programs (validated by the Joint Staff) in each timeframe were Naval! This is a high return on Navy sustained S&T investment.

Naval Science & Technology Investment Strategy

There is zero certainty that every research investment will pay the dividends we desire. What is certain: if we do not invest in promising research today, we guarantee that options and opportunities will be severely curtailed in future years.

So how do we choose the research in which to invest? We are guided by: (1) *National Naval Responsibilities* (fields in which Navy S&T is the only significant U.S. sponsor, such as Naval Engineering, Ocean Acoustics, and Underwater Weaponry); (2) *S&T Grand Challenges* (we encourage the Nation's scientific community to achieve breakthroughs in difficult but achievable technical challenges involving issues such as: Naval Battlespace Awareness, Electric Power Sources, Naval Materials by Design, and Multifunctional Electronics for Intelligent Naval Sensors); and (3) *Future Naval Capabilities (FNCs)* (which complement our commitment to achieve mid-term/long-term breakthroughs, by squarely facing the immediate challenge of meeting today's warfighter requirements).

With the focus of this hearing on some of our more immediate requirements, I want to particularly emphasize S&T contributions to enabling Navy transformation through achieving goals outlined in the Future Naval Capabilities (FNCs). The key to achieving FNC goals is the strong business partnership between S&T, Industry, Requirements, Acquisition, and Fleet/Force stakeholders.

The FNC process delivers maturing technology to acquisition program managers for timely incorporation into platforms, weapons, sensors, and process improvements. With a total investment of $577.6 million in fiscal year 2002 and over $600 million planned for fiscal year 2003, FNCs support the Secretary of the Navy's goals to: (1) increase combat capability; (2) enhance personnel performance; (3) introduce advanced technology; and (4) improve business practices.

ONR devotes approximately two-thirds of its 6.3 (advanced technology development) funds and about two-fifths of its 6.2 (applied research) funds to FNCs. As I

have reported to you previously, the twelve currently approved FNCs (in no priority order) are:

- Autonomous Operations—focused on dramatically increasing performance and affordability of Naval air, sea, land, and underwater unmanned vehicles;
- Capable Manpower—focused on affordable human-centered hardware and systems matching human capabilities, limitations and needs, for use by individual sailors and marines in an information rich battlespace;
- Electric Warships and Combat Vehicles—focused on revolutionary power plants that will permit new hullforms and propulsors, reduce manning, streamline logistics, and enable future high energy/speed of light weapons and sensors;
- Knowledge Superiority and Assurance—focused on developing capability to distribute integrated information in a dynamic network with high connectivity and interoperability to ensure Naval forces have knowledge superiority, common situational understanding, and increased speed of command;
- Littoral Antisubmarine Warfare—focused on enhancing our capability to detect, track, classify, and engage enemy submarines in a near-the-shore environment before they are close enough to harm our Fleet/Force;
- Littoral Combat and Power Projection —focused on development of uniquely capable combat and logistics systems necessary to deploy and sustain the Fleet/Force without building up a large logistical infrastructure ashore;
- Missile Defense—focused on developing capability to detect, track, and engage ballistic, theater and cruise missiles, as well as enemy aircraft, through a single integrated air picture, composite combat identification, distributed weapon measures, stealth and damage control;
- Time Critical Strike—focused on achieving a substantial reductions in the amount of time required to engage critical mobile targets, theater ballistic missiles, weapons of mass destruction, C^4I centers and armored vehicles;
- Total Ownership Cost Reduction—focused on ways to use advanced design and manufacturing processes to significantly decrease costs associated with acquisition, operations, maintenance, manning, ensure environmental compliance, and give Naval forces reliable cost estimating tools; and
- Warfighter Protection—focused on protecting Warfighters in the emerging Expeditionary Maneuver Warfare battlespace through combat casualty prevention, care, and management.

Technology Transition Initiatives

We are pursuing several initiatives to improve the transition from discovery to deployment within the Navy by strengthening the partnership between the Office of Naval Research (ONR) and the schools, universities, government laboratories and industry, as well as nonprofit and for-profit organizations. Despite the world-class S&T research conducted by the Naval Research Laboratory (NRL) and all of our other laboratories and warfare centers, we intend to avoid the "Not Invented Here" syndrome. We are not the font of all knowledge and intend to take full advantage of the creative genius present in the schools and private sector to meet Navy and Marine Corps requirements.

The Commercial Technology Transition Officer (CTTO) is my senior Naval advocate for moving promising technology out of commercial research and into systems procured for the Navy/Marine Corps. For the last 2 years, we have sponsored an annual Naval-Industry Research and Development Partnership Conference, where we attempt to address regulatory, funding, and technology transition issues.

In addition, we have established a "Swamp Works" office, similar in concept to the Lockheed-Martin Skunk Works office, but dedicated to addressing critical blue/green Navy/Marine Corps problems with out-of-the-box solutions. Swamp Works has already begun to show its value, for example, in the initial deployment of its Sea Airborne Lead Line (Sea ALL) unmanned aerial vehicle (UAV) to the Fifth Fleet. The Navy's Sea ALL UAV is derived from the Dragon Eye UAV, which was developed by ONR for the Marine Corps. Dragon Eye is a small, camera-equipped, backpack-size UAV designed to provide Marines with a portable airborne reconnaissance capability. Sea ALL will similarly provide Navy ships with reconnaissance capability while in port, as well as the potential capability to employ remote sampling to detect chemical, biological and explosive threats.

Swamp Works is also looking at blast mitigation. This program is applying new materials and unique structural configurations to prevent a blast from breaching a ship's hull—as happened to U.S.S. *Cole.* Two concepts with advanced materials will

be tested soon, and subsequent system design will offer near-, mid- and far-term applications. The near-term work will deliver a portable armor enhancement. The mid-term focus will be on permanent enhancements that can be back-fitted to existing ships. The far-term applications will be permanent enhancements to the next generation of ships.

We have also supported the Naval Fleet/Force Technology Innovation Office (NFFTIO) to strengthen communications between the Fleet/Force and the Naval S&T community by assigning Naval Research Science Advisors to serve with Fleet/Force commands. We also established the Naval Research Science and Technology Action Team (NR–STAT) to provide technology solutions (from all sources: government, military, industry, academic, etc.) to problems identified by warfighters. Initially exercised in July 2001, since September 11, NR–STAT has been a principal conduit for technology proposals/solutions in the war against terrorism.

S&T Labs and Personnel

Finally, let me describe some of our ongoing efforts to improve the quality of defense labs and test centers, and improve the quality of technical talent that can be attracted to these important facilities. Congress has supported several legislative provisions have helped the Service laboratories, especially Section 342 of the NDAA for fiscal year 1995 and Section 1109 of the NDAA for fiscal year 2000. Section 1109 eliminated controls on high-grade scientific and engineering positions, a move that has helped with retention of high-quality personnel scientific and technical personnel.

Section 245 of the NDAA for fiscal year 2000 has been used to allow participating Service laboratories and centers to implement, on a trial basis, a one-time clearing of the Priority Placement Program (PPP) registrants for professional science and engineering positions as soon as the recruitment action reaches the Human Resources Service Center. Preliminary indications are that this may be useful in reducing some of the time and effort needed to recruit new personnel. Implementation of Section 1113 of the NDAA for fiscal year 2001 is in process.

There are systemic problems facing the Service laboratories. In light of this and the urgent need to address them, it appears that incremental approaches and piecemeal legislative efforts may no longer be sufficient and timely.

Since the end of World War II, Service laboratories, along with private sector counterparts, have played a crucial role in providing our military the technological superiority needed to counter potential adversaries. This role is even more critical in the post-9/11 world, where a wide range of new technologies are needed to fight terrorism, protect the homeland, and enable defense transformation efforts. Therefore, it may now be time to consider establishing a new governance model within the Federal Government specifically tailored to the needs of a military research laboratory. Such a system could be designed to eliminate the need for piecemeal fixes, while retaining Federal status and competence in science and technology as it relates to National Defense.

Currently, a joint Naval Research Advisory Committee (NRAC) study, with panel representation from the Army Science Board and the Air Force Scientific Advisory Board, and sponsored by the Director Defense Research and Engineering, is examining the difficulty of the Service laboratories in recruiting and retaining top-quality scientists and engineers, as well as other issues related to their ability to remain world-class research institutions. The panel is currently examining recommendations from past studies of the laboratories, recent legislative reforms, including those mentioned above, and input from other experts, to develop a set of recommendations for improving the ability of these laboratories to attract and retain the best and brightest technical talent. The panel has just completed its visits to labs and is currently developing its findings and recommendations. It plans to submit a preliminary summary of its conclusions to the Services and OSD in May 2002. A formal report will probably not be completed until late summer 2002.

In conclusion, the pay off on S&T investment is clear. Naval transformation depends on a long-term, stable, and sustained investment in S&T/R&D, validated through on-going experimentation and transition to the Fleet/Force in a never-ending cycle.

Again, let me tell you how greatly I appreciate your inviting me to provide written testimony in your review of science technology to counter terrorism and weapons of mass destruction.

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

INTRODUCTION

Mr. Chairman, members of the subcommittee, and staff, I very much appreciate the opportunity to provide written testimony on the Fiscal Year 2003 Air Force Science and Technology (S&T) Program. The United States Air Force is committed to a robust S&T Program that enables us to achieve our vision of continuing our transformation to 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 think about employing our forces to defend our nation, as well as quantum leaps in our technology. We must be prepared to counter the worldwide availability of advanced weapons, regional instabilities, and other emerging and less predictable asymmetrical threats. We are developing transformational technologies that permit flexible forces capable of operating far from home, on short notice, for extended time periods. We must also be able to afford these innovations once we develop them in order to re-capitalize the Air Force to fulfill our vision. To meet these objectives, we search out the most promising and affordable technologies in order to win decisively, protect our forces, and minimize collateral damage.

S&T BUDGET

We have been faced with the reality of a fiscally constrained, but operationally-demanding budget environment. The high operations tempo the Air Force has sustained in support of peacekeeping operations and conflicts, such as Afghanistan, has placed a great burden on our people and resources and has strained our ability to maintain a balanced investment between current readiness, short-term objectives, and the long-term challenges that are enabled by our S&T Program.

In spite of these tight budgets, the Air Force is working hard to increase S&T funding, while maintaining a balanced S&T portfolio. The Air Force fiscal year 2003 President's Budget (PB) request was $1,659 million, an increase of approximately $280 million over the fiscal year 2002 PB. In conjunction with the PB increase, there has been a significant increase in the involvement of the warfighting commands and senior Air Force leadership in S&T planning, programming, and budgeting. For example, we have established semi-annual S&T Summits where the Secretary of the Air Force, the Air Force Chief of Staff, and the Air Force four-stars and other senior leaders review the S&T portfolio. The latest S&T Summit focused on transformational technologies that can be developed to assist in combating terrorism and homeland defense.

The Air Force has increased its space technology investment by initiating an advanced development program, Transformational Wideband MILSATCOM, to develop and demonstrate laser communications technologies. Laser communications could provide higher data throughput, and higher frequencies that could transform our military satellite communications infrastructure. Laser communications technology promises to increase the data transfer rates at least tenfold compared to current radio frequency communications systems. Additionally, laser communications uses a narrow beam, which decreases the likelihood of intercept and increases resistance to jamming. While laser communications has 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. While we continue to work on the challenges, we are conducting a study to determine the best architecture for implementing laser communications technologies to complement radio frequency-based systems. Transformational Wideband MILSATCOM is the only project in Program Element 0603436F, and will be executed at the Air Force Space and Missile Systems Center because of the desire to rapidly transition this technology into operational use, and the significant amount of manpower required to manage the effort.

S&T PLANNING PROCESS

I am pleased to report that the S&T Planning Review we undertook and completed in response to Section 252 of the National Defense Authorization Act for fiscal year 2001, Public Law 106–398, was an overwhelming success. We approached

this review enthusiastically and received the wholehearted support and participation of not only the Air Force S&T community, but also the requirements, planning, logistics, and user communities. Approximately 300 people were involved in this review: 160 from the S&T community; 90 from the requirements, plans, and logistics communities; and 50 from the user community. As required, the Air Force identified short-term objectives and long-term challenges. The short-term objectives identified include: Target Location, Identification, and Tracking; Command, Control, Communications, Computers, and Intelligence; Precision Attack; Space Control; Access to Space; Aircraft Survivability and Countermeasures; Sustaining Aging Systems; and Air Expeditionary Force Support. The long-term challenges identified include: Finding and Tracking; Command and Control; Controlled Effects; Sanctuary; Rapid Aerospace Response; and Effective Aerospace Persistence. In addition, we defined technology development roadmaps for each of these objectives and challenges.

Upon completion of the review, the Comptroller General of the General Accounting Office (GAO) assessed the review's compliance with the law. The recently released GAO report not only found the Air Force in compliance with the requirements of the legislation, but was also very favorable of Air Force efforts. The results of the S&T Planning Review are now providing both a short-term and long-term focus to the S&T Program. They are being incorporated into the Air Force S&T Plan, the Air Force Strategic Plan, and are laying the foundation for future Air Force S&T budget planning.

Subsequently, Section 253 of the National Defense Authorization Act for fiscal year 2002, Public Law 107–107, has 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. We expect to submit the results of this study to Congress not later than the May 1, 2003, deadline.

MAXIMIZING OUR S&T DOLLARS

The Air Force continues to leverage technology to transform combat effectiveness. Our strategy is to pursue integrated technology solutions that support our warfighter's highest priority needs. We must also pursue the fundamental enabling technologies that will transform tomorrow's Air Force. As technological superiority is a perishable commodity, we work hard to maximize the payoff of our S&T funding, by not only developing transformational technologies, but also by speeding the introduction of these new technologies into new capabilities for our warfighters using spiral development and reduced acquisition cycle times.

Aiding in the transition of technology to the warfighter is the Air Force's newly established Acquisition Center of Excellence, which will develop new acquisition processes and concepts for accelerating development programs into operational use. This new initiative could more highly focus the S&T Program on technologies that have a clear and well-defined technology transition path into developmental and fielded systems. The spiral development concept will be an important foundation of this new Air Force acquisition initiative. In addition to the Air Force's Acquisition Center of Excellence, another avenue that could provide for transition of maturing S&T technologies is the congressionally-directed Challenge Program. This program as described in Section 244, "Program to Accelerate the Introduction of Innovative Technology in Defense Acquisition Programs," of H.R. 2586, directs the Office of the Secretary of Defense to increase the introduction of innovative and cost-saving technology in acquisition 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 increasing our emphasis on the reliability, maintainability, and affordability of weapon systems. Emphasizing affordability from the very beginning through training of our management and engineering staff, as well as through careful review of technology transition pilot projects, increases our potential to reduce the costs of technology early in the process and throughout a product's life cycle.

We are 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 strong 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). Finally, the Air Force is involved in international technology cooperative ef-

forts for S&T, such as the software defined radio development, insensitive high explosives, and aircraft battle damage repair efforts conducted with France, Germany, and the United Kingdom. Another example of international cooperation is the bilateral work we are doing with Australia on testing small ordnance release and separation on aircraft with internal weapon bays at subsonic and supersonic speeds.

COMBATING TERRORISM

Since the September 11 attack on the United States, the Air Force has responded to civil and military requests for assistance providing both technology and scientists and engineers. For example, continental United States air defense systems are positioned along our borders to cover the air space from the shoreline to 250 miles outward. However, September 11 brought with it a sudden military need to cover the airspace over the United States as well. We sent scientists and engineers, equipment, and radar fusion software to the Northeast Air Defense Sector operations center, and integrated military and FAA radar data for real-time situational awareness of all air traffic in the Northeast United States.

In partnership with the MITRE Corporation, we mounted sensors on a New York Police Department helicopter and on a Drug Enforcement Agency aircraft. The helicopter and aircraft over flew "ground zero," using the video mosaic tool kit the Air Force developed to process Predator data, to produce a current aerial map of New York City. The police and fire departments used this map in their search and rescue efforts.

The Air Force Joint Defensive Planner program, an automated tool recently developed to allow joint collaborative planning of theater air defense, was modified for use by the North American Air Defense Command. Air Force scientists and engineers modified the Joint Defensive Planner databases to include a high-resolution topographical map of the United States, plus the location and capabilities of all military and FAA radars in the continental United States. This modified planner was installed in the 1st Air Force CONUS Regional Operations Center at Tyndall Air Force Base, Florida, and gave us the first ever, complete picture of radar coverage of the continental United States.

Another technology that has been deployed to support Operation Enduring Freedom is the Interactive Data Wall. Think of it as a very large computer screen. The data wall starts at waist level, goes up 3 feet, and is 12 feet wide. It has very high resolution, with over 4 million pixels in the display, and can overlay multiple sets of information and show several different displays simultaneously. Anything that can be displayed on a computer or television can be displayed on the data wall. You control the displays through voice recognition software and laser pens. The Air Force has been experimenting with data walls in joint exercises over the past 2 years and has met with much success in learning how best to use them. In December, the Commander of the Army 10th Mountain Division requested a data wall for immediate deployment in support of Operation Enduring Freedom with a second data wall to follow 90 days later. We delivered the first data wall the next day and the second one in less than 90 days.

The Air Force technology has also been directly supporting warfighters involved in Operation Enduring Freedom by providing fatigue countermeasures to B–2 bomber crews at Whiteman Air Force Base, Missouri, who are flying 44-hour missions to Afghanistan. The Warfighter Fatigue Countermeasures technology program is focused on optimizing warfighter survivability and combat capability during sustained and continuous (24/7) operations. Our primary S&T objective is to identify, develop, and transition tools and procedures that prevent and delay cognitive performance deterioration caused by acute and cumulative fatigue resulting from extended duty periods, disrupted or irregular rest periods, and circadian dysrhythmia typical of military operations today. Warfighter Fatigue Countermeasures research products primarily impact the warfighter through improved procedures, guidelines, and policy changes. These "knowledge products" derive from a thorough scientific assessment of the human system and the particular environment within which the human system must operate and are most frequently delivered through operational consultations. We also have software products in development that provide quick access to our expert knowledge on fatigue and cognitive performance.

TRANSFORMATIONAL TECHNOLOGIES

There are many other Air Force technology areas that deserve special mention. Let me highlight just a few additional examples. The Unmanned Combat Air Vehicle (UCAV), designated the X–45A, is an area that is generating increased excitement and could enhance warfighting capabilities. The Air Force/Defense Advanced Research Projects Agency (DARPA) X–45A joint advanced technology demonstration

program has entered its fifth year. Flight vehicle checkout, ground testing, and high-speed taxi tests of the first demonstrator are underway, with projected first flight in the spring of 2002. Test results to date have been very good, and we fully expect continued success. We plan to complete Phase II of the X–45A program by the fall of 2003 and the Air Force is planning for a follow-on acquisition program.

To increase aircraft survivability and operational efficiencies, the Air Force is developing both manned (F–22 and Joint Strike Fighter) and unmanned (UCAV) flight vehicles 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 their 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 is the Low Cost Autonomous Attack System (LOCAAS). The LOCAAS is a 100-pound class powered munition whose primary target set is moving and relocatable targets. It will demonstrate the effectiveness and military utility of this type of munition for the Lethal Suppression of Enemy Air Defenses, Theater Missile Defense Attack Operations, and Armor/Interdiction mission areas. LOCAAS will integrate a radar precision terminal seeker with autonomous target recognition algorithms, a multi-modal warhead, Global Positioning System/Inertial Navigation System midcourse guidance, and a miniature turbine engine with a fly-out range of 100 miles. This advanced technology demonstration program has five flight tests scheduled in fiscal year 2002 and fiscal year 2003, culminating in an autonomous flight with active seeker and warhead against a real target in fiscal year 2003. The first flight test was recently held and demonstrated the LOCAAS ability to fly a programmed flight path and perform high bank turns, while maintaining aerodynamic stability.

To continue the trend of miniaturization of space platforms, DARPA and the Air Force have provided funding to 10 universities to explore the military utility of innovative, low-cost nanosatellites. These nanosatellites, weighing 2 to 10 kilograms, will demonstrate such experiments as formation flying, differential Global Positioning System navigation, miniaturized sensors, and micropropulsion technologies.

The Air Force is also conducting the Experimental Satellite System series to demonstrate increasing levels of microsatellite technology maturity. The XSS–10, the first microsatellite in the series, is scheduled to launch in fiscal year 2002. It will demonstrate semi-autonomous operations and visual inspection in close proximity of an object in space—in this case a Delta II upper stage. In fiscal year 2004, we will launch XSS–11, which will demonstrate autonomous operations and provide experience with command and control in proximity operations to another space object.

Hypersonics is another transformational technology of high interest to Air Force S&T. Our HyTech program achieved major successes in fiscal year 2001 with the first ever ground test demonstration of a scramjet producing positive net thrust over the Mach 4.5 to Mach 6.5 flight range. The engine was developed by Pratt & Whitney, in collaboration with Air Force scientists and engineers, and was recently recognized by *Aviation Week and Space Technology* magazine as a 2001 Laureate in Aeronautics/Propulsion.

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 Surface Target Attack Radar System. The effort is focused on four technology areas: ground moving target tracking; motion pattern analysis; behavioral pattern analysis; and sensor resource allocation and scheduling.

WORKFORCE

The Air Force civilian and military S&T workforce is highly motivated and productive. The Air Force is unique in that 20 percent of its laboratory scientist and engineer (S&E) government workforce is active duty military. This gives us a direct link to the warfighter. Some of these military S&Es come directly from operational commands, while others will serve 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 provided. This challenge requires the Air Force to maintain a dominant edge in technology and also requires us to provide clear direction and growth for our S&E workforce. However, we as do others, find it is difficult to recruit and retain S&Es. The Air Force has several initiatives that address recruitment and retention issues.

The Air Force published a "Concept of Operations for Scientists and Engineers in the United States Air Force" and baselined the requirement for the Air Force S&E workforce. Upon analyzing the baseline requirement, we found our military and civilian authorizations to be about right, but our actual demographics are seriously short in some key areas. We are, therefore, shifting our focus to 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 containment and growth of our technological workforce. We are encouraging this growth through critical skills accession bonuses, critical skills retention bonuses, recruiting, and re-recruiting efforts. As we grow our S&E workforce, we are providing career guidance and mentoring that will enable us to meet our 21st century challenge. Initiatives, such as the special hiring legislation authorized by Congress, which provides "DARPA-like" hiring authority to the military departments, should also provide positive results in shaping our S&E workforce. This authority has only recently been delegated to the Air Force, but we are very optimistic about its potential.

CONCLUSION

The Air Force is in the midst of a technological and organizational transformation that is radically changing air and space contributions to the nature of war. Stealth and precision strike, in particular, have injected leap ahead improvements into combat power unlike any we have known since the introduction of the jet engine. We are also making important strides in command and control, long-range power projection, and mobility in support of an integrated Expeditionary Aerospace Force.

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 technologies for an Expeditionary Aerospace Force as we continue to move aggressively into the realm of space activities. The Air Force is confident that we can lead the discovery, development, and timely transition of affordable, transformational technologies that keep our Air Force the best in the world. As an integral part of the Department of Defense'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 an integrated air and space force.

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

PREPARED STATEMENT BY DR. TONY TETHER, DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

Madam Chairman, subcommittee members and staff: I am very pleased to submit this discussion of DARPA's fiscal year 2002 activities and our fiscal year 2003 plans to continue to transform our military through technological superiority. I will also describe what we are doing to help win the war on terror in Operations Enduring Freedom and Noble Eagle.

DARPA has occupied a special role and mission within the Department of Defense since the time of Sputnik. Our mission is to provide the research and development that bridges the gap between fundamental discoveries and their military use. The work we support is necessarily high-risk and high-return *because* we are trying to fill that gap. We try to imagine what a military commander would want and accelerate that future into being, thereby changing people's minds about what is technologically possible.

The phrase, "DARPA prevents technological surprise," also characterizes our mission over the years. To do this, we work to fill the gap between discovery and use before our adversaries can. However, DARPA, at its very best, not only prevents technological surprise, but creates technological surprise for our adversaries. An example of this is DARPA's development of stealth—a dramatic technological capability that continues to put our adversaries at a disadvantage.

Our mission in the Department creates a role that complements, but is no substitute for, the work of the service science and technology establishments. A DARPA program does not start with what a military commander wants *today*. Instead, we look at what *future* commanders might want. We look beyond today's known needs and requirements because, as military historians have noted, "None of the most important weapons transforming warfare in the 20th century—the airplane, tank,

radar, jet engine, helicopter, electronic computer, not even the atomic bomb—owed its initial development to a doctrinal requirement or request of the military." [1] *None* of them. To this list, DARPA would add stealth and Internet technologies.

At DARPA, we constantly focus on dramatically changing how we will fight in the future. Our unique mission has made us the technological engine of military transformation.

I returned to DARPA last June, having been a DARPA Office Director in the 1980s. When I had my job interview with the Secretary of Defense, I was given two charges: First, I was told to make DARPA like it used to be—an entrepreneurial "hotbed." Second, I was told that DARPA was to give the United States military more robust capabilities in space, so that our nation can maintain unhindered access to space and protect United States space capabilities from enemy attack—one of Secretary Rumsfeld's six transformational goals.

In his January speech on transformation at National Defense University, the Secretary said that he needed the Department to take ". . . a more entrepreneurial approach to developing military capabilities, one that encourages people, all people, to be proactive and not reactive, to behave somewhat less like bureaucrats and more like venture capitalists; one that does not wait for threats to emerge and be 'validated,' but rather anticipates them before they emerge and develops new capabilities that can dissuade and deter those nascent threats." That is DARPA at its very best. I believe that the Secretary had DARPA partly in mind when he said that. Also, the Section 1101 experimental hiring authority given to us by Congress is playing an important role in allowing us to hire the people we need to stay entrepreneurial.

Let me tell you more about what we're doing in our role as the Department's technological engine of transformation. You are familiar with our work in stealth and information technologies. DARPA has also made major contributions in areas such as precision-guided munitions and real-time command, control, communications, computers, surveillance, and reconnaissance. So what are we doing today to build on that legacy?

First, DARPA's vision is to fill the battle space with networked unmanned vehicles. Political support from Congress, particularly in this committee, top-level service and DOD leadership, and technical progress are all coming together to make that happen. One of our flagship efforts is the Future Combat Systems (FCS) program, which has major unmanned components. Under the leadership of U.S. Army Chief of Staff General Eric K. Shinseki and his team, we will transform how the Army fights.

The Future Combat Systems is the cornerstone of the Army's efforts to create what it calls the Objective Force. The Objective Force will respond to the full spectrum of land combat. It will be, in the Army's words, "responsive, deployable, agile, versatile, lethal, survival, and sustainable." Within the FCS program, we have been developing concepts and technologies for a force that can deploy within 96 hours and be highly lethal and survivable in the year 2010. FCS is conceived of as a system-of-systems, and not a particular platform. What makes FCS different is that we are *starting* with the *network* that will make these goals possible—we're *not* starting with a specific platform, or a set of platforms, which we then try to network together.

Within DARPA, our FCS portfolio of programs emphasizes command-and-control, communications, sensors, the Netfires precision missile system, and unmanned and semiautonomous ground and air vehicles. For example, our A160 Hummingbird unmanned, long-duration helicopter had its first flight in January of this year. Unmanned platforms and vehicles enable the FCS system-of-systems to put fewer warfighters directly in harm's way. Moreover, because unmanned vehicles do not require heavy armor to protect people, they are lighter and easier to deploy.

Afghanistan has given us a glimpse of how unmanned air vehicles may shape the future. The Global Hawk, a DARPA program that transitioned to the Air Force in 1998, has played a key role in Operation Enduring Freedom by providing U.S. commanders with high-altitude, long-endurance, unmanned aerial reconnaissance over the area of operations. The Predator, which was originally unarmed and grew out of the 1980s DARPA program called Amber, provides close-in combat surveillance and can now be equipped with Hellfire missiles.

DARPA currently has three unmanned air combatant programs underway: the Unmanned Combat Air Vehicle (UCAV) with the Air Force, UCAV–N with the Navy, and Unmanned Combat Armed Rotorcraft (UCAR) with the Army. These innovative programs are focused on enabling the next revolution in unmanned aerial

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[1] John Chambers, ed., *The Oxford Companion to American Military History* (New York: Oxford University Press, 1999) p. 791.

weapon systems. We are not adding a weapons capability to an existing platform. Rather, we are focusing from the start on the technologies, processes, and system attributes that will help transform each of the services: how the Air Force suppresses enemy air defenses, how the Navy suppresses enemy air defenses and conducts extended reconnaissance, and how the Army conducts armed reconnaissance and attack.

The Unmanned Combat Air Vehicle is a joint program with the Air Force to develop an unmanned aircraft that can be used to suppress enemy air defenses, thereby complementing piloted aircraft for extremely dangerous missions, and/or to conduct strike missions. Our current vision is that up to four UCAVs could simultaneously be supervised by a single battle manager. The last sentence contains two aspects at the heart of the UCAV revolution. First, UCAVs are not flown as one flies a Predator or Global Hawk or any unmanned platform today. Rather, the vehicles have sophisticated on-board adaptive mission planning, which will allow them to conduct the entire mission without continuous human oversight. Second, each of those vehicles is also directly linked to its fellow unmanned wingmen and can perform multi-ship cooperative targeting, tracking, attack, and assessment. UCAVs will hunt for relocatable and mobile targets in "four-packs" under the supervision of a skilled operator.

This is not about autonomous machines. It is about blending the best traits of man and machine. There is always a person in-the-loop to provide the timeless qualities of human judgment and insight to supervise the unmanned systems and manage the battle. Operators will be assisted by decision aids that allow them to focus on the operational art of war, leaving the implementation details to the unmanned element of this synergistic blend of man and machine intelligence.

While striving to mature these challenging command and control concepts, the UCAV program has not lost sight of keeping this new weapon system affordable. The program emphasizes making UCAVs low-cost (roughly 50 percent lower purchase price than an F–16CJ and 75 percent lower operating costs) and storable, unattended, for long periods of time—the "wooden round" idea.

UCAV continues to make solid progress across the four major program focus areas: first flight, coordinated multi-vehicle flight, system B design, and acquisition planning. We have completed two of the three series of taxi tests required before a safe first flight, which is now planned for later this spring. Software is under development to support the critical multi-vehicle flight demonstrations scheduled for next summer, and we have begun designing the X–45B fieldable prototype, which will take the next major step toward an operational system and support future demonstrations of military utility and operational value. Overall, the program is on the maximum acceleration path in support of the congressional goal of fielding 30 systems by 2010. DARPA has managed this program in close cooperation with the Air Force. In fact, the early and sustained participation of Air Force warfighters and developers has been a key factor in our success. DARPA is leading the program until the critical multi-vehicle flight tests are completed in Summer 2003, when we will transfer program management responsibility to the Air Force.

The Navy's variant of the UCAV, the UCAV–N program, is at a much earlier stage of development. In addition to the UCAV missions of suppression of enemy air defense and strike, the UCAV–N will also be tasked with extended surveillance. This additional requirement could lead to a vehicle that is significantly (i.e., 50 percent) larger than UCAV and it must be carrier-compatible and in-flight refuelable.

To date, DARPA's work on UCAV–N has been the preliminary design, analysis, and technology risk reduction required under what we call Phase I. Very shortly we expect to announce selections for Phase II, in which the detailed design and actual fabrication of UCAV–N will take place.

The Unmanned Combat Armed Rotorcraft is the newest of the three programs, with Phase I beginning this year. The goal of UCAR is an unmanned, affordable, survivable armed vertical take-off and landing system that can identify and attack targets farther in front of U.S. ground forces—doing a dangerous and critical mission while putting fewer soldiers in harm's way. Such a system would be an important element of the Army's Objective Force and will build on what we're learning about collaboration among unmanned vehicles in the UCAV program. During Phase I of the program, we will do the necessary studies to define the system concept, requirements, risk reduction roadmap, and effectiveness and affordability goals.

A second area where DARPA is continuing to push transformation is precision strike, building on a long tradition of work like Assault Breaker in the early 1980s. The war in Afghanistan showed us how precision strike, in the words of the Chairman of the Joint Chiefs before this Committee, means ". . . the bomb is no longer solely an area weapon, but is going to be used like bullets from a rifle, aimed precisely and individually." Timely, accurate, and precise delivery of bombs and mis-

siles helped us overthrow a hostile regime in short order with very few American or unintended casualties. Yet our experience there has also shown us that major challenges remain in target detection, identification, and tracking.

To bolster our work in this area, I have recently established a new office at DARPA, the Information Exploitation Office (IXO). IXO is assembling the sensors and the information technologies needed to find and destroy the right land targets in any terrain, in any weather, moving or not, at any time.

Let me give you some examples of what we are doing. Currently, one of the best ways for our adversaries to avoid being killed is to keep moving. The Affordable Moving Surface Targeting Engagement (AMSTE) program will demonstrate how, by making only minor modifications to existing and planned systems, we can network and integrate multiple stand-off radars and long-range weapons like Joint Direct Attack Munitions and Joint Stand-Off Weapons to affordably, precisely, and rapidly destroy individual moving surface vehicles.

Another example of our work in time-critical precision strike is the Advanced Tactical Targeting Technology program (AT3). Enemy air defense systems are using increasingly sophisticated tactics and technology, and AT3 is aimed squarely at this threat. The overall program goals are to target surface-to-air missile (SAM) launchers to an accuracy of 50 meters from 50 miles away within 10 seconds after the enemy's radar turns on, a dramatic improvement over today's capabilities.

The technology produced by AT3 will provide the precise coordinates of an enemy air defense unit immediately after it turns on its radar. Providing precise coordinates quickly will allow a weapon to destroy the SAM threat before it can run and hide. AT3 employs non-dedicated platforms, such as tactical fighters, reconnaissance aircraft, UAVs, and UCAVs, to rapidly detect and locate enemy radars by sharing measurements of radar signals using existing tactical data links.

A third program, Tactical Targeting Network Technologies (TTNT), is developing the wireless communications technology needed for future time critical precision strike by a system of systems network. TTNT will provide the communications glue, if you will, allowing systems like AMSTE and AT3 to achieve their full potential. TTNTs goals include: real-time capacity allocation; high-priority messaging; data rates high enough for secure video; low costs; and compatibility with existing tactical data links such as Link 16.

Programs such as AMSTE, AT3, and TTNT will tear down the historical separation between sensors and shooters, the separation between the J2 Intelligence staff and the J3 Operational staff. This is an extraordinarily difficult problem, both technically and organizationally. Our job here at DARPA is to answer those who say, "It can't be done," by demonstrating that it can.

A third area we are transforming is how our systems will talk to each other. The key to network centric warfare is secure, seamless, high-data-rate communications, and DARPA is leading the way in developing those technologies for both untethered, i.e. wireless, and tethered networks.

In the wireless world, four programs illustrate our goals. The FCS Communications program is prototyping the technologies needed for the high bandwidth, low probability of intercept radio links crucial to making FCS work. Our Small Unit Operations Situational Awareness System is the first ad-hoc, mobile, all-terrain radio frequency network system for dismounted infantry. The Terahertz Optical Reachback program will provide high bandwidth optical networks to tactical units in theater. Our Next Generation program will make 10 to 20 times more spectrum available to our military by dynamically allocating spectrum across frequency, space, and time; we call it "tuning for daylight."

For tethered networks, DARPA is working aggressively to counter computer network attacks. For example, we are working on software "wrappers" that can enfold malicious incoming attachments and prevent them from getting at the system resources they need to spread. Our Autonomic Distributed Firewall technology places a firewall inside every computer on a network—a firewall that can communicate with the other firewalls—providing much more robust protection than a traditional single network firewall.

A fourth area where we are continuing to help transform our military is space. Recall that DARPA *started off* as a space agency, when the shock of Sputnik caused Americans to believe that our Cold War adversary had seized "the ultimate high ground." Space continues to be the high ground, it has recaptured our attention, and DARPA once again is investing in that arena.

The ability to maintain unhindered access to space and to protect our space capabilities from enemy attack is one of Secretary Rumsfeld's six transformational goals. In order to do so, DARPA is pursuing several new space programs.

First of all, to enable us to get to space and stay there, we have our new Responsive Access, Small Cargo, Affordable Launch (RASCAL) and the Orbital Express

programs. RASCAL is designing and developing a low-cost orbital insertion capability for dedicated, micro-size (50 kilogram) satellite payloads. RASCAL will provide flexible access to space using a combination of reusable and low-cost expendable vehicle elements. Orbital Express will demonstrate the feasibility of refueling, upgrading, and extending the life of on-orbit spacecraft using automated spacecraft. This will lower the cost of doing business in space and will provide radical new capabilities for military spacecraft, such as high maneuverability, autonomous orbital operations, and satellites that can be reconfigured as missions change or as technology advances.

If one is going to space, one needs to know what is in space—space situational awareness. DARPA's new Space Surveillance Telescope program is developing a ground-based, large-aperture optical telescope with a very wide field of view using curved focal plane array technology. This will facilitate the detection and tracking of very faint objects in deep space. It is not intended as an imaging system, but, rather, as a search-and-detect capability. Both detection sensitivity and search coverage rate will be approximately an order-of-magnitude better than current capabilities.

To use space-based assets to gather information about objects on the ground, we are beginning the Innovative Space-based radar Antenna Technology program. The physics of this mission calls for a much larger antenna than has previously been considered. This drives the program's development of novel technologies and conceptual designs aimed at producing extremely lightweight, compact, and affordable space-based radar antennas that meet the stressing requirements of continuous, tactical tracking of ground moving targets for intelligence, surveillance and reconnaissance.

Finally, to protect our space satellites DARPA is initiating programs like the Satellite Protection and Warning/Space Awareness (SPAWN) program. SPAWN will demonstrate the feasibility of using micro-satellites to provide enhanced, near-field space situational awareness for U.S. space assets in geosynchronous orbit.

Since September 11, the war on terrorism has been foremost in everyone's minds. I want to take a few minutes to tell you about some of the DARPA technologies that are being used to support Operation Enduring Freedom.

In Afghanistan today, warfighters are using 6-inch-long, pen-sized water purification kits developed by DARPA that consume plain salt tablets and purify up to 300 liters of water on a single camera battery. They're using hand-held phrase translation devices in the field and at our embassy in Kabul that convert phrases spoken by our soldiers directly into local, native languages such as Pashto, Urdu, and Dari. Having worked with the Air Force to reduce critical Link 16 network shortfalls demonstrated in Kosovo, DARPA-developed software tools are being used in Operation Enduring Freedom to reconfigure a theater-wide Link 16 network for military aircraft in a few hours—a task that previously took many weeks. Lastly, small ground robots developed in DARPA's Tactical Mobile Robotics program deployed to Afghanistan in support of Operation Enduring Freedom.

On the American homefront, DARPA technology has been used in homeland defense, Operation Noble Eagle. A commercial version of the DARPA consequence management program, LEADERS, provided medical surveillance for signs and symptoms of a biological attack in New York State within 24 hours of the attack on the World Trade Center. The Centers for Disease Control and Prevention (CDC) also used LEADERS to monitor for specified syndromes from hospitals within in the New York City area and report them back in real-time to CDC in Atlanta via the Internet. Robots from the Tactical Mobile Robotics program were sent to New York City to assist in search and rescue operations. Lastly, DARPA personnel served as science advisors to the team responsible for the anthrax decontamination on Capitol Hill. After analyzing the decontamination technologies that might be used for the cleanup of the Hart Building, the team selected the chlorine dioxide approach developed under DARPA's ongoing Immune Building program; this technology proved both effective and safe.

All these technologies were available to respond to the terrorist attacks on our nation because Congress had provided years of patient funding to develop them. Patience pays off.

DARPA has several ongoing programs to help prosecute the war on terrorism. Since the mid-1990s, DARPA has had a significant program in biological warfare defense, covering sensors to detect biological agents, vaccines to prevent infection, therapies to treat people who have been exposed, and decontamination technologies to recover the use of contaminated equipment and locations.

An example of this work, and one that illustrates why it is so exciting, is the Unconventional Pathogen Countermeasures program, which is focused on developing therapies broadly useful across many classes of biological warfare agents. For exam-

ple, we are working on a new class of drug designed to attack the DNA of bacteria, viruses, and malaria, and that may eventually prove useful against threats ranging from anthrax and plague to smallpox.

One of the great challenges in the war on terrorism is to know our enemy—who he is, where he is, and what he's doing. In order to focus our efforts, I established another new DARPA office, the Information Awareness Office (IAO). IAO is developing the information systems needed to find, identify, track, and understand terrorist networks and vastly improve what we know about our adversaries. We will use the light of information technology to take away the shadows they hide in.

For example, IAO's Evidence Extraction and Link Discovery program is aimed at finding terrorist networks hidden in the mountains of diverse data that we collect. The Wargaming the Asymmetric Environment program is explicitly aimed at predicting the behavior of terrorist groups in some detail, an extremely difficult challenge. Usually what we do now is issue broad warnings to the public to be on guard, like the several that were announced following September 11. Wargaming the Asymmetric Environment seeks to move from those broad warnings to more specific predictions. In short, we want to go from predicting the terrorist "climate" to predicting the terrorist "weather." Some would argue that this is an outrageous goal, one that is not possible to achieve. I agree it sounds outrageous, but what if we can do it? That is why it is a DARPA program.

In addition, IAO's Total Information Awareness program is now setting up a testbed at the Army's Intelligence and Security Command to test our new technologies on real-world threat data.

I'd like to now discuss some of our investments in fundamentally new technologies, particularly at the component level, that have often been the technological feedstocks enabling quantum leaps in U.S. military capabilities.

Building on our long tradition in cutting edge information technology, DARPA is pursuing cognitive computer systems—computer systems that know what they are doing. Our current information systems are crucial to national defense, but are expensive to create and debug, require us to adapt to them, cannot coordinate effectively with one another, and are inefficient and prone to failure. We want to develop computing systems that think—that are self-monitoring and self-healing. Cognitive computers can reconfigure themselves as necessary, generate their own code, respond to naturally expressed human directives, and be configured and maintained by non-experts, and therefore last much longer than current systems. We are developing software, networks, components and full systems that are self-aware. We don't expect to reach our ultimate goal for many years, but we are starting now on the underlying technology.

Another traditional DARPA strength has been microelectronics, including photonics and microelectromechanical systems (MEMS), which continue to be core enablers for military systems. As the commercial microelectronics world approaches the end of Moore's Law within the next decade, the chips that emerge, containing trillions of nano-scale complementary metal-oxide semiconductor (CMOS) devices, will have a revolutionary impact on chip-scale, high-speed digital processing for future military systems. Integrating this advanced CMOS technology with radio frequency and analog components, including photonic sources and sensors and MEMS devices, will allow far more adaptable sensor and actuation systems. We foresee intelligent chips that can adapt in real-time, maintaining peak performance while tracking signals over a wide spectral range, and MEMS-based resonators for compact chip-scale oscillators with atomic clock precision. DARPA's goal is to create chips that reason and adapt, enable smarter sensors, and achieve human-like performance. Ultimately, our vision is a more adept human warfighter who uses microelectronics to achieve machine-like precision.

In the last few years, DARPA has had a significant and growing emphasis in the biological sciences, above and beyond what we're doing in biological warfare defense. We are taking inspirations from biology and combining these with DARPA's existing core competencies in the physical sciences, information technology, engineering and materials, to create new devices and systems for the warfighter that incorporate the incredible capabilities of living systems. That is, they are more adaptive, fault-tolerant, and dynamic in their response to an ever-changing environment.

For example, we are looking to biological systems to enable us to create better hardware. DARPA's Controlled Biological and Biomimetic Systems program is designing shoebox-sized, legged robotic vehicles that can clamber over rough and overgrown terrain where wheeled and tracked vehicles can't. We are exploring the use of distributed animal sentinels—foraging, social insects like honeybees—as environmental sentinels to collect and report on bioagents and explosives. Living, swarming sensors if you will.

We are also working to harness biology itself to directly enhance the performance of our warfighters via several programs to make our soldiers stronger and safer. For example, our Continuous Assisted Performance program is looking for ways to prevent fatigue and enable soldiers to remain awake, alert, and effective for up to 7 days straight without suffering mental or physical deleterious effects. Our Metabolic Engineering program is investigating whether naturally occurring states such as hibernation might one day be temporarily induced in soldiers who have been severely injured. DARPA's Persistence In Combat program is looking for ways to take hospital-level emergency trauma care to the farthest-forward battlefield area of operations, i.e., directly to the individual, injured warfighter, by equipping him with non-invasive therapeutics he can self-administer to control bleeding and pain and dramatically accelerate wound healing. This will enable all but the most severely wounded warfighters to stay in the fight and reduce additional casualties among fellow soldiers who would otherwise come to his aid.

Thus far in my testimony, I have dwelt on DARPA systems for which the military applications are fairly clear. However, one of the most exciting things about DARPA is our work on technologies whose exact military uses are not clear, but their *usefulness* is. This is part of what makes being the DARPA Director such a fun job.

For example, our Brain Machine Interface program has demonstrated that a monkey can control a robot arm using only his thoughts. Let me be clear about this: we are not tapping into the monkey's nerve impulses that control his arm. Rather, we are monitoring his actual thoughts and intentions: the monkey *thinks* about moving a robotic arm, an implanted probe detects his brain's neurological impulses, those impulses are wirelessly transmitted to a robotic arm located in another room, and the robot arm moves. Simultaneously, the monkey's thought signals are also sent out via another DARPA development, the Internet, to a lab 700 miles away, where he simultaneously controls another robotic arm. So the monkey also uses his brain to do mechanical work via the Internet!

Thus, we are finding ways to turn *thoughts into acts.* We do not yet fully understand the potential implications of this work. But imagine how useful and important it could be for a warfighter to use only the power of his thoughts to do things at great distances.

Think about our military commanders years from now. Envision them commanding warfighters who then can do things merely by thinking about them; who remain in action and effective for seven days and nights without sleep; who, if injured, can self-administer rapid-healing medications that enable them to stay in the fight, and who, if *seriously* injured, could be placed in temporary hibernation to prolong their lives until they can be evacuated to a hospital.

Will all these technologies work? We don't know yet. But I would be willing to bet you this: if we pursue these technologies now, develop them successfully, and get them into the hands of our future warfighters, the U.S. military commander in the field years from today will value them highly. Our Nation's adversaries will fear them.

Finally, I note the Department is frequently hampered by a demanding set of statutory requirements, which restricts our flexibility and, thus, our ability to adapt to changing circumstances. I ask the Committee to support the President's "Freedom to Manage" initiative, so that we would be better able to efficiently and effectively execute the programs you entrust us with.

Thank you for this opportunity to submit testimony to the subcommittee.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR MARY L. LANDRIEU

COMPUTER SECURITY/CYBERTERRORISM

1. Senator LANDRIEU. Dr. Sega, Dr. Marburger, and Dr. Younger, one emerging terrorist threat is increasingly frequent attacks on computer networks. What research and development is being done to protect critical military systems from computer hackers? How is this knowledge being used to help industry and private citizens at home?

Dr. SEGA. The Department of Defense (DOD) has a long-term commitment to computer network security science and technology (S&T) going back to the origins of the Internet. DOD is concerned with all aspects of computer network defense, information assurance and critical infrastructure protection as it impacts critical military systems, including those owned and operated by the private sector upon which the warfighter is dependent. DOD S&T investment in this area was $212 million in fiscal year 2001 and $222 million in fiscal year 2002.

Recognizing our increasing reliance on information systems and potential susceptibility to attacks, our S&T program includes research in Analysis and Assessment, Mission Assurance, Indications and Warning, Threat & Vulnerabilities, Remediation, Mitigation Response and Reconstitution. The rapid pace of advances in information and communications technology continually brings new challenges and vulnerabilities. Commensurate with these new challenges, protection of information and networks will necessarily require even more vigorous and focused research. This is especially true given DOD's unique requirements for protection, which continue to be more demanding than what the private sector requires. The primary responsibility of orchestrating DOD S&T portfolio is assigned to the Director for Defense Research and Engineering. A majority of this research is directed by the Defense Advanced Research Projects Agency (DARPA), the National Security Agency, and the Service Research Offices and Laboratories.

Potential adversaries have also recognized DOD's reliance on networked computer systems, and the tremendous potential to use this as an asymmetric threat to the detriment of our military effectiveness. DOD is developing new methodologies to mitigate the consequences of a successful attack and restoring its systems. Creating agile and self healing networks is a key S&T objective. The faster we are able to detect, isolate and restore a network to its intended purpose is fundamental to warfighter effectiveness. The events of September 11 have provided DOD with important reasons to reconsider the most serious national threats facing our nation. Because of the ubiquitous nature of many of our critical infrastructures, increased cooperation between the public and private sector is needed to advance the Nation's cybersecurity posture. In order to achieve the high standard of protection envisioned by Joint Vision 2020, it is necessary for DOD to provide leadership in cybersecurity S&T investment in order to keep pace with the growing threats and our changing environment.

DOD has four Defense Technology Objectives (DTOs) in this area: Information Assurance and Survivability Technology Base, Ultralog, Information Dominance, and National Infrastructure Protection. These DTOs are descripted in detail within the Defense Science and Technology Strategy and Plans which has been previously provided to the Senate Armed Services Committee. There is also a wide range of research outside of the DTOs covering topics such as wireless information assurance, steganography, security wrappers for commercial-off-the-shelf software, cyberforensics, intelligent agents, intrusion detection for mobile and high speed networks, situational awareness and network management, active response, and models for assessing damage from information attacks.

In 2001, my office established two new University Research Initiatives focused on cybersecurity. Twenty six grants totaling $9.3 million were awarded in fiscal year 2001 ($16 million in fiscal year 2002) to academic institutions. These grants were designed to enhance universities' capabilities to perform research related to critical infrastructure protection and high confidence software to meet DOD needs. In addition, $4.5 million was awarded in fiscal year 2001 for a DOD Critical Infrastructure Protection and Information Assurance Fellows program. These awards are intended to increase the number of postdoctoral and faculty scientists and engineers conducting high quality research computer defense and information assurance.

Technology transfer and widespread adoption by industry are important elements of our efforts. We work with other departments through the Information Security Research Council, a working group of U.S. Government research sponsors. More formally, DOD actively participates in the committee for Research and Development, chaired by OSTP under Executive Order 13212, to coordinate Federal research and development for protection of information systems for critical infrastructures. The committee seeks a coordinated outreach policy for private sector cybersecurity. DOD's Technology Transfer Program is focused on creating partnerships between the defense laboratories and the private sector, working through mechanisms like Cooperative Research and Development Agreements, to transfer dual-use technology to the private sector. DOD research has led to commercial spin-offs that benefit private citizens. An example is the DARPA funded development of the first firewalls, which are now in common use in the home and businesses. My office oversees the Software Engineering Institute (SEI). SEI's Computer Emergency Response Team (CERT) is a national clearinghouse on computer vulnerability notifications, security best practices preventive information, and incident warnings for viruses and other threats. They have a strong program of training and education available to private industry. The information available from the CERT is used extensively by industry, is accessible to the public at large, and reflects our commitment to "raise the bar" on computer security nationally.

Dr. MARBURGER. The Department of Defense (DOD) has traditionally supplied the lion's share of R&D support for critical infrastructure protection (CIP) almost exclu-

sively in the area of Information Assurance. Total Federal CIP, R&D funding has been between $480–600 million over the last few years, with defense providing typically about 80 percent of the total funding in this area.

Recognizing the increasing reliance on information systems by other critical infrastructures and their potential susceptibility to attacks, DOD is engaged in a wide range of activities that focus on protection of computer networks. Examples of some of the R&D activities currently underway include:

Assurance Methodologies

(1) Detecting subtle information integrity attacks, developing algorithms for self-repair, and creating techniques to map mission-critical services to remaining trustworthy resources; and

(2) quantifying and analyzing security and survivability requirements and assessing the degree of compliance and assurance achieved.

Cyber Panel

(1) Designing attack detection sensors and sensor placement and developing the correlation algorithms to detect highly sophisticated stealthy distributed attacks spread out over time and space;

(2) allowing operators to monitor the operation and attack state of information systems and networks on which they depend, at theater scales and in operationally relevant terms, and to observe and manipulate the operation of security and survivability features;

(3) modeling of system and application configuration and resource requirements while accounting for dynamic characteristics such as migration of mobile processing or operation of automatic load-balancing or failover features,

(4) the creation of rich and general models of coordinated and large-scale attacks, rather than the low level and anecdotal representations that now exist; and

(5) validation of network monitoring and response research efforts.

Organically Assured and Survivable Information Systems

(1) Ensuring the continued availability and graceful degradation of the system under partially successful attacks, minimizing resources available to attackers while maximizing the residual capacity available to legitimate users;

(2) determining the difference between malicious and accidental faults; and

(3) effectively integrating the resulting wide variety of intrusion detection, correlation, intrusion tolerance, and response technologies to provide the maximum possible protection while simultaneously minimizing the performance degradation and additional cost incurred by these mechanisms.

Fault Tolerant Networks

(1) Eliminating network services single points of failure;

(2) fortifying network elements to defeat or resist denial of service attacks; and

(3) developing tools and techniques to restore degraded networks to an acceptable operating level.

Several organizations exist that facilitate the exchange of information regarding R&D activities across the Federal Government. One such organization is the INFOSEC Research Council (IRC), a self-chartered coordination body of U.S. Government sponsors of information security research. The IRC has evolved from being primarily a DOD oriented activity to a group that now spans a greater portion of the Federal Government. In a more formal way, the DOD, CIP, and R&D efforts are coordinated under Executive Order 13212. This Executive Order established a Standing Committee for Research and Development, chaired by OSTP, to coordinate a program of Federal Government research and development for protection of information systems for critical infrastructure.

With regard to your question about how the R&D knowledge is being used to help industry and private citizens at home, I call your attention to DOD's Technology Transfer Program. The Technology Transfer Program is focused on creating partnerships between the defense laboratories and the private sector, working through mechanisms like Cooperative Research and Development Agreements, to bring commercial technology into defense systems and transfer dual-use technology to the private sector. Designated personnel within each Defense R&D facility are responsible for seeking opportunities to match defense and commercial technology needs. A Defense Technology Transfer Information System has been established to help match.

Dr. YOUNGER. DTRA is not involved in information operations. That is out of the scope of our charter. We focus on Chemical, Biological, Radiological Nuclear and High Explosives, a.k.a. Weapons of Mass Destruction (WMD). Nevertheless, we do look at information operations during our single point vulnerability assessments done under the Balanced Survivability Assessment (BSA) program sponsored by the

Assistant Secretay of Defense for Command, Control, Communications, and Intelligence.

CORROSION

2. Senator LANDRIEU. Dr. Sega, the Department of Defense spends billions of dollars annually in repairing corrosion damage to ships, tanks, planes, and other facilities. What research and development is being used so that future systems will not suffer the same rust and corrosion problems of current systems? What is the current and planned investment level in this area in each service and agency?

Dr. SEGA. The Service Components and Office of the Secretary of Defense have various science and technology (S&T) programs (6.1, 6.2, and 6.3) investigating advanced means to detect, evaluate, and control hidden and visible corrosion in platform structures and subsystems. The S&T projects emphasize the sustainment of current aircraft, ships, and ground vehicles as well as developing more corrosion resistant advanced materials and processes, which are also inherently environmentally benign. Four of our Defense Technology Objectives (DTOs), which are focused and relatively near-term joint projects, directly support corrosion control projects with high potential impact on materiel life extension and affordable maintainability. These joint Service DTOs with their associated fiscal year 2003 proposed funding are "Nondestructive Evaluation for System Life" funded at $4.9 million, "Materials and Processes for Metal Cleaning, Corrosion Control, and Coatings" funded at $1.8 million, ″Condition-Based Maintenance/Integrity Monitoring″ funded at $7.5 million, and "Materials Technologies to Enable Enhanced Life Management and Combat Readiness of Weapon System Assets" funded at $0.8 million. In addition to these very focused DTO programs, there is enabling applied research and advanced technology development being conducted by each of the Services and several agencies in projects such as non-chromate primers, hydrolytically stable resin systems for coatings, mission tailorable topcoats, stainless steel hull materials and appropriate coatings, applique coatings, many sensor and wireless communication projects for corrosion and health monitoring of structures, and environmentally benign processes for coating removal and disposal. The direct 6.2 plus 6.3 investment in these and related research for fiscal year 2003 is $3.1 million for the Army, $9.6 million for the Navy, and $18.4 million for the Air Force. The total basic research budget associated with corrosion and closely related topics is robust and forward-looking with an annual investment estimated at $8 million per year for advanced corrosion resistant coatings, advanced detection techniques, and fundamental understanding of corrosion and degradation processes. The Multidisciplinary University Research Initiative (MURI), administered by my office, regularly sponsors programs, usually nearly $1 million per year for 3 to 5 years, in corrosion and related areas. Most recently in fiscal year 2000 a program on "Science Underpinning Prime Reliant Coatings" was begun. In fiscal year 1996 two MURI programs were funded specifically addressing corrosion and one was begun on nondestructive inspection. The Strategic Environmental Research and Development Program, which is also administered by my office, supports several projects to reduce environmental impact of corrosion control materials and processes. Historically Strategic Environmental Research and Development Program (SERDP) awards in the area of corrosion control have been approximately $6 million annually and we anticipate there will be no change in fiscal year 2003.

INTELLECTUAL PROPERTY/ROYALTIES

3. Senator LANDRIEU. Dr. Sega, how much intellectual property revenue does the Department of Defense generate from its past technology developments? How can we work to ensure that the Department generates revenue from the commercial spinoff of defense technologies? How does the Department get a return on investment on its basic and applied research funding?

Dr. SEGA. The Defense Department has seen a gradual increase in its royalty income from patenting and then licensing technology developed for mission requirements. In fiscal year 2001, $6.3 million was received in royalty income. This income is derived from technologies patented in fiscal year 2001 as well as technologies developed within the past 15 years. Commercialization of a technology can take years of additional work after initial invention disclosure and because DOD invests in basic and some applied research, many times significant additional investment is required for commercial firms to be able to fully utilize the technology in its product line.

The Defense Department differs from most other Federal Departments because we are the customer for the technology we develop: our investments are based on mission need and commercial application is a secondary consideration. Having said this, we are working to educate our scientists and engineers on the value of intellectual property (IP) and the need to protect it before releasing it to the public. We are developing an Intellectual Property Management Information System (IPMIS) to allow us to better manage IP within the Department, in valuing these assets, and in marketing it to the private sector. Additionally, we have directed our partnership intermediary, TechLink, to focus its primary efforts on assisting in licensing our patents.

The DOD's primary return on its investment in basic and applied research funding is the ability to draw on technical expertise and new capabilities for DOD systems. Teaming with our colleagues in industry and academia allows DOD to get the "best of the best," leverage resources to accomplish our research and development, and transfer technology/expertise/information into and out of the DOD.

GLOBAL SCIENTIFIC LEADERSHIP

4. Senator LANDRIEU. Dr. Marburger, Dr. Sega, and Dr. Younger, are there any technology areas in which you feel that the United States is trailing some of our global competitors? What would you recommend we do to catch up in these areas? How do we keep track of which technology areas are critical to the military? How do we monitor if the United States has fallen behind in these areas?

Dr. MARBURGER. The United States retains preeminence in areas of national security science and technology. Our scientific and technological excellence spans the range of physical, chemical, biological and engineering sciences. Noteworthy examples are U.S. leadership in information technology and nanotechnology. Sustaining our outstanding capabilities in science and technology that underpin our global leadership will depend on continued judicious collaboration and partnership with our military allies and other international partners. Technology areas that are critical to our military excellence are tracked through a number of mechanisms. One means is through the deliberations of interagency working groups I established as part of the Antiterrorism Task Force under the National Science and Technology Council (NSTC). In particular, two of these working groups, co-chaired by OSTP—the Radiological, Nuclear, and Conventional Detection and Response Working Group and the Biological and Chemical Preparedness Working Group—coordinate Federal antiterrorism R&D efforts and are responsible for setting a 5-year research agenda.

In addition, OSTP also is engaged fully in such interagency groups as the Non-Proliferation and Arms Control Technology Working Group, led by the Department of State, and the Counterproliferation Program Review Committee, chaired by the Department of Defense. These groups serve to coordinate programs in areas of treaty verification and counter proliferation, and in doing so, monitor science and technology on a global scale. OSTP also maintains awareness of innovation and the global state of science and technology through its close interactions with the National Academies, and, in particular, through the committee on Science, Engineering, and Public Policy and the committee on the Science and Technology for Countering Terrorism.

OSTP also interacts with the Technical Support Working Group (TSWG) to monitor the global state of science and technology for national security and combating terrorism. The TSWG, also an interagency group, rapidly develops technology and equipment to meet the high-priority needs of the combating terrorism community, and addresses joint international operational requirements through cooperative R&D with the United Kingdom, Canada, and Israel.

Finally, as I stated at the American Association for the Advancement of Science Symposium, our nation today is a science superpower. The scope of our scientific activity, both basic and applied, is breathtaking and unmatched. We are not, however, a science monopoly, and we have much to learn from colleagues elsewhere in the world. We cannot limit scientific interactions with other nations without paying a scientific price.

Dr. SEGA. There are a few notable capabilities, concentrated in niche technical areas around the globe, where the U.S. trails. Many of these are dual-use technologies whose development is driven by commercial markets. Others are areas that we have elected not to aggressively pursue in order to focus our research on higher value areas. Additionally, some world class capabilities result from unique situations and experiences. It is important we identify countries that have equal or better capabilities in certain areas, particularly those areas related directly to national se-

curity. The Department's Militarily Critical Technologies List (MCTL) is continually updated to provide this information.

As a minimum, we need to continue to monitor world-wide technical capabilities, assess the criticality of foreign technology leads and focus research and development funds, as appropriate, to remedy any critical technology gaps. In some cases we rely on the marketplace to drive U.S. industry to catch up. In militarily critical areas we also use cooperative research and development arrangements such as joint project development arrangements and information exchanges to leverage the technology advances of Allies and friendly countries.

In some cases, the U.S. may purchase commercially available technologies, eliminating development costs in terms of time and money.

For example, three areas we are focusing on to increase research and development are: hypersonics technologies; wide-band gap semiconductor and material processing technologies; robotics, energetic materials, and energy storage and generating devices.

The Defense Threat Reduction Agency maintains the MCTL. The MCTL lists two categories of technologies with potential military application, weapons systems technologies and developing critical technologies. Within each technology area critical parameters, critical materials, unique test production, inspection equipment and unique software are identified. Content of the MCTL is developed by the Technology Working Groups (TWGs) comprised of representatives from industry and academia as well as DOD research, development, test and engineering facilities and the operational commands with DOD guidance and approval. The Intelligence Community also tracks foreign technology threats. This information is linked to U.S. military capabilities in the MCTL via Intelligence Community participation in the TWGs.

The MCTL includes assessments of foreign technical capabilities in the critical regions of each technology area. These assessments are based on the expert knowledge of the members of the TWGs augmented with additional information provided by knowledgable domestic and foreign sources.

Additionally, the Department is actively engaged in international cooperative activities with our Allies. Such engagements increase our awareness of international capabilities. Also, the Military Departments operate international field offices around the globe staffed with technical experts who support cooperative activities and monitor research and development within the regions they support.

Dr. YOUNGER. The DOD maintains a MCTL that is a detailed compendium of information on technologies that the Department of Defense assesses as critical to maintaining superior U.S. military capabilities. Within those technologies that are in the DTRA mission charter, we monitor and sponsor research in academia, industry, allied countries, and through the Intelligence Community we track progress by potential adversaries. These sources permit us to maintain a good estimate of our relative technological position, but we can never be fully sure that we will not be surprised. The best way to avoid a surprise that results in damage to our national interests is to maintain robust technology programs for agility to respond quickly to mitigate emerging asymmetries. One area in which the U.S. may trail others is in the area of energetic materials. The Russians have made a considerable investment in this area and we are learning more about the progress they have made.

ACTDS

5. Senator LANDRIEU. Dr. Sega, your testimony highlighted the important role that ACTDs play in technology transition. However, despite the elaborate approval process, some ACTDs do not transition quickly or at all. Would the transition success rate of ACTDs be improved by funding a smaller number of projects, but at more robust levels?

Dr. SEGA. We continue to work to improve technology transition through ACTD. We have many transition successes for ACTDs, including 30 ACTDs contributing products that have participated in either Operation Enduring Freedom or Operation Noble Eagle. Global Hawk and Predator, two highly visible systems in recent combat operations, started as ACTDs. Forty-eight ACTDs transitioned over 108 products including 36 that entered production. The 108 also includes a small number of ACTDs that have been terminated and another small number returned for additional technical development. I consider these terminations and returns to the tech base as successes because if ACTDs do not have a small, but measurable failure rate, we are not accepting enough risk.

We can and will do better on transition results, but we do not necessarily achieve greater success by lowering the bar. In the past year we established a dedicated transition office within our Advanced Systems and Concepts organization. We are

establishing Transition Managers as a required element of new ACTDs and mandating an agreed Transition Plan as a part of our management documentation. The purpose is to have several people who know their job is to transition ACTD products. We are also experimenting with a new funding profile that will pay a higher percentage of funds overall and increase our share (as compared to the Service/Agency funding) in the early and final years of an ACTD. The early increase is designed to jump start an ACTD when Service funding is already committed to other projects. The final year funding increase is designed to enable successful ACTDs to develop more of the necessary attributes of normal acquisition programs like sustainability, maintainability and reliability.

The Department has set a goal of starting 15 new ACTDs per year, though many more ACTDs are proposed annually. However, we will not start an ACTD that does not have a combatant commander and a Service or Agency as sponsors, that does not have adequate funding to complete a demonstration, that does not have a plan for transition pending successful demonstration, and that does not have Joint Requirements Oversight Council validation as a military need. With the many Departmental needs for joint solutions to warfighter problems, 15 ACTDs per year is a goal towards which we should strive.

6. Senator LANDRIEU. Dr. Sega, one of the issues in transitioning ACTDs into follow-on acquisition programs is funding discontinuities. There is often no funding programmed into follow-on programs to leverage the concepts demonstrated by the ACTD. Why doesn't the Department plan its budget assuming the success of ongoing ACTDs, so that funding is available immediately when the ACTD is completed?

Dr. SEGA. Funding discontinuities have been a challenge for ACTD as well as for any Departmental program that attempts to rapidly move important new technology to the warfighter. The budget system essentially requires the Services to plan their funding programs 2 years in advance. When innovative technologies emerge through ACTDs or experimentation, there is often a need for a funding bridge to enable that technology to survive until the budgeting process can support it. We are working hard to solve this problem.

We are experimenting with a new funding profile that will pay a higher percentage of funds overall and increase our share (as compared to the Service/Agency funding) in the early and final years of an ACTD. The early increase is designed to jump start an ACTD when Service funding is already committed to other projects. The final year funding increase is designed to enable successful ACTDs to develop more of the necessary attributes of normal acquisition programs like sustainability, maintainability and reliability. The additional funding requirements partially explain the department's increased budget request for ACTDs in fiscal year 2003. We also insist that ACTD transition managers are from the acquisition/program management side of the Department to ensure successful ACTDs find a home early in established programs.

Another argument against presuming the success of ACTDs and fully budgeting for their transition from the start is that we want a small percentage of ACTDs to fail or we are not accepting enough risk in the ACTD program. One downside to having transition funding identified for ACTDs at their commencement is this funding could negatively impact the objectivity of the military utility assessment, since there will be tremendous pressure to declare success so that follow-on funding will not be placed at risk.

The Department has set a goal of starting 15 new ACTDs per year. However, we will not start an ACTD that does not have a combatant commander and a Service or Agency as sponsors, that does not have adequate funding to complete a demonstration, that does not have a plan for transition pending successful demonstration, and that does not have Joint Requirements Oversight Council validation as a military need. With the processes described above, the Department has the funding flexibility to ensure successful ACTDs are able to transition into acquisition programs.

TEST AND EVALUATION

7. Senator LANDRIEU. Dr. Sega, what science and technology efforts are underway to improve our test and evaluation capabilities, especially in new technology areas such as space, high energy lasers, and unmanned systems?

Dr. SEGA. The Department recognizes that weapons systems testing and evaluation is an intrinsic part of the entire research, development, and acquisition process. Modern weapons systems are designed and fabricated with much more on-board sensing and diagnostic tools and capability that assist in both the test and evalua-

tion and subsequent operation of the systems. We also realize that, as Defense systems become more complex and need to operate more autonomously, the technical sophistication of our testing and evaluation infrastructure must be increased to match. To that end in fiscal year 2002, the Department initiated a new program within the Office of the Director of Operational Test and Evaluation (DOT&E) called Test and Evaluation/Science and Technology (T&E/S&T), PE603941D8Z. This program is designed to exploit new technologies and expedite their transition from the laboratory into the test and evaluation community. The T&E/S&T program will specifically focus resources on test technologies to support test and evaluation of transformation initiatives such as the ones you noted.

In fiscal year 2002 the program is investing in spectrum efficient technologies, multi-spectral test technologies, and hypersonics test technologies. Technologies pursued under these crosscutting focus areas begin to address test shortfalls derived from the transformational weapons technologies cited in the Quadrennial Defense Review. Additionally, a test technology investment-roadmap is being developed that identifies the technical challenges to testing advanced weapon systems and the required solution paths to meeting those challenges. My office is working very closely with DOT&E and is co-hosting the workshops to develop the needed investment strategy.

This T&E/S&T planning will be the foundation for building our outyear budgets and will encompass the breadth of challenges that face us, including testing directed energy weapons, space based systems, unmanned systems, smart munitions, hard and deeply buried target weapons, network centric warfare, and homeland defense systems. Additionally, the Under Secretary of Defense for Acquisition, Technology and Logistics, DOT&E, and the Under Secretary of Defense for Personnel and Readiness are committed to better integration of test and training facilities/events by pursuing new technologies leading to embedded instrumentation and common control systems.

I fully support the need to accelerate the development of advanced test technologies and integrated design for testability and believe that a robust T&E/S&T program is critical to ensuring that we have the capability to fully and completely test the weapons systems that are fielded in the future.

8. Senator LANDRIEU. Dr. Sega, the Department has set a goal of 3 percent of the President's budget dedicated to science and technology in order to support transformation. A robust science and technology program, research and development program, and procurement budget will require a robust test and evaluation infrastructure. Should the Department set a similar percentage goal for test and evaluation capabilities?

Dr. SEGA. No. Test and Evaluation is an integral part of Research, Development, Test, and Evaluation and should be budgeted accordingly.

JASON

9. Senator LANDRIEU. Dr. Tether and Dr. Sega, what role has JASON played in developing past science and technology goals and programs? What is the status of the JASON contract? What is the proposed fiscal year 2003 funding level for JASON? What types of questions will the JASONs be tasked to analyze?

Dr. TETHER. The JASONs have conducted numerous studies and analyses since their inception. DARPA has used the group to investigate and evaluate new technologies and concepts, to better inform DARPA management's investment decisions.

DARPA did not use the JASONs to formulate programs, but used the information provided by the JASONs as we put together our vision for militarily useful and technically feasible programs.

Because DARPA does not intend to serve as sole sponsor for the JASONs after fiscal year 2002, we did not include any funding in our fiscal year 2003 President's Budget Request.

As I understand the situation, the JASONs are now under contract to the Director of Defense Research and Engineering. We do expect that we will continue to use the JASONs' expertise for as yet undetermined studies and analyses in the future. When we do, we will pay for the study, as do all other users of the JASONs.

Dr. SEGA. The JASONs, like other formal Department of Defense advisory groups, have played an important role in providing independent, outside review and advice to the Department's science and technology program. A key role has been linking the Department to the state-of-the-art theory, primarily in physics and engineering. By providing advice on the technological feasibility of different proposed solutions,

JASONs provide input to DOD science and technology (S&T) goals and programs, but do not formulate the goals directly.

A new contract was finalized and signed between the government and MITRE in early May, running through December 31, 2002. MITRE acts as the JASONs administrator. This new contract is for approximately $3.3 million, with DDR&E sponsorship of approximately $1 million. Other government agencies, both within and outside the DOD, fund the JASONs on a task-order arrangement under the Director Defense Research and Engineering (DDR&E) contract up to the ceiling of $3.3 million. We have not yet created a separate budget item for the JASONs in fiscal year 2003, but intend to support them at about the same level of investment in fiscal year 2003 as in fiscal year 2002 (approximately $1 million from DDE) with additional funds coming from other government agencies.

This year, the DDR&E has asked the JASONs to conduct two studies. The first is a study on technological feasibility of hypersonic flight systems (to Mach 25), to include a review of current activity and recommendations of future technology residules. The second study is an assessment of technology available or planned that will reduce the power and energy dependence of the soldier, sailor, airman, and marine while examining best avenues for research and development into power generation and energy storage systems. This will include an assessment of the viability of devices such as fuel cells for the warrior, higher energy density batteries, and so forth.

DARPA STRATEGIC PLAN

10. Senator LANDRIEU. Dr. Tether, a recent Defense Science Board study called for the development of a strategic plan for DARPA. Does DARPA have a strategic plan? How is this plan developed? What other defense organizations are involved in the development of this plan?

Dr. TETHER. DARPA's strategy is described in my written testimony and implements DARPA's role as DOD's central technology research and development arm with the mission to conceive, explore, and demonstrate the most advanced breakthrough concepts and technologies that will ensure continuing U.S. technological superiority.

While my testimony describes our strategy, it admittedly does not describe how it was developed.

The research priorities in my testimony are based on a number of inputs that we receive from a host of sources. Since DARPA is opportunity driven, our strategy is continuously updated.

Ideas for new warfighting capabilities are suggested to the DARPA Office Directors, DARPA's Deputy Director and me from: (1) our Program Managers; (2) industry and universities; (3) formal science boards such as the Defense Science Board, Army Science Board, Air Force Scientific Advisory Board, Navy Research Advisory Council; and (4) informal groups such as Information Science and Technology Study Group and Defense Science Research Council.

In addition, I personally learn which new capabilities are needed from frequent meetings with the Service Secretaries, Service Chiefs, Commanders in Chief of Joint Commands, Directors and senior leadership of Defense Agencies such as National Security Agency, Defense Threat Reduction Agency, National Imagery and Mapping Agency, Defense Information Systems Agency, Defense Logistics Agency, as well as the Central Intelligence Agency, National Academy of Sciences, and the National Science Foundation. My Deputy Director and DARPA's Office Directors and Program Managers also do this outreach at all levels.

As stated in my testimony, a DARPA program does not start with what a military commander wants today. Instead, we look at what future commanders would need to maintain our forces' decisive superiority at all levels of warfare.

DARPA looks beyond today's known needs and requirements. As military historians noted, "None of the most important weapons transforming warfare in the 20th century—the airplane, tank, radar, jet engine, helicopter, electronic computer, not even the atomic bomb—owed its initial development to a doctrinal requirement or request of the military."[1] None of them. To this list, DARPA would add stealth, unmanned air vehicles, and the advanced military information systems enabled by internet technologies.

DARPA Office Directors and Program Managers are required to focus on the ideas that would dramatically change how our forces would fight in the future, to go after

[1] John Chambers, ed., *The Oxford Companion to American Military History* (New York: Oxford University Press, 1999) p. 791.

the capabilities that would enable U.S. forces to dominate the battlefield. Our unique mission has made DARPA the technological engine of military transformation, and that is what DARPA's strategy is all about.

One of the major values for having a clear strategy is to communicate what we think is important so that creative people who are interested in working high risk, high payoff projects can recommend ideas and concepts. DARPA is always open to new ideas, from any source.

We communicate our strategy in many ways. One important way is through the written testimony I have provided. I am sure you realize that your publication of the testimony will be studied by many who are interested in science and technology projects here in the United States and around the world.

Additionally, we brief our strategy when we are asked to appear before a formal body or an industrial association.

Finally, DARPA has a major symposium approximately every 18 months where our strategy is presented in great detail over several days. The next time this will be done is DARPATech 2002, which is being held from July 30 to August 3 in Anaheim, California. We expect well over 1000 attendees from industry, universities, other parts of DOD, and Congress.

ANNUAL REVIEW OF CONTRACTS

11. Senator LANDRIEU. Dr. Tether, DARPA has recently begun to annually review contracts for renewal. This may have the effect of driving research programs to focus on near-term deliverables, rather than the revolutionary, long-term research that DARPA has excelled in. This may be particularly difficult for university researchers who employ and fund graduate students using DARPA funding. What is the effect of the DARPA contract review and renewal policy on university participation in DARPA-sponsored research?

Dr. TETHER. Reviewing awards for renewal is not new at DARPA. DARPA's multiple year efforts are incrementally funded and are reviewed for renewal at the start of every fiscal year. Typically this renewal requires a certification by the Program Manager that the contractor has performed as expected and that the project is still worthwhile and likely to benefit the Department of Defense.

More recently I have formalized establishing Go/No-Go milestones for multiple year efforts. These milestones are not based on the fiscal calendar but on what makes sense in the context of the project, which usually seems to be approximately every 18 months.

The Program Manager, Office Director, and I jointly develop the Go/No-Go milestones as a series of interim achievements required to achieve the ultimate goals of the project. The milestones are then communicated to all performers so they also know what needs to be done by whom and by when.

Setting these expectations results in fewer misunderstandings and more healthy relationships between DARPA and our performers. Our Go/No-Go milestones will not make our work less revolutionary nor do I think they will interfere with university participation in DARPA programs. Instead, I view them as a technique for providing solid management and accountability for the significant investments we make with taxpayer dollars.

My experience has shown this to be a very effective way to manage the development of technical capability that is truly revolutionary but that may not be achieved for many years, perhaps beyond the tenure of the current researchers. This technique allows progress to occur quickly and keeps everyone focused on accomplishing goals they can see happen yet that will still have a big long-term impact. Industry understands this method because it is a technique used by the best industrial managers for executing a difficult multiyear contract.

If a Go/No-Go milestone is not satisfied, one of several options can occur.

Option 1. It may be that the effort to date proved that the criteria could not be satisfied. In this case, there is no need to go on since it was established at the beginning that this Go/No-Go was necessary to reach the long-range capability.

Option 2. It may be that the effort showed that a technology that was assumed to be available for use in the effort and satisfying the Go/No-Go is not available. In this case, the effort might be re-directed to further develop the required requisite technology.

Option 3. It may be that the effort initially estimated for achieving the Go/No-Go was underestimated. In this case, the effort may be continued but rather than going on to the next phase, the effort would continue to work on satisfying the current Go/No-Go.

At a recent meeting I had with the deans of several prominent engineering schools I explained the purpose of the Go/No-Go milestones; I believe I received a "buy-in" from them. After all, it's analogous to the process by which the ultimate goal of students is to graduate, but they have to pass courses and take demanding tests all along the way.

That said, I understand how researchers who may be more familiar with grants awarded by National Science Foundation (NSF) or National Institute of Health (NIH) might be uncomfortable with the more focused demands DARPA places on them. NSF and NIH do an outstanding job building scientific knowledge and capacity. Only a portion of DARPA funding is awarded via a grant since we are in the business of creating specific technical capabilities to transform our national security. Accordingly we use a different set of management approaches, including Go/No-Go milestones.

UNFUNDED S&T PRIORITIES

12. Senator LANDRIEU. Dr. Sega, Dr. Tether, Admiral Cohen, Dr. Andrews, and Dr. Engle, if more money were to become available for science and technology programs, in what technology areas would you like the opportunity to make increased investment?

Dr. SEGA. There are three particular areas that warrant special attention to support transformation; (1) aerospace technologies; (2) surveillance and knowledge systems; and (3) energy and power technologies. The technology programs in these areas have broad application toward transformation. They also have intrinsic "jointness" characteristics. I think we have an opportunity to rapidly advance the Department's goal of transforming the military by enhancing "aerospace" capabilities. I believe this can be accomplished through an integrated technology development and demonstration approach in three major aerospace areas: hypersonic flight, access to space, and advanced space technologies. We are currently in the process of developing an aerospace technology plan within this framework which has parallel, synergistic thrusts across these areas and is characterized by an aggressive "stepping stone" approach, to include flight demonstrations, in order to push technical frontiers. This has the potential to offer new capabilities to the warfighter incrementally through "off ramps" from the flight demonstrations for fielding systems. This effort could develop and demonstrate leap-ahead technologies providing enhanced knowledge, speed, agility and lethality applicable to time critical targets; long range strike options; efficient, affordable, and responsive access to space; and new approaches to space control and missile defense.

The second area is surveillance and knowledge systems. The outcomes from this research could provide joint and coalition forces an optimal, persistent, common battlespace view for rapid decision making and execution through seamless and timely exploitation of all surveillance assets. The four technical thrust areas we plan to seek future funding in are sensors and unmanned vehicles; high bandwidth communications and information assurance; information/knowledge management systems; and cyber warfare.

The third area is energy and power which should have a direct bearing on future aerospace systems, enabling significant reductions in size and weight of platforms while improving performance. Four technical thrust areas we plan to seek future funding in are power generation, energy storage, power management and control, and directed energy. These areas impact transforming capabilities and should provide much greater capabilities to generate, store, and supply electrical and other forms of energy to nearly all air, ground, sea, and space platforms.

Additionally, we have identified information operations, space, robotics, hard and deeply buried targets, advanced energetics, advanced electronics, and military medicine as other joint areas of importance.

Dr. TETHER. The fiscal year 2003 President's budget provides for a balanced science and technology program and correctly places much of the Department's emphasis on transformation squarely on the shoulders of the Defense Advanced Research Projects Agency. While transformation can, and will, occur with existing resources, there are several technology areas that offer substantial promise for the next generation of warfighters and are areas that would benefit from increased funding.

The first area is space. Military leaders are always taught to seek and defend the high ground, and space is the ultimate high ground.

The Secretary of Defense has directed DARPA to develop the technologies necessary to ensure rapid access to space, protect U.S. space assets, control adversary

space-borne resources, and exploit the unique advantages that space provides, particularly for surveillance and response.

DARPA's fiscal year 2003 request funds a number of initiatives in these areas within its topline but additional funds could be used to develop a greater array of space capabilities and could also be applied to existing efforts to accelerate their development.

Another exciting area is what DARPA terms "cognitive computing." DARPA has been at the forefront of the information technology revolution and has fostered a number of the technologies essential to the information age.

DARPA envisions cognitive computing as the next "leap" in information processing. It would enable direct linkage between mind and machine, enable a computing system to gauge the physiological state of the user and modify its presentation to suit the needs of that user, and re-design computing system architectures to handle the kinds of multi-variable and uncertainty-riddled problems that the current linear/digital computer structures have trouble solving.

The initial phases of this technology development are funded in the fiscal year 2003 request but greater funding would allow more expansive efforts.

Biologically based technologies are another area that offers significant promise to the future warfighter. If lessons from the astounding survival of existing organisms could be adapted to the warfighter, operations in extreme environments could be enhanced.

Precious and perishable supplies of organic substances like blood could be safely stored and transported. The advanced concealment techniques of animals could hold the promise of improved camouflage.

DARPA has established a new project in fiscal year 2003 whose focus is development and demonstration of biologically based devices and concepts. Additional resources would allow further attention to be placed on programs in this area.

The House Armed Services Committee has proposed substantial reductions in all three of the aforementioned areas. In this environment, DARPA would be grateful if it could maintain the proposed programs at the level requested in the President's budget.

Senate support of the budget requests for these three areas is essential if the Department is to realize its transformation goals and be prepared for the next generation of threats.

Admiral COHEN. Increased Navy investment opportunities for Anti-Terrorism include:

[In millions of dollars]

Littoral Surface Craft/Experimental	15
Force Protection	15
Free Electron Laser Weaponization	10
High Power Microwave	15
Hypersonic Weapon	10
Affordable Weapon	5
Hairy Buffalo	9
Project M Shock Mitigation	5
Naval fire Support Barrage Round	5
Agile Vaccines	3
CINC–21 ACTD for FORCEnet	5

Dr. ANDREWS. Our first priority in Army science and technology (S&T) is to accelerate technologies for the Future Combat Systems (FCS). Specifically we would like to increase investments in hybrid electric vehicle components, active protection system technologies, and mission equipment packages for unmanned aerial vehicles, common (air/ground) operating picture integration technologies, and Objective Force Warrior (OFW) technology to synchronize these efforts with FCS fielding. We also seek additional funding for modeling and simulation technologies to speed concept and technology development for the FCS and OFW system of systems development and acquisition approaches.

Dr. ENGLE. The results of the Fiscal Year 2001 Science and Technology (S&T) Planning Review point to several technology areas that warrant increased investment if additional funding were available. As directed by Congress in the fiscal year 2001 National Defense Authorization Act, this S&T review identified both Short-Term Objectives and Long-Term Challenges. Two technology areas reflected in the Short-Term Objectives are Information Technology and Advanced Weapons. Key Information Technology efforts include Joint Battlespace Infosphere (JBI), Effects-Based Operations (EBO), and Time-Critical Targeting. Key Advanced Weapons efforts include High Power Microwaves for Airborne Applications, Effects-Based Weapons, and Airborne Tactical Lasers. In the Long Term Challenges arena in-

creased emphasis is highlighted in the nanostructure materials area. This has broad applications to several transformational warfighter capabilites providing improved performance in embedded sensors, self-diagnostic structures, and electromagnetic shielding.

FUTURE COMBAT SYSTEMS

13. Senator LANDRIEU. Dr. Andrews and Dr. Tether, how has the acceleration of the Future Combat Systems (FCS) schedule affected your technology development efforts? What are some technology areas that are not likely to be mature enough to include in FCS Block I? Are these areas being funded adequately, so that they may be ready for future versions of FCS?

Dr. ANDREWS. We have carefully reviewed all FCS technology efforts and focused resources on the highest priority technologies that also have the greatest probability of being transitioned in time for the FCS Milestone B decision. The Army has requested $654 million in the fiscal year 2003 President's budget to mature and accelerate FCS enabling technologies such as advanced armor and active protection, hybrid electric vehicle drive components, advanced sensors and signature management.

Technologies still needed, but requiring further development and continued investment for insertion into future versions of FCS include:

- Compact Kinetic Energy Missile
- Extended Range Precision Attack Missile and increased endurance Loiter Attack Missile with Netted Inter-Missile Connectivity
- Advanced Multi-Spectral Payloads for Unmanned Aerial Vehicles
- Fully-Autonomous Unmanned Ground Vehicles
- Multi-Role (Direct and Indirect Fire) Cannon with Extended Range Ammunition Suite

Dr. TETHER. The acceleration affected some of our development efforts.

Technologies are naturally maturing at differing rates. We have divided the technologies into two categories. First, technologies that will be ready for transition in FCS Block I. Second, those technologies that require further development and definition for successful deployment in Block II and later.

Technologies that have been accelerated to ensure sufficient maturity for fielding under FCS Block I include NetFires, Organic Air Vehicles, Small Unit Operations: Situational Awareness System, and FCS-Communications.

Those technologies still undergoing development and design include-A160 and the Unmanned Ground Combat Vehicle concepts. These will be ready for Block II.

The DARPA/Army FCS program is fully funded through fiscal year 2003 at levels that will allow us to meet the Army's desired fielding schedule.

WORKFORCE

14. Senator LANDRIEU. Dr. Sega, Dr. Marburger described the Department of Energy's lab workforce issues as being very different than DOD's. Would a similar system in which the DOD labs are contractor-operated be useful in addressing workforce issues? Would this model be consistent with the mission of the DOD labs?

Dr. SEGA. The workforce issues of the DOD laboratories are different from those of Department of Energy. I do not believe that converting our DOD laboratories to contractor operated facilities is a useful way to address our workforce issues. We currently have a significant number of contractor personnel in our labs assisting the civilian-military workforce in accomplishing the defense laboratory missions. We also have strong collaborations between our laboratories and universities. The DOD Laboratory Model is a good one, but improvements are needed to insure they continue to produce the research and technology successes needed by the Nation in the future.

15. Senator LANDRIEU. Dr. Sega, would a pilot program that authorized a limited number of excepted service personnel slots for defense laboratories and test and evaluation centers help address the issue of attracting and retaining the technical workforce? Would the Department utilize such authority?

Dr. SEGA. We have initiated action to implement a pilot program under the authority provided in Section 1113 of the National Defense Authorization Act of 2001. The Services have been given the authority to proceed in filling their respective allocation of 40 positions in coordination with the Under Secretary of Defense (Personnel and Readiness) and the Under Secretary of Defense (Acquisition, Technology,

and Logistics). Once the pilot program in complete, and the results are in, we will consider requesting additional excepted service personnel slots as appropriate.

SMALL BUSINESS OUTREACH

16. Senator LANDRIEU. Dr. Sega and Dr. Marburger, what informational materials and programs are available to non-traditional contractors who are seeking to understand the defense contracting process?

Dr. MARBURGER. OSTP works closely with Department of Defense science and technology organizations and with the Technical Support Working Group (TSWG) to ensure that anyone seeking to understand the defense contracting process is provided an appropriate point of contact for information and programs that are available to non-traditional contractors. DOD and TSWG maintain a number of websites with informational materials on solicitations that are also published in the Federal Business Opportunities (FedBizOpps).

Dr. SEGA. There are numerous avenues available to non-traditional small business firms seeking to understand the Defense contracting process. The Department (DOD) has several publications designed to assist companies interested in Defense work. Two such key publications include the "Guide to DOD Contracting Opportunities" that outlines 10 key steps for a company interested in defense opportunities and "Selling to the Military" intended to assist a company in marketing its product to the appropriate defense buying offices. These publications and other information are available on the DOD Small Business website: *www.acq.osd.mil/sadbu.* Additionally, the DOD posts notices of all business opportunities on the Federal Business Opportunities website: *http://www.fedbizops.gov.* The website has an automatic notification feature that allows companies to be notified electronically of a business opportunity related to the codes a company enters describing their business and geographical areas of interest.

Small business firms involved in research and development are encouraged to participate in the Small Business Innovation Research and Small Business Technology Transfer Programs. These programs solicit proposals on specific topics of interest to DOD. Through the submission of a simplified proposal, research firms not only become acquainted with the DOD contracting process but have the opportunity to participate in DOD research programs in the developmental stage.

The DOD Mentor-Protégé Program provides incentives to large DOD prime contractors that mentor qualified small business protégés. Under this program DOD develops the requisite capabilities within the small business community to satisfy mission requirements at both the prime contracting and subcontracting levels. Proteges are provided training in procurement, quality, and technical areas to meet their individual needs.

One excellent starting point for a firm interested in becoming familiar with DOD contracting procedures and opportunities is through its local Procurement Technical Assistance Center. These centers are located within most states and are partially funded by DOD to provide procurement assistance to firms interested in the Federal marketplace, and DOD in particular. They offer training and one-on-one counseling as needed by the individual firm. Once the firm has identified a target market within DOD the small business specialists at the procuring activity can assist small business firms in marketing to their respective command.

17. Senator LANDRIEU. Dr. Sega and Dr. Marburger, what is the process for evaluating unsolicited white papers and proposals submitted to the Federal Government and, in particular, the Department of Defense?

Dr. MARBURGER. OSTP has been working closely with TSWG, DOD and other agencies to explore how best to evaluate unsolicited white papers and proposals related to technologies for combating terrorism. As an interim measure, we have been forwarding proposals received at OSTP to TSWG, and TSWG has been referring some of these unsolicited proposals to other agencies for review. For the longer term, OSTP has been working with the Office of Homeland Security to develop a more comprehensive, single point system for review of these proposals, and we look forward to reporting back to your committee on this subject.

Dr. SEGA. The DOD follows the process set forth in the Federal Acquisition Regulation (FAR), subpart 15.6, regarding unsolicited proposals. The FAR establishes the criteria to be considered in determining whether the proposal qualifies as a valid unsolicited proposal. To qualify the proposal must be: (1) innovative and unique; (2) independently originated and developed by the offeror; and (3) prepared without Government supervision, endorsement, direction, or direct Government involvement. The FAR also sets forth the procedures for an initial review by the agency point

of contact to determine relevancy of the proposal to the agency mission and whether sufficient information is included in the proposal for a comprehensive evaluation. The FAR sets forth criteria to be considered during the comprehensive evaluation. If a favorable comprehensive evaluation results and funding is available, the contracting officer must make a final determination that the sole source award is justified, synopsize and negotiate the final price of the contract.

EMERGING THREATS FROM NEW SCIENCE

18. Senator LANDRIEU. Dr. Sega, how does the DOD science and technology community plan to assess and evaluate the threats to our national security from such new science initiatives as biocomplexity and nanotechnology?

Dr. SEGA.The Director of Defense Research and Engineering works closely with the Defense Intelligence Agency's directorate for Policy Support in the Pentagon, as well as the Central Intelligence Agency, to receive periodic assessments and evaluations of emerging threats to our national security from rapidly developing new science areas such as biotechnology, nanoscience, biocomplexity and information technology. Such assessments enable us to devise innovative technology solutions to defeat such potential threats to our national security should they arise.

TECHNOLOGY READINESS LEVELS

19. Senator LANDRIEU. Dr. Sega, the nine technology readiness levels recently published by the DOD provide good descriptions of performance, but do not mention whether it is possible to manufacture or acquire the materiel in either prototype or larger quantities. Will this capability be considered in describing technology readiness in the future?

Dr. SEGA. The maturity of manufacturing processes is an issue we are currently looking at. Normally, prototype manufacturing processes are developed by the industry sponsor for the weapon system during the design and development stage of acquisition. Within our formal acquisition process, manufacturing development and maturity is normally assessed by our Integrated Product Teams as a system enters Milestone C and low rate initial production. However, there is a growing recognition that manufacturing readiness needs earlier consideration as part of the technology maturity assessments. In fact, manufacturing was a critical technology assessed by the Director Defense Research and Engineering review team prior to the decision for the Joint Strike Fighter to enter the System Development and Demonstration phase. We found this to be of value to all participants, and anticipate manufacturing will continue to be assessed in future technology reviews, as needed. I expect to make adjustments in our processes and polices as we gain more experience in using technology readiness levels.

OVERDUE REPORT ON VACCINES

20. Senator LANDRIEU. Dr. Klein, Section 1044 of the Fiscal Year 2002 National Defense Authorization Act required the Secretary of Defense to develop a long-range plan for the production and acquisition of vaccines for the Defense Department. That provision also required the Secretary to provide a report to Congress on the plan by February 1 of this year. Neither that report nor the plan have yet been submitted to Congress. Can you explain the delay in the report, and can you explain the Department's position on the question of vaccine production and acquisition? Do you expect the Department to act alone on the production of vaccines, or to join with other federal agencies for a national effort?

Dr. KLEIN. The congressional language in Section 1044 requires DOD to consult with "the heads of other appropriate departments and agencies of the Federal Government" to generate this report. Thus, it has been necessary for DOD to hold several meetings with the Department of Health and Human Services (DHHS), Centers for Disease Control (CDC), Food and Drug Administration (FDA), and the National Institutes of Health (NIH), among others, in order to put together a far-reaching plan for vaccine acquisition. The report was submitted to Congress July 12, 2002.

21. Senator LANDRIEU. Dr. Klein, when do you expect a decision on how to proceed with the production of vaccines, and when would you expect vaccines to be available from such new production?

Dr. KLEIN. The Department of Defense is in discussions with other Federal agencies including the Department of Health and Human Services, Centers for Disease Control, the Food and Drug Administration (FDA), and the National Institute of

Health to determine the best method for meeting the Nation's need for biodefense vaccines. Discussion is also ongoing with major pharmaceutical manufacturers regarding their interest to assist the Nation to supply this vital requirement. It is undecided at this time if DOD or other Federal agencies will call for construction of a national vaccine production facility to augment existing vaccine production capabilities. Therefore, no time line can be given for production of vaccines from a new facility. Typically, the total development time for research and development, production, and FDA licensure for a new vaccine is 10–18 years.

VACCINE TESTING CAPACITY

22. Senator LANDRIEU. Dr. Klein, before vaccines can be licensed by the Food and Drug Administration and produced for our military, they must go through rigorous scientific testing and clinical trials to demonstrate that they are safe and effective. Typically this process takes years. Do we currently have sufficient capacity within Defense Department facilities to conduct the necessary pre-clinical testing and clinical trials of newly developed vaccines for defense against biological warfare agents? If not, how can we remedy this situation? Are there existing or planned facilities we could use for this purpose?

Dr. KLEIN. This is a critical question because it addresses the costly and time consuming work that must be accomplished between discovery of a new vaccine and the production of a licensed product. In the past, the DOD had sufficient animal testing capabilities to evaluate new products being developed. At the present time, they do not have sufficient pre-clinical animal testing capacity to handle the influx of new vaccines and drugs for DOD, the Department of Health and Human Services, and industry. The Biosafety Level (BSL–3/BSL–4) animal testing capabilities at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and Battelle Memorial Institute (BMI), a defense contractor, are currently the only locations where pre-clinical animal testing of biodefense products can be performed at such exposure levels.

There is no immediate solution for expanding animal testing capabilities. However, the BMI is in the process of expanding its animal capacity in West Jefferson, Ohio, which should be completed by late 2002. In addition, the U.S. Army Medical Research and Materiel Command is in the process of identifying solutions for increasing its high containment animal holding capacity at USAMRIID until a more permanent solution is available.

23. Senator LANDRIEU. Dr. Klein, the budget request proposes to create a new facility at Fort Detrick for biological defense research. Could that facility conduct the kinds of tests and trials needed for developing vaccines for clinical trials and then demonstrating vaccines before they are licensed?

Dr. KLEIN. Our $5.0 million military construction request contained in the fiscal year 2003 President's budget is for the Countering Biological Terrorism Research Center. The funding is intended to support the determination of laboratory requirements, planning and design for a facility in which to conduct RDT&E to support the proposed Countering Biological Terrorism Research Program. This program includes biological forensics, threat assessment research for biological agents and emerging threats, demonstration of proof of principle for countermeasures to emerging threats, and rapid assessment of emerging countermeasures. The requirement and design specifications for this facility are not yet determined.

Since submission of the budget request, the Army has become aware of the National Institutes of Health (NIH) plan to construct a biocontainment clinical vaccine testing laboratory at Fort Detrick. We believe that it would be in the best interest of the Nation to develop a coordinated effort with the NIH in planning and constructing biological containment laboratory capabilities at Fort Detrick, to include recapitilization of the USAMRIID and countering biological terrorism research. Accordingly, the Army is planning to host a meeting with NIH officials to develop a joint DOD/NIH strategic plan to clearly identify biocontainment laboratory requirements and construction plans for a biocontainment campus concept at Fort Detrick. If designed with the appropriate capabilities, such a facility could support the kinds of tests needed for developing vaccines and demonstrating their efficacy prior to human clinical trials and licensure.

ACCELERATED CHEMICAL DEMILITARIZATION

24. Senator LANDRIEU. Dr. Klein, the Department of Defense approved a plan for accelerated demilitarization of chemical agents, and included a request for $300 mil-

lion to implement this accelerated demilitarization plan in its fiscal year 2002 Supplemental Appropriations request to the Office of Management and Budget (OMB). However, the $300 million was not included in the final OMB-approved supplemental request.

The funding would permit the Department to accelerate by up to 5 years the destruction of chemical agents at several chemical stockpile sites, thus eliminating potential terrorist targets years ahead of schedule. Acceleration would also reduce lifecycle demilitarization costs by billions of dollars. In addition, accelerated demilitarization would permit the United States to meet its Chemical Weapons Convention treaty deadlines for interim agent destruction, and possibly to meet the final destruction deadlines for most if not all stockpile sites. How does the Department propose to fund the accelerated demilitarization plan so as to achieve these numerous benefits as early as possible?

Dr. KLEIN. The Department is currently looking at options to resource the proposed accelerated chemical weapons disposal programs for the Newport, Indiana and Aberdeen, Maryland stockpile sites.

QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

AIR FORCE S&T BUDGET

25. Senator LIEBERMAN. Mr. Engle, funding for Air Force science and technology has declined dramatically over the last 10 years while the other service science and technology budgets have grown substantially. Moreover, there is concern that the proposed Air Force science and technology budget for 2003 includes a number of programs that are inappropriately categorized as 6.3 programs. These are the Transformational Wideband MILSATCOM, which is targeted to be funded at $195 million and appears to have been categorized as 6.4 in the year prior, and Special Programs, which is targeted to be funded at $97.3 million. When you remove these two programs, the Air Force has science and technology cut by 13 percent. Please describe the nature of these programs and how 6.3 priorities were shifted to pay for them. What is the rationale for the insertion of these programs into 6.3? Where are these programs being managed, and (if applicable) why are they not being managed out of a research facility?

Mr. ENGLE. The Transformational Wideband MILSATCOM program accelerates current Advanced Wideband MILSATCOM System efforts and provides capabilities such as laser communications and additional protection for tactical users. In fiscal year 2003, this program will initiate an Advanced Wideband System that incorporates interoperable laser communications and its planned first launch in fiscal year 2009. This program addresses only acceleration of the design of the first two satellites; acceleration of the procurement effort is not included here.

Inclusion of the Transformational Wideband MILSATCOM program within the Air Force Science and Technology (S&T) Program provides for increased Air Force investment in space technology to develop and demonstrate laser communications technologies. These efforts could prove a number of attributes that could provide higher date throughput and higher frequencies that could transform our military communications infrastructure. While laser communications have a high potential to revolutionize satellite communications, there are several critical technologies that require maturation to reduce risk prior to fielding an operational system. This maturation of technology can best be accomplished within the S&T community. However, because of the overall maturity of this concept we want to posture ourselves to be able to rapidly move these maturing technologies to development.

For this reason, the Air Force Space and Missile Systems Center (SMC) is executing this reason, the Air Force Space and Missile Systems Center (SMC) is executing this in S&T not only because of the desire to rapidly transition this technology into operational use, but also because of the significant amount of manpower required to manage the effort. SMC will be working closely with a consortium of government labs, lead by the Air Force Research Laboratory.

Special Programs provide for classified S&T efforts.

Both of these programs came into the S&T Program with funding, thus, increasing S&T topline funding. There was no requirement to shift 6.3, Advanced Technology Development, priorities to pay for these S&T efforts.

26. Senator LIEBERMAN. Mr. Engle, the Air Force Materiel Command has set a funding target for science and technology at 2.0 percent to 2.4 percent of the total Air Force budget. The fiscal year 2003 President's budget request proposes to fund Air Force science and technology at well below 2 percent. Does the Air Force leader-

ship subscribe to the Air Force Materiel Command's goal, and if so, how do you intend to support it?

Mr. ENGLE. The Air Force investment strategy is to fund a broad spectrum of different mission areas that support our warfighting capabilities. This philosophy requires a flexible funding strategy that can be readily changed as demands on the different mission areas change. Therefore, as a matter of general policy, the Air Force does not set a fixed funding percentage for any mission area, including the Air Force Science and Technology Program. Having said that, we do receive and follow guidance of this nature provided by OSD and when specific percentage guidance is included, we will attempt to meet that guidance. Finally, we permit our MAJCOMS to set their own goals during their planning and programming process and they use these goals to make arguments within a broader Air Force debate in the competition for limited resources.

AIR FORCE S&T LEADERSHIP

27. Senator LIEBERMAN. Mr. Engle, the Air Force has instituted internal policy changes in response to criticisms that there has not been sufficient advocacy and leadership support for science and technology at the corporate policy and decision-making level. What is your assessment of leadership support for science and technology, what changes have been made, how effective have they been, and do additional policies need to be developed to encourage leadership buy-in?

Mr. ENGLE. Air Force leadership is committed in its support of its Science and Technology (S&T) Program. The S&T Planning Review, directed by Congress in the fiscal year 2001 National Defense Authorization Act, helped bring S&T to the forefront and results of this review have been incorporated into the current Air Force S&T Plan. In the last year or so, we have also started a new process that brings the operational user, the Product Centers, and the Air Force Research Laboratory together early in the development process to identify those technologies that are most important to warfighter capabilities. These new Applied Technology Councils (ATCs) highlight S&T efforts and offer great potential for improving our ability to rapidly and effectively transition technologies into advanced capabilities. Additionally, the Air Force has begun to use our semi-annual S&T Summits, where the Secretary of the Air Force, the Air Force Chief of Staff, and the Air Force four stars and other senior leaders review the S&T portfolio, to increase the awareness of senior leadership of the technologies in development that could provide new capabilities.

While many of these changes are still relatively new, we believe that the S&T Study, directed by Congress in the Fiscal Year 2002 National Defense Authorization Act, should reflect the positive impact these changes are having on the Air Force S&T planning process and advocacy.

REDUCING AIR FORCE OPERATIONS COSTS

28. Senator LIEBERMAN. Mr. Engle, the Air Force's explanation for the lack of science and technology and RDT&E funding has been that operations costs (the costs to repair and fly aircraft) have been escalating and drawing away from other areas of funding. On the other hand, the President's budget request for fiscal year 2003 would eliminate certain programs that are designed to drive down operations and support costs, such as the Aging Aircraft Systems Program Office and the Productability, Reliability, and Maintainability programs. Why are these programs being cut if they are intended to help reduce operations costs—costs that are so high that they supposedly justify draining funds that would otherwise go into science and technology?

Mr. ENGLE. During development of the Fiscal Year 2003 President's Budget (PB), the Air Force had to make difficult decisions, balancing near-term high priority mission requirements against long-term investments. The fiscal year 2003 PB request reflects Air Force funding priorities to meet near-term operational requirements within current budgetary constraints. The Air Force structured its budget to maintain a balance between the different investment accounts within Research, Development, Test, and Evaluation (RDT&E) and other investment areas. The Aging Aircraft and Productivity, Reliability, Availability, and Maintainability (PRAM) programs are thus funded at the highest level possible given the fiscal constraints imposed by the need to fund higher priority operational mission requirements.

AIR FORCE RESTRUCTURING INITIATIVES

29. Senator LIEBERMAN. Mr. Engle, there have been indications that the Air Force is planning to implement workforce restructuring initiatives. Can you describe these initiatives and what additional tools or authority the Air Force needs to ensure their success?

Mr. ENGLE. The Air Force identified 27 civilian restructuring or force shaping initiatives in the areas of hiring, development, and retention/separation management and the legislation, funding, and policy or regulatory changes required. In addition to attracting new employees with critical skills, we also must manage the projected loss of mid to senior-level personnel—approximately 42 percent of our workforce will be eligible to retire by 2005. Air Force civilians represent one quarter of the total force.

Your support and sponsorship of our fiscal year 2003 legislative initiatives is critical for their passage. Specifically, we need to streamline the hiring process, expand performance-based compensation across larger parts of our workforce, and continue with separation incentives to shape our civilian force. We also need to ensure we invest in training and developing our current workforce to avoid losses in institutional knowledge as our senior, technical and managerial employees retire.

Senator Lieberman, the roles Air Force civilians play in accomplishing the Air Force mission are, in and of themselves, compelling reasons to invest in the civilian workforce. They are an integral part of the complex system that keeps the fighters, bombers, tankers and rockets flying as well as playing a critical role in DOD's homeland security mission. However, we need your support to ensure that we have the tools, authority, and funding necessary to ensure our success with this effort. Thank you for your time and the opportunity to present our vision for the future.

BIOLOGICAL WEAPONS ATTACKS

30. Senator LIEBERMAN. Dr. Klein, current DOD organizational structures and capabilities do not appear to be well-suited for the management of a major biological weapons attack such as smallpox or other agents with similar capability to spread rapidly. Please provide your views and opinions on this problem, as well as with current and future plans for how it will be addressed.

Dr. KLEIN. The spread of a contagious disease, like smallpox, from person to person presents unique public health issues for both DOD and the Nation's public health structure. The most effective way to deal with such diseases is by immunization with an effective vaccine while at the same time developing both detection and diagnostic capabilities. DOD has very active programs for both detection and diagnosis of biological agents.

Two agents that are highly contagious are smallpox and plague. DOD is currently developing vaccines to counter both threats, as well as diagnostic capabilities. In addition, DOD is meeting regularly with other Federal agencies (e.g., Department of Health and Human Services, National Institutes of Health, Centers for Disease Control, and Food and Drug Administration) to develop a national immunization policy should a smallpox outbreak occur in the U.S. At the present time, DOD has not made any decision regarding a specific smallpox immunization policy.

CONNECTIONS BETWEEN AGENCIES

31. Senator LIEBERMAN. Dr. Klein, it appears that major "fault lines" may exist between different levels of the DOD and government (federal, state, and local), between the government and private sector, among different institutions and agencies, and within the public and private sector. These "disconnects" could impede situational awareness and compromise the ability to limit loss of life, suffering, and economic damage. Please provide your views and opinions on this problem, as well as with current and future plans for how it will be addressed.

Dr. KLEIN. There are numerous relationships between DOD and other Federal agencies, and between the Federal Government and state and local governments and agencies. While many of these relationships are sound and effective there are also opportunities for improvement. In order to ensure improved situational awareness and capabilities to respond to a variety of threats to the United States, it is important to emphasize that these relationships are ongoing processes, not static achievements.

Many technologies under development through the Chemical Biological Defense Program (CBDP) may have application for other than the traditional warfighter mission. In order to ensure coordination on the development and fielding of equip-

ment for homeland security purposes, DOD actively participates with several Federal, state and local government organizations. These relationships include participation from the private and public sector to leverage their capabilities for the research and development. DOD has an established Memorandum of Understanding with the Department of Energy (DOE). Through the DOE Chemical and Biological Nonproliferation Program (CBNP), the DOE National Laboratories are engaged in responding to the threat posed by chemical and biological weapons to U.S. civilians.

The DOD is one of the funding departments for the Interagency Board (IAB) for Equipment Standardization and Interoperability. The IAB is a working group of state and local first responders, standards setting organizations, and Federal Government agencies working cooperatively to establish and coordinate local, state, and Federal standardization, interoperability, and responder safety to prepare for, respond to, mitigate, and recover from any incident by identifying requirements for Chemical, Biological, Radiological, Nuclear or Explosive (CBRNE) incident response equipment. Detailed information is available on the IAB web site at *http://www.iab.gov*.

DOD largely funds the activities of the Technical Support Working Group (TSWG). The TSWG is an interagency forum that rapidly develops technology and equipment to meet the high priority needs of the combating terrorism community, and addresses joint international operational requirements through cooperative research and development efforts with the United Kingdom, Canada, and Israel. TSWG membership includes representatives from nearly eighty organizations across the Federal Government. Policy oversight is provided by the Department of State and execution oversight is provided by the Department of Defense, specifically the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict (ASD (SO/LIC)). Detailed information is available on the TSWG web site at *http://www.tswg.gov*.

In May 2000, the DOD participated in a series of exercises (known as the top officials, or TOPOFF), which were combined interagency exercises for all agencies who participate in the consequence management of a weapon of mass destruction (WMD) terrorist event, including officials from state, local, and Federal organizations. DOD will also participate in a follow-on exercise, TOPOFF 2, in May 2003.

In summary, DOD is involved, and we continue to expand our outreach between Federal agencies and state and local governments to increase the level of knowledge and awareness, and increase our preparedness on countering WMD attacks.

VACCINES/BIOLOGICAL WEAPONS

32. Senator LIEBERMAN. Dr. Klein, there does not appear to be a surge capability in both the DOD and the U.S. health care and public health systems, or the pharmaceutical and vaccine industries. This institutionally limited surge capacity could result in both the DOD and federal, state, and local hospitals being overwhelmed and becoming inoperable; could impede public health agencies' analysis of the scope, source, and progress of the epidemic, the ability to educate and reassure the public, and the capacity to limit causalities and the spread of disease. Do you think the DOD has sufficient stockpiles of selected vaccines for all DOD personnel, distribution systems designed to rapidly vaccinate DOD personnel, and capability/plans (on a large scale/multi-state) to augment civil agencies in case of a major biological weapons attack?

Dr. KLEIN. There is no simple answer to the issue of a sufficient vaccine stockpile. BioPort is now manufacturing licensed anthrax vaccine, which is accumulating pending a decision on an anthrax vaccination policy. Our anthrax vaccine stockpile will continue to increase as we purchase the BioPort output.

For smallpox vaccine, the Secretary of Health and Human Services has announced there will be several hundred million doses of vaccine available by fall 2002. The DOD is developing agreements with the Department of Health and Human Services (DHHS) for access to this stockpile. However, there is no Food and Drug Administration (FDA) licensed smallpox vaccine in this stockpile; and the vaccine will have to be administered with informed consent as an Investigational New Drug (IND).

Finally, there is a question of a sufficient stockpile of other biological defense vaccines that protect against lower profile agents. The DOD is currently developing new vaccines against some of these agents based on validated requirements.

IND vaccines against botulinum toxins, tularemia, and plague may be available in the next 12 to 24 months, if these products demonstrate safety and efficacy in early clinical trials. Like smallpox vaccine, we can produce IND stockpiles for use

with informed consent while we work toward product licensure. We are evaluating requirements for establishing these stockpiles.

DOD policy for vaccinating military personnel is clearly established (DOD Directive 6205.3) and our ability to implement an effective distribution system designed to rapidly vaccinate DOD personnel was demonstrated through the Anthrax Vaccine Immunization Program (AVIP). The policies for vaccinating the civilian population are being widely debated. The Department of Health and Human Services is the lead Federal agency for establishing such plans and policies. In addition to the production issues discussed above, several other issues need to be addressed before vaccinating the civilian population. Physiological differences between the military and civilian population need to be addressed. For example, the civilian population includes a large pediatric and geriatric population, and it would include a larger percentage of people who are immune suppressed or have medical contraindications. Legal issues also need to be addressed. For example, who would be liable for adverse effects associated with vaccines? Or when should vaccines be administered to protect against diseases that are not naturally occurring? In short, several issues need to be addressed in order to initiate vaccinations of civilians against biological warfare threats.

BIOLOGICAL THREAT COMMUNICATION

33. Senator LIEBERMAN. Dr. Klein, does the DOD possess the capability to deal with the immediate challenges for all levels of DOD and government that a significant biological weapons incident may cause for information management and communication systems (e.g., dealing with the press effectively, communication with citizens, and maintaining the information flows necessary for command and control at all institutional levels)? Other than FEMA serving as the backbone of any major regional response which the DOD supplements, does the DOD have an internal integrated information management and communications system designed to either supplement or replace FEMA capabilities should it not be able to respond and organize quickly enough?

Dr. KLEIN. The Department's present capability would be limited to its existing command and control networks for military forces only. The DOD is not structured to cope with the command, control, communications, and intelligence (C^3I) demands of a major biological weapons incident or employment for all levels of both DOD and government.

With respect to the second part of your question regarding supplemental or replacement systems to FEMA, DOD has been working since last November to address issues related to emergency response information technology, to include information management and communications systems. DOD and FEMA co-chair the Emergency Response Network Initiative (ERNI), an interagency working group that was established to coordinate and coalesce efforts to deliver an emergency response network, collaboration tools, and information access for first responders.

The Defense Threat Reduction Agency and the Department of Energy participate in the ERNI consortium. It is critical that DOD identify and solve the coordination and communications challenges that exist at the civil-military interface, and the ERNI consortium is our vehicle for making progress in coordination with the other Federal partners.

MULTI-STATE BIOLOGICAL THREAT

34. Senator LIEBERMAN. Dr. Klein, in the event that a contagious bio-weapon pathogen is deployed on U.S. soil, containing the spread of disease will present significant ethical, political, cultural, operational, and legal challenges starting with state and local agencies and eventually requiring DOD involvement. The DOD may be required to respond with not only soldiers to contain movement of personnel but also with medical supplies and assistance. Do you believe we have sufficient capability, plans, exercises, and protocols to handle a multi-state situation like this?

Dr. KLEIN. With regard to supporting the effort to improve security here at home, there are three circumstances under which the Department of Defense would be involved in activity within the United States.

First, under extraordinary circumstances, which require the department to execute its traditional military missions. In these circumstances, DOD would take the lead. Combat air patrols and maritime defense operations are examples of such missions. As with military missions abroad, DOD has the lead role in the conduct of traditional military missions in defense of the people and the territory of our country. In these instances, DOD is supported by other Federal agencies. Plans for such

contingencies, to the extent possible, would be coordinated, as appropriate, with the National Security Council and with the Homeland Security Council.

Second, in emergency circumstances of a catastrophic nature—for example, responding to an attack or assisting in response to forest fires, floods, hurricanes, tornadoes and so forth. In these instances, the Department of Defense may be asked to act quickly to provide capabilities that other agencies simply do not have.

Third, missions or assignments, which are limited in scope, where other agencies have the lead from the outset. An example of this would be security at a special event, like the Olympics. Another example is assisting other Federal agencies in developing capabilities to detect chemical and biological threats.

The first of those three categories, extraordinary circumstances, when DOD conducts military missions to defend the people or territory of the United States at the direction of the President, falls under the heading of homeland defense. In these cases, the Department is prepared to take the lead.

The second and third categories are emergency or temporary circumstances, in which other Federal agencies take the lead, and DOD lends support. These are appropriately described as homeland security. In these cases, Governor Ridge, as the President's adviser for homeland security, coordinates the planning among civilian Federal agencies, as well as state and local agencies. DOD is represented in these deliberations of the Homeland Security Council and is prepared to support the plans that are developed in this process.

In the event of multiple requests for DOD assets, whether domestic or international, the President would be the one to make the allocation decisions, using the coordinating mechanisms of the National Security Council and the Homeland Security Council.

To take another example, in the case of an incident that might exceed the capacity of a state or local authority to address such an attack such as employing chemical or biological weapons, the Federal response plan assigns to FEMA responsibility for coordinating and directing the activities of Federal agencies. Under this plan, resources of the Department of Defense could be made available to support these activities. This could include the deployment of soldiers to control crowds, assist in evacuation, the provision of transportation, medical facilities and supplies, or communications equipment.

In sum, the Department of Defense has two roles to play in providing for the security of the American people where they live and work. The first is to provide forces to conduct those traditional military missions under extraordinary circumstances, such as the defense of the Nation's airspace or its maritime approaches. The second is to support the broader efforts of the Federal domestic departments and agencies and indeed the state and local government, as coordinated by and in cooperation with the Office of Homeland Security under emergency conditions for special purposes.

DOD HEALTH MONITORING

35. Senator LIEBERMAN. Dr. Klein, with respect to surveillance detection systems and improved communication and warning systems, do DOD surveillance systems provide information crucial to monitoring the health of the DOD population, identifying DOD health problems and priorities, taking DOD health action to prevent further illness, and evaluating the effectiveness of these actions? Public health and DOD sources of data for disease surveillance seem nearly as varied as the diseases or conditions of concern. Because there are multiple data sources, different information requirements, multiple, distinct users, and different partners with whom the DOD may be required to collaborate to obtain data for specific program areas, is there is a single surveillance system that captures all the information required to monitor DOD health?

Dr. KLEIN. DOD currently uses the "Global Emerging Infections System" (GEIS) to detect and track potential infectious diseases on a global basis. DOD-GEIS provides an early warning surveillance and response system for emerging infections. It accomplishes this through an integrated surveillance program involving six cooperative, host nation/DOD medical research units and the operational surveillance programs of the three military services. It is the only U.S. entity that is devoted to infectious diseases globally and that has broad-based laboratory capacities in overseas settings.

GEIS uses various means for global disease surveillance including an "electronic surveillance system for the early notification of community-based epidemics" known as ESSENCE. This system looks for early detection of aberrant clinical patterns, rapid epidemiology-based targeting of limited assets, provides leaders with outcome

based exposure estimates, and provides risk communication to reduce the spread of panic and civil unrest. At the present time, ESSENCE has been implemented for daily analysis of outpatient data from the Military Treatment Facilities in the greater District of Columbia area. In the future, GEIS plans to include other geographic areas, collaboration with local civilian surveillance systems, and addition of other health indicators (e.g., pharmacy usage, lab test ordering, school absenteeism, etc.). Therefore, DOD is developing a more effective surveillance system to monitor DOD health.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

NEW TECHNOLOGY DEVELOPMENT

36. Senator BILL NELSON. Dr. Sega, Dr. Marburger, Dr. Klein, Dr. Younger, and Mr. Waldron, since September 11, thousands of flowers are blooming in American industry and universities eagerly developing counter terror or counter weapons of mass destruction (WMD) technologies. My office has been approached by nearly a dozen companies or universities with "breakthrough" technology in the detection of biological or chemical agents, systems for tracking contamination, systems for alerting the nation, systems for consequence management, and on and on. What are your selection criteria for prioritizing among these technologies to ensure you meet the established requirements across all service and agencies?

Dr. SEGA. The Department of Defense continues to seek the best available technology or concepts to counter weapons of mass destruction from all available sources. Our recent Broad Agency Announcement focused on Operation Enduring Freedom objectives and emergent homeland security counter terrorism needs and included, in part, a solicitation for new and novel approaches to counter weapons of mass destruction. The overall solicitation was well received by academia and industry and we collected over 12,000 responses. The individual requirements selected for advertisement were prioritized by user subgroups within the Technical Support Working Group. The vendor submissions were reviewed against a combination of cost, schedule, technical risk, past performance, and most importantly the ability to meet the needs of the Department. The submissions were reviewed by user agencies and by technical experts from the interagency community.

Dr. MARBURGER. Technology areas that are critical to our ability to develop counter terror or counter weapons of mass destruction capabilities are identified through a number of mechanisms. One means is through the deliberations of interagency working groups I established as part of the Antiterrorism Task Force under the National Science and Technology Council (NSTC). In particular, two of these working groups, co-chaired by OSTP—the Radiological, Nuclear, and Conventional Detection and Response Working Group and the Biological and Chemical Preparedness Working Group—coordinate both near-term and long-term Federal antiterrorism R&D efforts and are responsible for setting a 5-year research agenda.

In addition, OSTP's interaction with the Technical Support Working Group (TSWG), is another interagency mechanism for identifying near-term research and development priorities for science and technology for combating terrorism. TSWG is a requirements-driven organization that rapidly develops technology and equipment to meet the high-priority needs of the combating terrorism community.

Dr. KLEIN. The Department of Defense continues to seek the best available technology or concepts to counter weapons of mass destruction from all available sources. Our recent Broad Agency Announcement focused on Operation Enduring Freedom objectives and emergent homeland security counter terrorism needs and included, in part, a solicitation for new and novel approaches to counter weapons of mass destruction. The overall solicitation was well received by academia and industry and we collected over 12,000 responses. The individual requirements selected for advertisement were prioritized by user subgroups within the Technical Support Working Group. The vendor submissions were reviewed against a combination of cost, schedule, technical risk, past performance, and most importantly the ability to meet the needs of the Department. The submissions were reviewed by user agencies and by technical experts from the interagency community.

Dr. YOUNGER. We consider urgency of requirements, gaps in capability, technology feasibility, potential operational utility and cost as criteria to select technologies that will provide the greatest benefit to countering terror or weapons of mass destruction. One illustration of how we address this situation can be taken from the recent highly successful DOD Combating Terrorism Technology Task Force (DCT3F) commissioned shortly after September 11 of last year. The Task Force generated a number of technology candidate lists and obtained multiple inputs across the DOD

and other Federal agencies, both technical and operational. The Task Force assessed each proposed project against two criteria: utility and product. The utility criterion reflected the extent to which the effort provided utility across the full spectrum of the Nation's needs for combating terrorism. The sub-criteria within utility were prevention, protection, and response, weighed equally. The perspective of this analysis was intended to consider combat support and homeland security. The product criterion reflected the extent to which the product, report, or deliverable was clearly defined. The Task Force obtained parallel assessments from the Joint Staff using a quantitative method that reflected the military utility and importance to combatant commands. The Task Force made its final recommendations based on technology feasibility, operational utility, and cost.

In addition to the Task Force, the Technical Support Working Group (TSWG) sponsored a call for proposals that generated over 16,000 responses. They are completing their process of selecting candidate efforts for funding. In addition to the TSWG efforts, DTRA is reviewing those entries to identify potential additional technology contributions to countering terror and WMD. DTRA will use the criteria used in the Task Force to evaluate the TSWG submittals since they are generally offered as near-term solutions.

An example from our model development efforts is our hazard predictions and consequence assessment models for release of chemical or biological agents due to accidental, terrorist or targeting activities. These models try to use the best technologies available, based on time to deliver and cost/benefit. Ideas and proposals come from various means—unsolicited proposals, conferences, and interagency meetings. Examples include Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Office of the Federal Coordinator for Meteorology, and panel discussions on WMD. DTRA's prioritizations are based heavily on inputs from the warfighting CINCs elicited during extensive DTRA participation in exercises and war games. The annual Hazard Prediction and Assessment Capability (HPAC) users' conference is a DTRA-sponsored forum specifically for identifying user needs and priorities. All technologies are reviewed for new ideas, technology gaps that need to be filled, and requirements. Our program plans and budget are built to first meet stated requirements and then to look at new technologies or integrate with existing technologies.

Our response thus far has emphasized selecting technologies that would provide near-term solutions. The selection criteria we use to evaluate potential longer-term efforts put greater emphasis on potential operational utility while placing less weight on technical risk.

Mr. WALDRON. The National Nuclear Security Administration's R&D Program for countering terrorist use of weapons of mass destruction is focused on detecting nuclear/radiological and chemical/biological weapons. We are evaluating "breakthrough" technologies for both of these areas. We first look to the underlying science and engineering and the proposed improvement in detection and identification capability. Other criteria include: the ability to support multiple users or applications; cost effectiveness of the mature technology or system in terms of purchase price and operations; anticipated reliability of the technology during operations—extremely low to no false positives and long life time; and ease of operation.

37. Senator BILL NELSON. Dr. Sega, clearly the research, development, and acquisition of counter terror/counter WMD technology is a management challenge within the Department of Defense. Technological development is no less a total government challenge and begs the question of how we are managing this laterally across Federal agencies and vertically with state and local authorities. How are we working to ensure that the counter terror/counter WMD systems that we develop and procure in the DOD are interoperable with those among the relevant Federal agencies, Office of Homeland Defense, and at the state and local levels?

Dr. SEGA. The Technical Support Working Group (TSWG) was established to support lateral integration across the government for requirements and proof of technology projects in this area. TSWG has nearly 80 members across the Federal, State and Local Government. Interoperability of systems is but one area focused upon by the TSWG process. Furthermore, a TSWG program manager is the current Co-chair of the Technology Panel of the Interagency Board for Equipment Standardization and Interoperability. This group, known as the Interagency Advisory Board (IAB), provides a forum for coordinating weapons of mass destruction (WMD) requirements and setting standards for equipment. The IAB is made up of Federal and Civilian responders from across the country. Both the TSWG and the IAB support state and local authorities by developing equipment to meet their requirements and promulgating information to make them more effective. More generally, the Department

works within the framework of the National Security Council and the Homeland Security Council, which provide for top-level integration.

38. Senator BILL NELSON. Dr. Sega, Dr. Marburger, Dr. Klein, Dr. Younger, and Mr. Waldron, the Nation is demanding protection from terror and WMD right now and we are all working hard to get there. Nonetheless, as is often the case in science and technology, additional money does not necessarily mean that technological development will progress toward procurement any faster. We are always in danger of wasting a lot of money and time, but we have to try. With the technologies that each of you are considering now, how long are you estimating it will take to develop the systems that meet our protection requirements—months, years?

Dr. SEGA. Protection from terror and weapons of mass destruction is a complex problem for which we must continually scan our research and engineering program for opportunities. The time to develop systems varies based on many factors such as technology maturation, system complexity, etc. When feasible, we alter our investment to accelerate urgently needed programs. Examples of this acceleration are two projects identified for immediate investment following the September 11 terrorist attacks. They were Nuclear Quadrupole Resonance (NQR) Detection Systems and Thermobaric Weapons.

Nuclear Quadrupole Resonance (NQR) technology was developed by the Naval Research Laboratory and is being used by the Federal Aviation Administration for detection of bulk explosives. There are many advantages of NQR over x-ray detectors but of particular significance is that little interpretation is required. The existing technology is now being modified for use in examining "bulk" packages.

A thermobaric explosive weapon system was accelerated, tested, and certified from the concept stage within 90 days. From "chemistry-to-weapon," the thermobaric explosive was developed and tested in a laboratory setting in October 2001, successfully flight tested in December, and made available to the warfighter earlier this year.

The Department's S&T program has numerous program activities well underway, such as ACTDs, which will help to meet the near- and long-term, critical warfighter needs. Other programs and technologies are being developed to provide future options and capabilities. We are focusing in areas such as counterterrorism and protection from weapons of mass destruction, and working to balance the demands of today with those of the future. The Department would benefit from additional flexibility to carry new ideas rapidly through exploration, development, and insertion into the field.

Dr. MARBURGER. Some of the technologies that are being considered now will meet protection requirements in a period of months while other technologies may not be ready for deployment for years. For example, in the short term, there are a number of technologies available for screening baggage at airports, including x-ray backscatter, neutron activation, acoustic frequency-swept interrogation and radiometry. In this area we have been working with the FAA, with the purpose of ensuring that good candidate technologies are considered rapidly, but without interfering with FAA's process for introducing new technologies.

In the longer term, technologies for countering bioterrorism, such as fast and cost-effective ways to detect specific pathogens and development of new vaccines, may take years.

In some areas, we need improved tools with which to prevent, detect, protect, and treat victims of chemical, biological, radiological, nuclear, and conventional terrorist attacks. Additionally, we will need new and improved tools to recover facilities from attacks, should they ever occur. In many cases, this may call for a "systems approach," rather than simply perfection of a single device.

In addition, we should remember that countering terrorism is a constantly evolving process. Over time, terrorists develop new means of imposing violence on their targets, and those who oppose terrorism must anticipate and counter those means. We are engaged in a continual process of thrust and counter.

Dr. KLEIN. Protection from terror and weapons of mass destruction is a complex problem for which we must continually scan our research and engineering program for opportunities. The time to develop systems varies based on many factors such as technology maturation, system complexity, etc. When feasible, we alter our investment to accelerate urgently needed programs. Examples of this acceleration are two projects identified for immediate investment following the September 11 terrorist attacks. They were Nuclear Quadrupole Resonance (NQR) Detection Systems and Thermobaric Weapons.

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The Department's S&T program has numerous program activities well underway, such as ACTDs, which will help to meet the near- and long-term, critical warfighter needs. Other programs and technologies are being developed to provide future options and capabilities. We are focusing in areas such as counterterrorism and protection from weapons of mass destruction, and working to balance the demands of today with those of the future. The Department would benefit from additional flexibility to carry new ideas rapidly through exploration, development, and insertion into the field.

Dr. YOUNGER. Because the terrorist and WMD threats are so urgent and so broad in scope, we have pursued both near-term solutions to enhance protection, and longer-term programs that will provide more complete and higher confidence security. To provide transformational advances in protection requires more than technology. It requires creative ways of integrating and applying technologies to derive the maximum protective improvements while imposing the least possible disruption or diminution of the unique freedoms we Americans enjoy. Some of the protection technologies may be available in months since we are exploiting "off-the-shelf" material to develop protection equipment. Others may be available in years as they are follow-on and adaptations of the off-shelf equipment that is being currently exploited. Specifically:

- *Unconventional Nuclear Warfare Defense (UNWD)*—Congress appropriated $75 million in fiscal year 2002 for a joint DTRA–NNSA program to demonstrate an installation nuclear warfare protection system designed to have an operational capability to detect, identify, respond, and prevent the threat brought upon by stolen nuclear weapons, improvised nuclear devices (INDs), or radiological dispersal devices (RDDs) by unconventional delivery methods. Congress directed four test beds be established for this program. The first test bed to be operational at Kirtland AFB by September 2002.
- *Terrorist Device Defeat (TDD) Program*—This program is designed to rapidly develop the technologies and operational concepts to defeat the threat of nuclear terrorism in the form of nuclear weapons, Improvised Nuclear Devices (INDs) or Radiological Dispersal Devices (RDDs). Some of the technologies and concepts developed are currently being tested and employed by operational elements. They will be used in combating terrorism, facility/site protection and to rapidly identify the organization responsible for the weapon/device, if detonation occurs. The program consists of three sub-programs: (1) Special Nuclear Program (SNP) which is an operational-technical mix that currently provides the regional CINCs with a militarized capability to counter this type threat; (2) Improvised Device Defeat (IDD) which is developing the capability to locate, access and provide advanced diagnostics to defeat INDs in the field in support of a classified Chairman, Joint Chiefs of Staff (CJCS) plan; and (3) Domestic Nuclear Event Attribution (DNEA)—A nuclear forensics capability using nuclear debris and signature analysis tools to rapidly identify the organization responsible for an unclaimed domestic nuclear event.
- *Remote detection of High Explosives*—Following September 11 DTRA helped field new technologies that allow remote detection of high explosive materials, and more advanced versions of the technology will follow in the next couple of years.
- *Biodefense Initiative.* Our biodefense initiative will create a national multi-component, multiorganization biological defense capability that will provide early detection and characterization of biological terrorism, assist the Metropolitan Medical Response System, and support the Departments of Justice and Health & Human Services as they work with state and local governments. In 2 years we will have a prototype system of systems achieved by integrating existing systems and fielding two next generation urban biological detection systems by early fiscal year 2004.

For the longer term, we have two programs that are building our knowledge of the critical infrastructures that are so important to the well-being of our nation. The National Infrastructure Simulation and Analysis Center (NISAC) is a cooperative effort between DTRA and several of the National Labs. NISAC is building the data-

bases on our critical infrastructures so we can better assess the system vulnerabilities and can determine how to mitigate these vulnerabilities, both for the National well-being and for the dependencies for military missions. A second infrastructure program, the Mission Degradation Analysis Support (MIDAS) program is focused specifically on the infrastructures needed to support military missions and functions. Both of these infrastructure programs are designed to provide tangible benefits within the next year, but will continue to grow incrementally in their ability to analyze vulnerabilities of the critical infrastructures.

Mr. WALDRON. I believe the answer is a combination of both months and years for some systems to be available. In the nearer term, we will be providing technologies that require more human operation or intervention and do not have the highest level of sensitivity. In the longer term, we will be developing technologies that are more autonomous and with greater sensitivity.

39. Senator BILL NELSON. Dr. Sega, Dr. Marburger, Dr. Klein, Dr. Younger, and Mr. Waldron, generally speaking, are counter terror/counter WMD technologies sensitive to additional funding—that is will additional resources mean we will develop technologies faster; or, is the pace of development fairly limited such that the advantage of additional money is really how many more technologies we can explore?

Dr. SEGA. Technologies that are potentially useful in countering either terrorism or weapons of mass destruction (WMD) are widely disparate, requiring the Department to consider the entire range of possible investment strategies. For example, at the early or discovery end of technology development, added resources always allow the research community to explore more options, which aids good science. At the other end of the development, medical technology for eventual licensure has many rate-limiting steps, only some of which can be accelerated by adding funds. It is important for the Department to have stable funding for fundamental work while maintaining flexibility to move quickly, as many technologies develop rapidly. In research and development, new and innovative ideas "arrive" unexpectedly so we need some flexibility to take full and timely advantage of them. When preparing for uncertain methods from terrorist adversaries, the ability to move quickly and smartly is especially critical if we are to provide the Nation broader options for preempting or defeating the use of terror or WMD. In this area as in others, flexibility within a balanced program gives us the ability to invest in a wide array of possible solutions as well as focusing resources on particularly promising technologies.

Dr. MARBURGER. There is a need to achieve a balance between innovation versus implementation in the war against terrorism. As I have learned more about the challenges of terrorism, I've realized that the means for reducing the risk and consequences of terrorist incidents are for the most part already inherent in the scientific knowledge and technical capabilities available today. Only in a few areas would additional basic research be necessary, for example in research in connection with bioterrorism. Beyond this, the greater challenge for us is to define the specific tasks we want technology to perform, and to deploy technology effectively throughout the diffuse and pervasive systems the technology is designed to protect.

Dr. KLEIN. Technologies that are potentially useful in countering either terrorism or weapons of mass destruction (WMD) are widely disparate, requiring the Department to consider the entire range of possible investment strategies. For example, at the early or discovery end of technology development, added resources always allow the research community to explore more options, which aids good science. At the other end of the development, medical technology for eventual licensure has many rate-limiting steps, only some of which can be accelerated by adding funds. It is important for the Department to have stable funding for fundamental work while maintaining flexibility to move quickly, as many technologies develop rapidly. In research and development, new and innovative ideas "arrive" unexpectedly so we need some flexibility to take full and timely advantage of them. When preparing for uncertain methods from terrorist adversaries, the ability to move quickly and smartly is especially critical if we are to provide the Nation broader options for preempting or defeating the use of terror or WMD. In this area as in others, flexibility within a balanced program gives us the ability to invest in a wide array of possible solutions as well as focusing resources on particularly promising technologies.

Dr. YOUNGER. Additional resources can accelerate some ongoing programs. For example, the hazard prediction and consequence assessment modeling is sensitive to additional funding. Model development, test, and verification can be done faster. Detector technology, particularly for biological agents can be accelerated. However, the largest benefit for hardware development efforts would be to increase the breadth of the technologies being worked. This would result in less risk in the overall progress of solutions of Homeland Security tasks. Even with additional breadth in the scope of technologies being examined, we may be limited by the difficulty, time,

skilled personnel and testing required to integrate the new technologies into integrated systems that are operationally suited to the need.

Mr. WALDRON. Typical of most technology development programs, you will find a mix of sensitivity to additional funding. Some technology development projects can readily apply more funds to finalize development sooner, and some development will not happen sooner no matter how much money is applied. This is more typical of technologies that depend upon a very thorough understanding of the supporting science. The breadth of science and technology needs to expand to maintain the flexibility to respond to future threats.

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

TECHNICAL SUPPORT WORKING GROUP BUDGET

40. Senator BINGAMAN. Dr. Sega, you mentioned a recent broad agency announcement (BAA) that attracted 12,500 responses through a web server for combating terrorism. I've heard this amazing number in testimony to this Armed Services Committee from other senior officials in the office of the Under Secretary for Acquisition, Technology, and Logistics. I assume you are talking about the Technical Support Working Group, or TSWG. My office, like others on Capitol Hill, have been overwhelmed with the responses from companies in our state that are looking for a venue to have their ideas evaluated. We have steered all these companies to the TSWG. We have steered our companies to the TSWG because it has a long track record of fielding hardware that meets an interagency requirements list on a short time frame with proven utility. It is my understanding that this BAA has generated approximately $176 million in new concepts. It is my understanding that your office will commit only $30 million over 2 years to fund this effort or $15 million a year. I find this response disappointing. The reason I find this increase disappointing is that I am very aware of the large budgets that agencies such as DARPA have received for combating terrorism when they do not nearly have the experience of the TSWG nor are they the National Security Council chartered forum for combating terrorism. Why is there such a large unfunded requirements gap between the TSWG as compared to DARPA? Would you be averse to doubling the current budget of the TSWG? Doubling the TSWG's budget would still fall short of that allocated to DARPA for combating terrorism. Please explain.

Dr. SEGA. Thank you for recognizing the outstanding work the TSWG accomplished through the Combating Terrorism Technology Support (CTTS) Program for rapidly providing hardware to meet interagency requirements. The response to the BAA was overwhelming. Of the 12,500 submissions, approximately 150 are high priority areas for the DOD. Over the next 2 years we plan to fund $30 million of these promising high priority technologies.

This supplements a baseline investment of several hundred million dollars already being invested in combating terrorism technologies throughout the Department. While we received a significant number of submissions, many were similar to efforts underway. Our focus was on the "golden nuggets" that could be fielded quickly. Both Defense Advanced Research Projects Agency (DARPA) and Defense Threat Reduction Agency (DTRA) have funding in their budgets supporting elements key to combating terrorism and developing chem/bio technology. DARPA's funding focuses on longer term revolutionary new approaches to biowarfare defense vice the near term focus that enables rapid delivery of capabilities into the hands of the warfighter. In addition to the "quick hitting" responses, there is also a compelling need for a longer term integrated combating terrorism program, such as developed by DARPA and DTRA. It is the balance we seek. The basic ground rules for the BAA were that technologies proposed could be funded and fielded within an 18 month timeframe. The more promising ideas identified through the BAA evaluations will also be reviewed by both the TSWG office and the Defense Agencies for funding considerations prior to release of any additional general combating terrorism BAAs.

In June, as part of the annual review process, all programs are reviewed to ensure current investments reflect the Department's priorities. Findings and recommendations may include reallocation of resources.

THREAT REDUCTION BUDGET

41. Senator BINGAMAN. Dr. Younger, what is your spending rate for the CTR and other threat reduction programs with Russia and the newly independent states? It

is my understanding that some of these programs have not had released their fiscal year 2002 funds. Is this true? Who is issuing this hold and why?

Dr. YOUNGER. The following shows the CTR obligation rates for the current fiscal year and the two prior fiscal years:

Fiscal Year Execution	Millions of Dollars Obligated
2002	$ 59.7
2001	328.9
2000	459.0

I want to underscore these are the execution rates for these years, and involve multiple year funding ranging from fiscal year 1994 to fiscal year 2001.

The obligation totals for the specific years of appropriation (i.e. how much of the fiscal year appropriation has been obligated) are:

Fiscal Year Appropriation	Millions of Dollars Obligated
2002	$ 0
2001	80.7
2000	233.9

Before DOD can obligate CTR funds, the current legislation requires several steps be completed. The first step is to certify that the recipient country is committed to six courses of action including complying with all relevant arms control agreements and forgoing any military modernization program that exceeds legitimate defense requirements of the fiscal year 1994 National Defense Authorization Act (Public Law 103–160). This certification must come from the President (delegated to the Secretary of State) and normally occupies the first 3 to 6 months of each fiscal year. However, in considering whether to certify Russia to receive CTR assistance this year, the administration identified concerns with Russia's commitment to comply with the Biological and Chemical Weapons Conventions. Because of these concerns in the face of the administration's desire to continue to provide nonproliferation assistance to Russia, the administration has asked Congress to amend the existing law to allow the administration to waive the certification requirements when it deems it important to the National security interest.

The second step is to submit any reports to Congress required to remove any congressional constraints on obligation of funds for CTR programs. Preparation and coordination of such reports is concurrent with step one.

The third step is to prepare a notification of DOD intention to obligate funds for CTR programs to submit to the Senate Armed Services, Foreign Relations and Appropriations Committees and the House Armed Services, International Relations and Appropriations Committees, as required by Section 1205 of fiscal year 1996 National Defense Authorization Act (Public Law 104–106). The Secretary of Defense is required to provide these notifications and Congress has up to 15 days to comment on them before the Department may obligate funds. The notification must follow the certification and reporting requirements. Partial notifications are prepared and signed by the Secretary when some of the recipient countries have satisfied the certification and/or some of the reporting requirements have been met and the remainder is judged to require additional time.

The fourth step is to amend the implementing agreements with the recipient country. These documents are used to reaffirm through individual Executive Agents (ministries) each recipient nation's intent to continue to comply with the implementing agreement, and specify the up to funding level available for agreed and notified tasks. These amendments may take only a few weeks or, in some cases, many months. The long delays are usually caused by internal issues within the recipient country (e.g., a governmental reorganization that abolished the Ministry of Economics in Russia, creating a delay while a new Executive Agent was identified by Russia for the Strategic Offensive Arms Elimination Program). Some program areas, such as Defense and Military Contacts, do not require implementing agreements.

DARPA FUNDING

42. Senator BINGAMAN. Dr. Tether, the DARPA optoelectronics centers have proven to be a wealth of innovation for providing new generations of physical scientists in the area of photonics, electronics materials, and information theory. These university centers of excellence, working in concert with industry, provide innovative research fueling future capabilities that include: high performance RF and digital

communications, complex information processing, and new and improved sources, detectors, modulators, and storage, all of which are critical for enhancing the effectiveness of military platforms providing warfighter comprehensive awareness and precision engagement. This year the budget for these centers decreases from an fiscal year 2002 amount of $11.5 million to $5.7 million. Would DARPA have any issue with providing essentially a level funding for these centers in fiscal year 2003 at $12 million?

Dr. TETHER. Our current support for University Optoelectronics Centers has been limited to a period of 36 months extended over 4 fiscal years. The University Optoelectronics Centers program has been an outstanding success for DARPA.

The most recent program has generated a number of novel and innovative technologies that are now ready for application to some of DOD's most demanding problems. The fiscal year 2003 decrease in funding for the University Optoelectronics Centers program reflects the fact this will be the final year of funding as this program reaches a successful conclusion.

The program is in the process of finishing efforts that are ready for transfer to industry. This is a normal occurrence and consistent with past practices in this type of development program.

However, the planned decrease in fiscal year 2003 of this single program does not mean that DARPA's funding of university-based optoelectronics research is declining. While it is still too early to determine the exact extent of university involvement, we expect in fiscal year 2003 to spend close to $25 million on optoelectronics research at universities (over and above the amount allocated through the University Optoelectronics Centers program).

Those institutions that have participated in the University Optoelectronics program are in an excellent position to compete for those funds should they choose to respond to DARPA's Broad Agency Announcements.

Given the highly successful integration of university-based optoelectronics research into so many of our mainstream programs, we are evaluating several options in an effort to determine the best way to move forward.

As we develop our fiscal year 2004 budget and Future Years Defense Program, we will determine the most appropriate funding level for the future.

I have no doubt that our future funding level for university-based optoelectronics research will exceed the annual funding for the University Optoelectronics Centers program.

CHEMICAL AND BIOLOGICAL DEFENSE SPENDING

43. Senator BINGAMAN. Dr. Klein, it is estimated that the Chemical and Biological Defense Program (CBDP) research and development portfolio would jump 70 percent to $933 million, more than double the fiscal year 2001 funding level. I am glad that the Department of Defense is taking seriously the protection of the warfighter from these asymmetric threats. Can you please explain your spending rates for costing the fiscal year 2002 appropriation? Will you be able to obligate the fiscal year 2003 request if provided in full?

Dr. KLEIN. The increase in the fiscal year 2003 budget request for CBDP research and development is primarily due to two new initiatives that evolved as part of the Department's response to the events of September 11. The Office of Homeland Security, working with the Office of Management and Budget (OMB), provided additional funds for the Department to resource these initiatives, which were not part of our fiscal year 2002 budget request. The ultimate goal of these initiatives is to rapidly ramp up a capability to meet urgent chemical and biological defense requirements supporting homeland security missions. These two initiatives, the Biological Counter-terrorism Research Center and the Biological Defense Homeland Security Support Program, contain a fiscal year 2003 funding request of $385 million over and above the core program R&D request.

The CBDP, working in close coordination and oversight with the Office of Homeland Security, fully intends to obligate the full amount of the additional funding if appropriated. Toward this goal, we are currently developing the plans and strategies necessary to enable the Department to begin execution of these programs as soon as fiscal year 2003 funds are made available. We view these initiatives as critical to the overall objective of securing the homeland against biological terrorist attacks and are committed to rigorous and expeditious execution of these programs.

NUCLEAR WEAPONS COUNCIL

44. Senator BINGAMAN. Dr. Klein, can you please explain the current requirements from the Nuclear Weapons Council regarding any modifications to the W–76 warhead?

Dr. KLEIN. The NWC conditionally approved Development Engineering (Phase 6.3) for the W–76/Mk4 refurbishment (i.e., the Life Extension Program (LEP)). The conditions were satisfied in December 2000 and the unconditional Phase 6.3 is proceeding. The W–76 LEP will consist of refurbishment activities required in the Nuclear Explosive Package and in several of the non-nuclear components. A new transfer system is also being deployed in the W–76 warhead. The LEP will eliminate most of the existing production defects and most (but not all) of the aging concerns.

45. Senator BINGAMAN. Dr. Klein, has the Nuclear Weapons Council had any discussion that might lead to requirements for a nuclear warhead as part of a missile defense system? If so can you please provide me with a briefing on this issue.

Dr. KLEIN. This issue has not been discussed by the Nuclear Weapons Council.

COUNTERPROLIFERATION COUNCIL

46. Senator BINGAMAN. Dr. Klein, do the activities of the Counterproliferation Council receive adequate funding and contractor support to adequately provide Congress with their annual report?

Dr. KLEIN. The Counterproliferation Program Review Committee (CPRC) has had no funding since the transfer of all Office of the Secretary of Defense Counterproliferation related funding to the Defense Threat Reduction Agency (DTRA) as part of the Defense Reform Initiative. DTRA has always supported the activities of the CPRC adequately in order to provide Congress with the annual report. As you are aware, the Department has recently submitted the CPRC report for 2002. Subsequent to the events of September 11, an increased emphasis is evident within the report on efforts to negate paramilitary and terrorist threats involving weapons of mass destruction (WMD) as part of the Department of Defense's homeland defense initiatives. Within the current and future reports, this emphasis on countering these paramilitary and terrorist WMD threats will reflect changing mission requirements, reorganizations, transformations, and research development and acquisition programs in support of the homeland defense and homeland security roles and missions of the CPRC's constituent membership. As in the past, I am confident that DTRA will provide funding and contractor support adequate to provide the annual report of the CPRC to Congress. I will continue to monitor DTRA efforts in these and other related areas in my role as principal staff assistant for DTRA activities in the Office of the Secretary of Defense.

UNFUNDED REQUIREMENTS FOR R&D

47. Senator BINGAMAN. Mr. Waldron, in your brief to Congress you list four primary areas of research and development:

1. Develop and demonstrate technologies needed to remotely detect the early stages of a proliferant nation's nuclear weapons program;
2. Develop, demonstrate, and deliver technologies to detect, locate, identify, and characterize nuclear explosions underground, underwater, in the atmosphere, and in space;
3. Develop and demonstrate technologies to improve our national capability to detect nuclear materials, to counter nuclear smuggling, and to identify the origins of nuclear materials; and
4. Develop and demonstrate technologies and systems that dramatically improve our ability to detect the proliferation or use of chemical and biological agents, and to minimize the consequences of potential terrorist use of chemical or biological agents.

Please list your unfunded requirements by category for items 1–3.

Mr. WALDRON. Senator Bingaman, we do not have any unfunded requirements. However, as is typical with R&D programs, we could accelerate development of some technologies and explore new technologies with additional funding.

PROTECTING RESEARCH BY FOREIGN STUDENTS

48. Senator BINGAMAN. Dr. Marburger, please explain what efforts your office has undertaken to protect the right to publish and exchange basic research and attract the best foreign students in light of recent terrorist events?

Dr. MARBURGER. Of the 30+ million international visitors who enter the U.S. each year, roughly 500,000 students and research scholars enter the U.S. on F, M, or J visas to attend U.S. universities or learning institutions. Approximately 175,000 of these enter as science students or scholars. The vast majority of these students are here to gain knowledge that will benefit themselves and their homelands. But a small number of international students may come with other motives, seeking to gain unique, sensitive education and training that might eventually be used against us in a terrorist attack.

To prevent uniquely available, sensitive education and training from falling into the wrong hands, the President directed, through Homeland Security Presidential Directive HSPD–2, that, "The Government shall implement measures to end the abuse of student visas and prohibit certain international students from receiving education and training in sensitive areas, including areas of study with direct application to the development and use of weapons of mass destruction." But the Directive also cautioned that these measures should be implemented with great care because, "The United States benefits greatly from international students who study in our country. The United States Government shall continue to foster and support international students."

To fulfill the requirements of Homeland Security Presidential Directive (HSPD)–2.3, the Office of Homeland Security (OHS) and the Office of Science and Technology Policy (OSTP) established an interagency working group which included members from the Departments of State, Justice (headed by the Immigration and Naturalization Service (INS)), Agriculture, Commerce, Defense, Education, Energy, the National Science Foundation, the National Institutes of Health, and representatives from the intelligence, counterintelligence, and law enforcement agencies. This working group labored over several months to find the right balance between scientific openness and national security in implementing the requirements of HSPD–2.

To address the concerns raised in HSPD–2.3, the administration will create an Interagency Panel on Advanced Science and Security (IPASS) to perform an enhanced review process for advanced students and visiting scholars seeking education or training in uniquely available, sensitive science and technology areas. The IPASS co-chairs would be appointed by the Secretary of State and the Attorney General, and the members would be drawn from the State Department, the INS, Federal science and technology agencies, and the intelligence, counterintelligence, and law enforcement communities. The goal of the IPASS would be to ensure that international students or visiting scholars do not acquire uniquely available education or training in U.S. educational institutions or facilities that may be used against us in a terrorist attack. The Attorney General and the Secretary of State, along with OHS and OSTP, will routinely monitor the work of the IPASS to ensure that the right balance between scientific openness and national security is being realized.

REVIEW CRITERIA FOR BASIC RESEARCH

49. Senator BINGAMAN. Dr. Marburger, please explain what efforts your office has undertaken to independently evaluate the review criteria for applied and basic research by the Office of Management and Budget? It is my understanding that the DOE Office of Science received one of the few green lights for management of basic research and development and received virtually no increase in budget.

Dr. MARBURGER. OSTP is actively engaged with the relevant Federal agencies and OMB in discussions aimed at developing and implementing investment criteria for R&D, as mandated by the President's Management Agenda. This effort includes a working group formed under the National Science and Technology Council, which is staffed and chaired by my office. This working group is actively discussing approaches to implement the investment criteria. This forum provides input to the implementation of the criteria, which will improve the management of the Federal R&D process.

As a point of clarification, the DOE Office of Science received an "effective" rating for its overall program performance. Only NSF received a "green light" in any of the management initiatives, and that was for its financial management practices.

50. Senator BINGAMAN. Dr. Marburger, do you think this review of a coveted green light is equitable when no increase is given?

Dr. MARBURGER. I do. The effectiveness ratings provide a tool to help make funding decisions, but they do not directly correspond to funding increases or decreases. Decisions on a funding level for a particular program will depend on the specific circumstances of that program, including reasons it is effective or ineffective. For example, DOE's Office of Science was rated "effective" because it met or exceeded expected performance within the resources available. In other cases, a program rated "ineffective" might receive a funding increase if it was determined that additional funding would be the best way to improve program performance.

QUESTIONS SUBMITTED BY SENATOR BOB SMITH

NUCLEAR WEAPONS EFFECTS

51. Senator SMITH. Dr. Younger, in recent testimony before the House Armed Services Committee, General Kadish reaffirmed that the WMD threat, including adversarial use of nuclear weapons, has not abated. It continues to evolve as our adversaries advance technologically. In his recent foreword to the Nuclear Posture Review, Secretary Rumsfeld points out that since the end of the Cold War, the U.S. nuclear defense infrastructure has atrophied. I am also aware of recent reports confirming that the technical community that represents the total of U.S. capabilities for understanding and mitigating atmospheric nuclear weapons effects is at risk due to inadequate funding and management neglect. At the same time, the U.S. military and civilian infrastructure is becoming increasingly dependent on space assets for communications systems, surveillance and reconnaissance systems, and precision targeting/precision strike. All of these systems rely on satellites and ground-to-space links using evolving technologies which can be vulnerable to the effects of nuclear weapons. It is my understanding that significant vulnerability issues have not yet been evaluated and mitigation strategies developed. The responsibility for maintaining nuclear weapons effects capabilities rests with, DOD and DTRA, as its agent.

As the new Director of DTRA, what is your position on the status of the capabilities for modeling, predicting, and mitigating the effects of nuclear weapons in the atmosphere and space and what plans do you have to address the growing evidence that increased funding and management attention is required to maintain a critical level of capability in this technical area?

Dr. YOUNGER. As the world has changed since the end of the Cold War, the nature of threats to the United States has become much broader than the past. With a broader range of credible asymmetrical threats to our nation's security, the resources we focused on nuclear weapons in past decades are applied to a broader set of WMD technical issues. Thus, we must rely on the decades of data collected from atmospheric and underground tests, coupled with the expanding capability to conduct ever more realistic simulations of nuclear weapons to maintain a core expertise for nuclear weapons effects. Unfortunately, the state of our government and industry team has been slowly eroding over the past decade. Our challenge is to apply limited resources to maintain the expertise on the effects of the traditional large nuclear weapons while also working on the issues of the 21st century. There is not an easy solution to the long-standing issue of the atrophying base of expertise, but it is one that DTRA is addressing before the critical mass of expertise vanishes. I have begun two efforts in nuclear weapons effects. The first is a study of what is required to maintain an understanding of relevant phenomena. This includes experimental and test facilities, modeling, archiving of past data, and the training of new technical experts. Secondly, I am working with industry, where another source of expertise in nuclear weapons effects resides, to help establish a sustainable nuclear base in this important area.

52. Senator SMITH. Dr. Younger, I am aware of some discussion for the establishment of the Nuclear Weapon Effects Institute, which, if constituted correctly, appears at this level to be a viable long term solution for maintaining a responsive national technical infrastructure for nuclear weapons effects matters. However, I note that there is no request for funding for the institute and I am not yet aware any effort to address the fragile health of the nuclear weapons effects technical community in the near-term. I am concerned that what remains of the expertise in the current community, which will be required in the establishment of a viable institute, will be lost.

How do you propose to address the funding and management requirements for reconstituting the nuclear weapons effects technical community in the near term while diverting funds to the establishment of the Nuclear Weapon Effects Institute?

Dr. YOUNGER. We are considering this among other alternatives but have made no formal decision.

DEFENSE THREAT REDUCTION AGENCY

53. Senator SMITH. Dr. Younger, the charter given by Congress to DTRA (and its predecessor agencies) in nuclear matters calls for the Agency to be the primary DOD resource for all information, research, analysis, and technology relating to effects of nuclear explosions. Nuclear weapon technologies have proliferated beyond the original superpowers, and today we have grave concerns about nuclear threats from a number of adversaries. Consequently, I believe it is important that the DTRA program for nuclear weapon effects of many varieties be actively pursued by the Agency. Can you summarize for the efforts the Agency is currently undertaking in each of the following technical areas:

1. Nuclear effects pertinent to mid-course missile defense systems;
2. Nuclear effects pertinent to boost-phase and terminal missile defense systems (quite different since detonations associated with these systems would be in the atmosphere rather than space);
3. Nuclear effects that impact the operations of communications systems, the global position system used most effectively for precision targeting and precision strike, and space-based surveillance systems;
4. Nuclear effects that degrade or destroy satellite assets through radiation effects;
5. Nuclear effects that relate to the survivability and functionality of our offensive missile systems; and
6. Nuclear effects on the national infrastructure, including effects such as electromagnetic pulse.

In your response, I would like to know the funding level for each of these topic areas, along with an estimate of the number of DTRA staff and technical contractor personnel involved.

Dr. YOUNGER. The DTRA Nuclear Weapons Effects Technology supports a wide customer base. Warfighters and weapon systems, including the associated Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance equipment, missile defense and support systems/equipment, must be able to survive and operate effectively through a spectrum of hostile environments. DTRA efforts emphasize the development and demonstration of innovative and cost effective technologies to sustain the functional survivability of U.S. and Allied Forces and systems when confronted with threats from advanced conventional weapons, special weapons and limited nuclear attack.

The DTRA Nuclear Technology program constitutes the DOD's resident S&T expertise in nuclear phenomenology and mitigation technology. It develops and demonstrates affordable strategies and hardening technologies for U.S. systems; transfers the technical products to acquisition program offices; conducts component, subsystem, system and end-to-end performance tests and assessments as requested by the Services and CINCs; and provides support to the Office of the Secretary of Defense on technical and policy matters that relate to the acquisition of survivable systems and strategic system sustainment. The program also provides the S&T basis for use of the nuclear stockpile as a realistic deterrent against the use of VMD by foes of the U.S. and our allies. DTRA's Nuclear Technology Program provides a balance between direct response to specific customer needs and a rigorous R&D program to provide technology solutions to anticipated future requirements.

The DTRA Nuclear Technology has four major thrusts. First the Radiation Hardened Microelectronics projects respond to DOD space and missile system requirements for hardened microelectronics and photonics technology to support mission needs. This activity is done in coordination with the DOD, USD (AT&L) Radiation Hardened Electronics Oversight Council (RHOC) roadmap to ensure coordination with DOD program requirements. Second, the Nuclear Phenomenology projects develop a full spectrum of analytical tools for evaluating battlefield survivability and lethality; develops instrumentation to quantify risks for warfighters in radiation environments; and captures, archives, and adapts WMD knowledge to apply to emerging DOD challenges. Third, the Simulation and Assessment Technology program develops technologies and provides assistance to ensure system operability and survivability in nuclear weapon effects environments. This is accomplished by providing response models, radiation simulators, testable design protocols, hardware-in-the-loop test technologies, and assessments for CINCs and SPOs to determine operability in a nuclear environment. Finally, the EM and Infrastructure Protection projects provide the science and technology to ensure protection of military and civilian in-

frastructure electronic systems against multiple electromagnetic (EM) environments, including nuclear electromagnetic pulse and high power microwaves, as well as WMD threats.

The following summarizes the efforts the Agency is currently undertaking in each of the technical areas of interest by the committee. Please note that there is extensive overlap of the nuclear weapon effects programs (and resources) for the specified technical areas. For example, our work on understanding and mitigating the effects of electromagnetic pulses (EMP) spans the areas of missile defense, communications systems, offensive missile systems, and the National infrastructure.

1. Nuclear effects pertinent to mid-course missile defense systems. Many of DTRA's nuclear weapons effects projects described above deal with portions of the technical issues related to mid course missile defense systems. These systems are required to operate in a potential space nuclear environment and encompass the actual kill vehicles, sensors, communications, and associated ground sites. The nuclear environment includes effects from ionizing radiation, the electromagnetic pulse, and disturbed environment effects. Portions of the efforts from all four program areas relate to this technical area.

2. Nuclear effects pertinent to boost-phase and terminal phase and terminal missile defense systems (quite different since detonations associated with these systems would be in the atmosphere rather than in space). The nuclear effects would be quite different since the ionizing radiation from the burst would be absorbed by the surrounding atmosphere (range for absorption very height/density dependent). However, if the nuclear event is above about 20 kilometers, the gamma rays interacting with the atmosphere would still produce an electromagnetic pulse that could effect the supporting ground systems. Therefore, parts of the program dealing with assessments of intercept scenarios, the additional effects of Source Region EMP (if the nuclear event is close enough to the surface that the fireball diameter touches the ground), and phenomenology efforts related to the output of the device, electromagnetic effects, and potentially other codes related to blast, shock, and thermal effects (again depending upon the height of the event) are relevant to this technical area.

3. Nuclear effects that impact the operations of communications systems, the global position system used most effectively for precision targeting and precision strike, and space-based surveillance systems. The effects on these systems would be the result of a nuclear event at any altitude, hence parts of all 4 areas in the nuclear program are relevant and portions of the resources allocated, based upon judgment of proportion for these specific systems.

4. Nuclear effects that degrade or destroy satellite assets through radiation effects. Again, many of the programs described above include effects on the supporting satellite systems related to a missile defense system. While a missile defense scenario is normally concerned with approximately a 30-minute window, there are also longer-term effects from "pumping" the natural radiation belts that could produce persistent effects on satellite assets for many months. This effect is related to DTRA's phenomenology and hardened microelectronics efforts.

5. Nuclear effects that relate to the survivability and functionality of our offensive missile systems. The offensive missile system includes the entire end-to-end architecture from the space- and land based sensors and radars, to the command, control, and communications systems, to the actual delivery systems. These systems must be survivable from nuclear bursts at any altitude. Hence, there is again considerable overlap with the technical areas described in the first two questions. Not only is their overlap in some of the satellites and ground support facilities for both missile defense and offensive systems, the related phenomena and effects are the same. In addition to the above programs, efforts within the phenomenology program relate to the effectiveness/functionality of the offensive systems in producing the desired effects. Resources are allocated by the estimated portions of the nuclear program described above dealing with the offensive missile assets.

6. Nuclear effects on the National infrastructure, including effects such as electromagnetic pulse. In addition to efforts focused directly on EMP, the Electromagnetic Protection Technology Program includes the Mission Degradation Analysis program and management of DOE execution of the National Infrastructure Simulation and Analysis Center. Both of these efforts are directed at various threats to the National infrastructure and related networks, and can be extended to include nuclear effects. Portions of the Phenomenology program dealing with the electromagnetic pulse, as well as maintenance/upgrade of existing codes dealing with blast/shock/thermal effects are included in this area.

Due to the overlap of the four thrusts of the DTRA Nuclear Technology Program in each of the six areas above, it is not possible to precisely allocate the funding and personnel to each area. For fiscal year 2003 President's Budget Request, the

DTRA Nuclear Technology RDT&E is $111 million and there are 51 government personnel, 20 support contractors and approximately 300 scientists and engineers in industry supporting the program.

CHEMICAL DEMILITARIZATION PROGRAM

54. Senator SMITH. Dr. Klein, although this is a subject not under consideration at today's hearing, due to the national and international importance of the chemical demilitarization program, I am compelled to make the following inquiry and wish to solicit your response. In December, the Secretary of Army announced the transfer of the chemical demilitarization program from the Assistant Secretary for Acquisition, Logistics, and Technology (AS–ALT) to the Assistant Secretary for Installations and Environment (AS–I&E), Dr. Mario Fiori. Currently, the chemical demilitarization program is a Major Defense Acquisition Program (Acquisition Category ID) with milestone decision authority residing with OSD Under Secretary Aldridge. Moreover, in responding to this committee's questions in November, you indicated that your duties include oversight of this program.

Since this is an acquisition program under Under Secretary Aldridge, why is oversight of the program within the Army and now outside the acquisition elements of the Army (AS–I&E)?

Dr. KLEIN. The Milestone Decision Authority for the DOD Chemical Demilitarization Program, as an Acquisition Category I–D program, will continue to reside within the OSD acquisition community. I am actively involved with senior Army officials regarding the chemical demilitarization program [and currently meet with them each week] to maintain program oversight. The December 2001 Army decision to place AS–I&E in charge of the program is subject to Office of the Secretary of Defense review and indeed is under review. It is premature to state whether or not the program will remain outside the acquisition elements of the Army.

55. Senator SMITH. Dr. Klein, is it true that current Assistant Secretary of Army for Installations and Environment, Dr. Mario Fiori, is pursuing the transfer of this program away from the acquisition oversight and authority completely?

Dr. KLEIN. I am of the firm view that the chemical demilitarization program will remain under Office of the Secretary of Defense acquisition oversight and authority. To this end, I currently meet weekly with Dr. Fiori and other key staff members and the same individuals will meet monthly with the Under Secretary of Defense (Acquisition, Technology, and Logistics). The Milestone Decision Authority for the DOD Chemical Demilitarization Program, as an Acquisition Category I–D program, will continue to reside within the OSD acquisition community.

56. Senator SMITH. Dr. Klein, do you support removing this program from under the acquisition oversight authority? How would you view this type of action?

Dr. KLEIN. I am of the firm view that the chemical demilitarization program will remain under the Office of the Secretary of Defense acquisition oversight and authority. The Milestone Decision Authority for the DOD Chemical Demilitarization Program, as an Acquisition Category I–D program, will continue to reside within the OSD acquisition community. Accordingly, I would resist an effort to remove OSD acquisition oversight authority from the chemical demilitarization program.

QUESTIONS SUBMITTED BY SENATOR TIM HUTCHINSON

VACCINE ACQUISITION

57. Senator HUTCHINSON. Dr. Klein, I have grave concerns about our military's vaccine acquisition strategy. We do not have vaccines available for a variety of biological weapons that we know are being produced by our enemies. Iraq continues to develop increasingly virulent pathogens. One of my greatest fears is that al-Qaeda, or another terrorist group, utilizes these kinds of weapons against the military or the American people. Do you agree that vaccination is the best protection against biological weapons? Do we have access to adequate vaccine stocks for ricin?

Dr. KLEIN. Vaccines offer the best protection in terms of performance and cost, if we know a threat exists and have time to immunize. For the surprise attack or untoward event, we need other products that provide immediate immunity or protection. Vaccines, drugs, and therapeutics are complementary, and the DOD must look at protection against biological weapons from a systems standpoint. Newer immune globulin preparations (e.g., monoclonal antibodies) and non-specific immune

stimulators may add to our arsenal. However, the costs for these products are not cheap, and they will take time to develop and license.

Ricin is an easily manufactured toxin by-product of the castor bean industry. It is highly lethal when injected but far less effective when inhaled or ingested. The DOD is currently funding applied research on a new vaccine against ricin, however, a vaccine will not be available for many years.

CHEMICAL/BIOLOGICAL DEFENSE

58. Senator HUTCHINSON. Dr. Klein, the opening statements would indicate that the DTRA is the singular DOD agency for defense from WMD that is nuclear and chemical/biological defense. Given that Congress in P.L. 103–160 directed the establishment of a Joint Services Chemical and Biological Defense Program with the Army as Executive Agent, how does this dominant DTRA role in chemical/biological defense fit within the law?

Dr. KLEIN. The Defense Threat Reduction Agency (DTRA) is a Combat Support agency that provides support to the warfighting Combatant Commanders for all aspects of chemical and biological defense. DTRA currently works for the Assistant to the Secretary of Defense (Nuclear, Chemical and Biological Defense Programs) who also has responsibility, mandated in P.L. 103–160, for the Chemical Biological Defense Program (CBDP). DTRA works within the current framework of and supports the CBDP to ensure an integrated chemical and biological defense research, development and acquisition program is maintained.

59. Senator HUTCHINSON. Dr. Klein, how does the Secretary of the Army's duties as Executive Agent for chemical/biological defense align with the Director of DTRA's role? Is there a duplicative function engendering confusion and unnecessary cost?

Dr. KLEIN. The Chemical and Biological Defense Program (CBDP) was established by 50 U.S.C. 1522 in 1994. Since the inception of the CBDP, there have been numerous changes in the worldwide environment regarding chemical and biological threats resulting in its growth. As part of the increased emphasis to address threats from weapons of mass destruction, the DOD established the Defense Threat Reduction Agency (DTRA) on October 1, 1998. DOD is analyzing and reviewing the functions of the CBDP with the Army, as Executive Agent, and DTRA to ensure we have a management structure that is streamlined and responsive to meet the ever growing chemical and biological threat. Steps are being taken in consultation with Army and DTRA officials to develop a management structure that is more efficient.

60. Senator HUTCHINSON. Dr. Klein, the services, specifically the Army, has had the lead role for chemical/biological defense for 85 years. The services have the chemical/biological defense force structure, research and development infrastructure and acquisition work force/resources to satisfy the Service Secretary's Title 10 responsibilities. Would it not make more sense for the responsibilities to continue to be executed by the services with Army lead and OSD ATSD (NCB) oversight to integrate the nuclear and chemical/biological defense?

Dr. KLEIN. The Department of Defense is certainly aware of the experience and breadth of expertise offered by the Army in the defense against chemical and biological (CB) agents. Because of the increased threat from CB agents and the increased scope and emphasis on CB defense, the Under Secretary of Defense (Acquisition, Technology and Logistics) chartered a comprehensive analysis of the current management structures supporting this effort. Once complete, the Under Secretary of Defense (Acquisition, Technology and Logistics) will approve a reorganization that will provide a streamlined and responsive program while ensuring that the warfighters needs and Title 10 responsibilities are addressed.

QUESTIONS SUBMITTED BY SENATOR MARY L. LANDRIEU ON BEHALF OF SENATOR CONRAD BURNS

10 April 2002.

Senator MARY LANDRIEU,
Chairman, Emerging Threats and Capabilities Subcommittee,
Senate Armed Services Committee,
United States Senate,
Washington, DC.

DEAR CHAIRMAN LANDRIEU. On April 10, 2002, the Emerging Threats and Capabilities Subcommittee held a hearing on technology for combating terrorism and weapons of mass destruction in review of the Defense Authorization Request for Fiscal Year 2003. I would appreciate it if the following questions for the record that I have could be submitted to The Honorable Ronald Sega, Director, Defense Research and Engineering, for response.

Thank you for your continued support of our Nation's Armed Forces. I look forward to working with you in the days and weeks to come. As always, if I can be helpful in any way, please do not hesitate to let me know.

Sincerely,

CONRAD BURNS,
United States Senator.

ACQUIRING NEW TECHNOLOGIES

61. Senator BURNS. Dr. Sega, how is the DDR&E's Domestic Technology Transfer Program helping the DOD to identify and acquire innovative technologies for combating terrorism that are being developed by the private sector?

Dr. SEGA. The DOD Domestic Technology Transfer Program, managed from my office, promotes transfer of DOD-developed technologies to the private sector for commercial use, transfer of commercially developed technologies into the DOD for military application, and joint development of technologies for both military and commercial applications. This is accomplished by the Military Departments and Defense Agencies through a variety of technology transfer mechanisms such as Cooperative Research and Development Agreements (CRADAs), Patent License Agreements (PLAs), Educational Partnership Agreements (EPAs), testing agreements, and programs such as the Small Business Innovation Research (SBIR) program. While this is not an exhaustive list, some examples where technology transfer tools are used to identify and acquire innovative technologies for combating terrorism are:

- Army CRADA for technical evaluation of an optics-based, rapid pathogen identifying device, designed to recognize pathogens in real-time from food and water samples.
- Army CRADA to conduct collaborative research and development towards an optimal fermentation process for CC10, a recombinant human protein, and to collaborate on related issues such as scale-up, purification, characterization, and biological activity.
- Navy for nine licensed patents to produce an explosives detection scanner for use in airports to detect small quantities of concealed explosives in carry-on baggage.
- Air Force CRADA to perform Research and Development (R&D) on the production of reagents that facilitate detection of anthrax in the environment and in biological systems.
- Air Force CRADA to perform R&D on the testing and evaluation of a prototype of an effective, yet economical, glovebox designed for use in handling materials and/or objects that are potentially contaminated with biological agents.

The Department's Dual Use Science and Technology (S&T) program also plays a role in helping identify and acquire innovative technologies being developed by the private sector that can be used for combating terrorism. One example of the technologies with application to counter-terrorism is the testing of the use of selectively permeable membrane technology fabric systems for military and civilian clothing applications (e.g., HAZMAT protective clothing). These selectively permeable membrane based garments are extremely thin, lightweight, flexible, waterproof, and allow water vapor through their membrane structures thus minimizing heat stress to the users, while resisting permeations of toxic chemical vapors and dangerous microorganisms in liquid, vapor, and aerosol forms. Another example of a technology being developed through the Dual Use S&T program is the world's smallest infrared camera. The camera can be mounted on soldiers' weapons or helmets and also has

wide application by firefighters in smoke-filled environments. The camera was used in part of the search and rescue operation at the World Trade Centers.

COMMERCIALIZING DOD DEVELOPMENT

62. Senator BURNS. Dr. Sega, how successful has the Technology Transfer Program been at commercializing new technology developed by the DOD's research laboratories, so that this technology is cost-effective and readily available for homeland security and the war on terrorism?

Dr. SEGA. DOD is actively working to encourage commercial applications for technologies originally developed for military applications. In line with 15 USC 3710(a)(2) and (3), and to encourage participation in the technology transfer program, our scientists and engineers job performance is based partly on their technology transfer efforts. In addition to joint development with industrial partners using Cooperative Research and Development Agreements CRADAs, cooperative agreements, and other partnership vehicles, we have seen an increase in DOD-held patents licensed to the private sector which attest to the success of this program. In fiscal year 2001, there were 283 active patent license agreements for use of DOD-developed technologies. Some examples of those which relate to homeland security and the war on terrorism are:

- Survival, Inc., in Seattle, WA, is working with the U.S. Navy's Naval Surface Warfare Center, Dahlgren Division, to evaluate a Navy-developed bio/chemical decontamination compound for use in cleanup of contaminated sites. Survival, Inc. plans to license the technology and make it available to the U.S. military and first-responders in the domestic market.
- Quantum Magnetics, Inc., in San Diego, CA, signed patent license agreements with the U.S. Navy's Naval Research Laboratory for nine patents/patent applications for use in its line of QScan$_{TM}$ explosive detection devices. Quantum Magnetics QScan QR 160 is designed to detect small amounts of explosives concealed in mail, briefcases, purses, carry-on bags, and shoes. The QScan QR500 is designed to scan larger items, such as mail bags, boxes, and large suitcases.
- EnVirion, L.C. has licensed technology from the U.S. Army's Edgewood Chemical and Biological Center to produce and market a device and method for the detection and identification of submicron particles.
- The National Law Enforcement and Corrections Technology Center Northeast and its Law Enforcement Analysis Facility are using the Air Force Research Laboratory/Information Directorate's Web Enabled Timeline Analysis System (WebTAS). WebTAS is a computerized program which graphically plots events and presents visual and statistical data on timelines, graphs, tables, and maps. It can be used as a predictor of behavior or events and, by using an algorithm called the Temporal Transition Model, analysts take information about a suspect's behavior and use it to predict what the suspect might do next.

TECHNOLOGY TRANSFER AND SMALL BUSINESSES

63. Senator BURNS. Dr. Sega, how successful has DOD's Technology Transfer Program been at partnering U.S. small business with the DOD to develop, test, and rapidly transition innovative new concepts into war-winning capabilities?

Dr. SEGA. The Department's technology transfer program focuses on research and development of technologies for both military and commercial applications. We have over 2,000 active Cooperative Research and Development Agreements (CRADAs) with small and large business to jointly develop technologies to improve our war-winning capabilities. Approximately 40 percent of our CRADAs are with small business firms. "The Influence of Federal Laboratory R&D on Industrial Research," a paper prepared in response to the National Science Foundation grant, states, "Our results suggest that CRADAs may be more beneficial to firms than other public-private interactions, precisely because of the mutual effort that they demand of firms and government laboratories." In addition to CRADAs, the technology transfer program helps transition new concepts into war-winning capabilities by licensing DOD-developed technologies to U.S. companies that, in turn, commercially produce this technology to support the DOD mission.

To give a brief example of recent successes, one DOD Technology Transfer program partnership intermediary has facilitated 62 different technology transfer partnerships between the DOD and U.S. companies in a little over 2 years. These include 22 CRADAs and 11 patent licensing agreements.

64. Senator BURNS. Dr. Sega, how successful have DOD's partnership intermediaries, such as the TechLink Center at Montana State University, been at developing partnerships between the DOD and U.S. small business for new technology development and commercialization?

Dr. SEGA. The TechLink Center at Montana State University (MSU) is the only Defense Department-wide partnership intermediary. The Air Force has four partnership intermediaries and is the executive agent for TechLink. Partnership intermediaries have been successful in assisting the DOD and U.S. small business develop partnerships for new technology development and commercialization. The TechLink Center at MSU, in the 2½ years it has been supporting DOD, facilitated 62 partnership arrangements involving Army, Navy, Air Force, and Defense Agencies, including 6 company start-ups around DOD-related technologies. TechLink has assisted 11 small companies in licensing DOD technologies for commercial use and has facilitated 22 partnerships between DOD laboratories and private sector companies in the northwestern United States to jointly develop new technology with both military and commercial applications. TechLink is helping small companies succeed in the DOD Small Business Innovation Research program. TechLink is encouraging small companies to submit summaries of their research into the DOD Independent Research and Development database, including technology for combating terrorism.

[Whereupon, at 11:14 a.m., the subcommittee adjourned.]