

SCIENCE AND TECHNOLOGY ON A BUDGET: FIND-
ING SMARTER APPROACHES TO SPUR INNOVA-
TION, IMPOSE DISCIPLINE, DRIVE JOB CRE-
ATION, AND STRENGTHEN HOMELAND SECUR-
ITY

HEARING

BEFORE THE

SUBCOMMITTEE ON CYBERSECURITY,
INFRASTRUCTURE PROTECTION,
AND SECURITY TECHNOLOGIES

OF THE

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HOUSE OF REPRESENTATIVES

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**SCIENCE AND TECHNOLOGY ON A BUDGET:
FINDING SMARTER APPROACHES TO SPUR
INNOVATION, IMPOSE DISCIPLINE, DRIVE
JOB CREATION, AND STRENGTHEN HOME-
LAND SECURITY**

Thursday, November 17, 2011

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON HOMELAND SECURITY,
SUBCOMMITTEE ON CYBERSECURITY, INFRASTRUCTURE
PROTECTION, AND SECURITY TECHNOLOGIES,
Washington, DC.

The subcommittee met, pursuant to call, at 10:04 a.m., in Room 311, Cannon House Office Building, Hon. Daniel E. Lungren [Chairman of the subcommittee] presiding.

Present: Representatives Lungren, Walberg, Thompson, and Richardson.

Mr. LUNGREN. The Committee on Homeland Security Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies will come to order.

The subcommittee is meeting today to examine Science and Technology Directorate and its operations in the current fiscal climate. I want to begin this hearing by emphasizing my strong support for science and technology research and development. I think you will find that across both ends of the spectrum and both sides of the aisle.

I believe scientific R&D generates innovation, cutting-edge technologies, and new products to drive economic development and job creation. R&D is also a critical element of the Department's mission to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions to bolster our homeland defenses.

The Homeland Security Act broadly authorizes the Under Secretary for Science and Technology to conduct research, development, testing, and evaluation activities for the Department, utilizing National labs and Federally-funded research and development centers.

In reviewing the Department's use of these authorities in recent years, our Homeland Security Committee has determined that accountability and internal procedures essential to the Department's ability to perform its research and development mission were insufficient. This conclusion was informed by a 2009 National Academy of Public Administration study that found that S&T strategic plan-

ning process and organizational structure created serious challenges across the agency.

So as a result, S&T experienced management challenges to its multimillion-dollar technology, development, and acquisition efforts in support of the Department's many missions, including securing the border and screening airline passengers and baggages for explosives.

Our committee had addressed these process and procedure deficiencies in last year's S&T authorization bill, H.R. 4842, and again in this year's DHS Authorization Act of 2012, H.R. 3116.

Our objective is to establish robust management in administrative processes for identifying, prioritizing, and funding R&D in order to enhance the long-term productivity and effectiveness of the Directorate. The act also codifies S&T's role in providing technical support throughout the acquisition life-cycle, requires a 5-year research and development plan to better inform expenditures for basic, advanced, and applied R&D activities, and provides flexible hiring authority so S&T can recruit skilled personnel into key scientific and engineering positions.

In this new era of fiscal restraint, S&T must change the way it does business and convince Congress and other stakeholders that it knows how to be smarter and more efficient by realigning its priorities and investments for its customers. It accomplished this by developing a more robust technology to determine how to prioritize research products, fund those products, assess their progress, transition them into acquisition programs and, finally, deploy them to the field.

In August 2010, Under Secretary O'Toole responded to these deficiencies by reorganizing her S&T Directorate to better align it with strategic goals, to allow for easier interaction among senior leadership, and to reduce the number of direct reports to the Secretary from 21 to 10. The realigned structure consolidates the S&T Directorate into four primary entities that address basic research through advanced technology, development, and transition.

I also want to compliment the Under Secretary for instituting an annual portfolio assessment of your R&D programs to help identify those that are underperforming and find cost savings, as well as for pursuing approaches such as technology foraging that aim to improve S&T's return on investment and to shorten development time.

When resources are constrained and unpredictable, it behooves S&T to adopt a more deliberate and targeted foraging effort, and I look forward to hearing how S&T will go about implementing.

Under Secretary O'Toole, I am pleased that the Department has taken these low-cost steps to improve your Directorate, and I hope these changes quickly yield increased performance, productivity, and efficiency. We are aware of the current economic climate and the uncertainty that comes with it is forcing you to make tough decisions.

A frugal man's approach to science and technology doesn't mean you have to compromise on performance. It means we all have been smarter about what we invest in and how we make it count. As Chairman of the Congressional oversight committee for this responsibility at DHS, we will monitor your progress to ensure our Nation

has the Homeland Security S&T capability we all desire. Homeland Security investments in R&D should be nonpartisan, and I look forward to working with you and the administration to upgrade the critical security missions of the Department.

Now I would recognize the gentlelady from California, who is pinch-hitting for the Ranking Minority Member, the gentlelady from New York.

Ms. Richardson is recognized for any statement she might make.

Ms. RICHARDSON. Thank you, Chairman Lungren, for convening this hearing, and also Ranking Member Thompson for all of your support in this effort, both in the past and continuing today.

S&T is an essential component of the Department's efforts, and I know many of us are eager here today to hear about the accomplishments and the priorities that have been set, especially since we concluded our authorization hearing last year.

Dr. O'Toole, it is good to see you back on to this subcommittee, and Mr. Maurer—and I apologize if I butchered your name there a little bit. Thank you, thank you for giving us your perspective today, and we are pleased to have you here.

In 2009, spurred by the findings of several reports, this committee and subcommittee initiated a comprehensive review, as Chairman Lungren laid out. Our purpose was to identify areas within the Directorate that could use a fresh set of eyes and additional oversight or modifications to legislative authorities.

In doing so, we reviewed the Homeland Security Act and the Department's use of its authorities that Congress has vested in it.

It might be said that with such a large and complex portfolio, the Directorate has found it difficult to craft a cohesive strategy, and we found the insularity that defines its culture was reflected in the lack of mechanisms necessary to assess its performance in a systematic way.

Our analysis also suggested that the Department had not developed a clear risk-based methodology to determine what research projects to fund, how much to fund them, and how to evaluate the project's effectiveness and usefulness. Without clearly-defined metrics, it becomes problematic for Congress to justify increases in programmatic funding. I am anxious to hear any of the strides that you have been able to make in regards to these concerns that we have already laid out.

Additionally, the Majority in the House has passed a proposed DHS budget, H.R. 2017, which radically cuts the Department's S&T budget from \$827 million down to \$398 million. Now, I believe in being frugal, but the question is really: Are these adequate resources to protect our homeland? When you consider S&T reductions are a part of the \$1.1 billion reductions in the DHS overall budget, the proposed DHS budget is \$1 billion lower than the full year 2011 funding level and \$3 billion lower than the President requested.

I have read that DHS officials say that the decrease in S&T budget will wipe out dozens of programs, stalling the development of technologies for our border protection, detection, and biohazards; hinder our progress of where we are trying to go with cargo screening, and leaving in doubt research on IED detection; affecting our ability to assess vulnerabilities for mass transit.

Striving to do more with less is always a hallmark that we strive for, however, but doing that at the expense of failing to protect citizens and this Nation with programs that are backed, that cannot be fully funded, is of great concern.

Our serious concerns are ones that I will ask you today in this hearing, is: What are the implications on the possible deliverables that the Directorate is now facing due to Congress' appropriation priorities? This committee needs a realistic assessment on the record of those implications.

Thank you, Mr. Chairman, and I yield back the balance of my time.

Mr. LUNGREN. The Chairman will now recognize the Ranking Member of the full committee, the gentleman from Mississippi, Mr. Thompson, for any statement he might make.

Mr. THOMPSON. Thank you very much, Mr. Chairman, and, again, I thank you for holding this hearing on the Science and Technology Directorate. I also join you in welcoming Under Secretary O'Toole and Mr. Maurer and look forward to their testimony.

Many of my concerns, however, about the Science and Technology Directorate stem from my work on the committee last year. During my Chairmanship, we all worked hard to pass a science and technology authorization bill which sought to provide much-needed direction for the research and development efforts of the Department. Today we find ourselves at a new crossroads, for several reasons.

First, I am concerned that the Department does not have adequate training that would allow program managers to help components identify capability gaps and write technical requirements. I hope to learn how we can keep essential personnel and train them in light of these severe budget cuts.

Second, it is still unclear to me whether there is a system to monitor milestones and collect feedback from customers and end-users on the effectiveness of the services delivered by the Directorate. These milestones and feedback would allow our committee to offer an objective assessment of the successes and failures of agencies. Without effective measurement tools, I question how S&T will be able to continue to develop security solutions.

Third, I cannot tell you how many times a company, mainly small businesses, comes to me and complains about how difficult it is to work with S&T.

I hope our witnesses have some evidence to share on how those relationships have been improved and the potential impact of budget cuts on our outreach efforts, particularly in SBIR for small business at the Department.

Finally, I believe we are at a new crossroads because the Directorate will be challenged to prioritize or eliminate programs that protect the American people today. With the support of many of my Republican colleagues, extreme budget cuts have now impacted the important work the Department has been challenged to complete.

The fiscal year 2012 funding levels for the Department that passed in the House, with no support from Democratic Members of this panel, are harsh in anyone's reckoning. It manages to cut S&T's budget 52 percent, from \$827 million to \$398 million. These

cuts have consequences, because if you have less money for science and technology, you can only do less scientific and technological research. On the surface, the S&T budget at the level of the proposed cuts will eliminate over 1,400 science and engineering jobs, wipe out dozens of programs, stall the development of technologies for border protection, detection of biohazards, cargo screening, and limit research in the domestic IED detection that will leave mass transit vulnerable to attack.

It is almost impossible to believe. Mr. Chairman, I hope the committee will take these matters seriously as we learn how the Directorate will carry out its strategic plan, management directives, and operational programs going forward.

With that, I thank you for allowing me to give my opening statement, and I yield back.

[The statement of Ranking Member Thompson follows:]

STATEMENT OF RANKING MEMBER BENNIE G. THOMPSON

NOVEMBER 17, 2011

Good Morning, Mr. Chairman, and thank you for holding this hearing on the Science and Technology Directorate.

I join you in welcoming Under Secretary O'Toole and Mr. Maurer and look forward to their testimony.

Many of my concerns about the Science and Technology Directorate stem from our work in the committee last year.

During my Chairmanship, we all worked hard to pass a Science and Technology authorization bill which sought to provide much-needed direction for the research and development efforts of the Department.

Today, we find ourselves at a new crossroads for several reasons.

First, I am concerned that the Department does not have adequate training that would allow program managers to help components identify capability gaps and write technical requirements.

I hope to learn how we can keep essential personnel and train them in light of severe budget cuts.

Second, it is still unclear to me whether there is a system to monitor research milestones and collect feedback from customers and end-users on the effectiveness of the services delivered by the directorate.

These milestones and feedback would allow this committee to offer an objective assessment of the successes and failures of the agency.

Without objective measurement tools, I question how S&T will be able to continue to develop security solutions.

Third, I cannot tell you how many times a company, mainly small businesses, comes to me and complains about how difficult it is to work with S&T.

I hope our witnesses have some evidence to share on how those relationships have been improved, and the potential impact of budget cuts on our outreach efforts, particularly in SBIR for small business at the Department.

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The measure cuts the S&T budget by 52 percent—from \$827 million to \$398 million.

The cuts will have consequences, because if you have less money for science and technology, you can only do less scientific and technological research.

On the surface, S&T's budget at the level of the proposed cuts will:

- eliminate 1,400 science and engineering jobs;
- wipe out dozens of programs;
- stall the development of technologies for border protection, detection of bio-hazards, cargo screening; and

- limit research into domestic IED detection that will leave mass transit vulnerable to attacks.

It is almost impossible to believe.

Mr. Chairman, I hope the committee will take these matters seriously as we learn how the directorate will carry out its strategic plans, management directives, and operational programs going forward.

Thank you, and I yield back.

Mr. LUNGREN. I thank the Ranking Member.

Other Members of the committee are reminded that opening statements may be submitted for the record.

[The statement of Ranking Member Clarke of New York follows:]

STATEMENT OF RANKING MEMBER YVETTE D. CLARKE

NOVEMBER 17, 2011

Thank you Chairman Lungren for convening this hearing on the Science and Technology Directorate. S&T is an essential component of the Department's efforts, and I know many of us are eager to hear about accomplishments and priorities at the directorate, especially since we concluded our authorization hearings last year.

Dr. O'Toole, it is good to see you back before this subcommittee, and Mr. Maurer, thank you for agreeing to give us your perspective, and we are pleased to have you here today.

In 2009, spurred by the findings of several reports, this committee and subcommittee initiated a comprehensive review of the Directorate. Our purpose was to identify areas within the Directorate that could use a fresh set of eyes and additional oversight or modifications to legislative authorities. In doing so, we reviewed the Homeland Security Act and the Department's use of the authorities the Congress has vested in it.

With such a large and complex portfolio, the Directorate has found it difficult to craft a cohesive strategy, and we found that the insularity that defines its culture was reflected in the lack of mechanisms necessary to assess its performance in a systematic way.

Our analysis suggested that the Department had not developed a clear risk-based methodology to determine what research projects to fund, how much to fund, and how to evaluate a project's effectiveness or usefulness. Without clearly-defined metrics, it becomes problematic for Congress to justify increases in programmatic funding.

In my opinion, the directorate will never achieve success unless research rules and metrics are more fully established, and I am anxious to hear of any strides that the Under Secretary may have made in these areas of concern.

However, we have additional challenges facing the directorate today.

Earlier this year, the Majority in the House passed a proposed DHS budget—H.R. 2017—which radically cuts the Department's S&T budget from \$827 million to \$398 million, and the S&T reductions are part of a \$1.1 billion reduction in DHS's overall budget. The proposed DHS budget is \$1 billion lower than the fiscal year 2011 funding level, and \$3 billion lower than the President's request.

I have read that DHS officials say the decrease in S&T's budget will wipe out dozens of programs, stalling the development of technologies for border protection, detection of bio-hazards, cargo screening; and leaving in doubt research on IED detection, affecting our ability to assess vulnerabilities for mass transit.

Striving to do more with less is always the hallmark of an efficiently run effort—of any type—but trying to protect our citizens and Nation with programs that are backed by underfunded and depleted science and technology research assets is another matter. There are serious concerns about what the directorate would have to give up as a result of the budget voted for by the Majority.

I look forward to the testimony of the Under Secretary and Mr. Maurer, especially to hear what strides she has made since our efforts last year, and I expect we'll have questions on how she will work to keep the Directorate moving forward during these challenging times. Thank you Mr. Chairman, and I yield back.

Mr. LUNGREN. We are pleased to have two very distinguished witnesses before us today on this important topic.

Dr. Tara O'Toole was sworn in as the Under Secretary of Science and Technology Directorate at the Department of Homeland Security in November 2009. She is internationally known for her work

in biosecurity and on health and safety issues relating to the U.S. nuclear weapons complex.

Prior to serving at S&T, Dr. O'Toole was CEO and Director of the Center for Biosecurity at the University of Pittsburgh Medical Center, and Professor of Medicine and of Public Health at the University of Pittsburgh from 2003 to 2009.

Prior to founding the University of Pittsburgh Medical Center, Dr. O'Toole was one of the original members of the Johns Hopkins Center for Civilian Biodefense Strategy, serving as its director from 2001 to 2003. At both centers, she created independent organizations dedicated to improving the country's resilience to major biological threats.

From 1993 to 1997, Dr. O'Toole served as the Assistant Secretary of Energy for Environment, Safety, and Health. In this position, she is the principal adviser to the Secretary of Energy on environmental protection, on the health and safety of the approximately 100,000 workers in the U.S. nuclear weapons complex in the Department of Energy laboratories.

Dr. David Maurer is a Director in the U.S. Government Accountability Office's Homeland Security and Justice team, where he leads GAO's work reviewing DHS' and DOJ's management issues. His recent work in these areas includes DHS management integration, the Quadrennial Homeland Security Review, Secret Service financial management, DOJ, grant management, the Federal prison system, and an assessment of technologies for directing explosives in the passenger rail environment.

I want to thank both of you for being here today. As you both know, having testified before, your prepared remarks will be included in the record in its entirety. We ask that you attempt to summarize that within 5 minutes, and then we will have questions from the panel.

So the Chairman recognizes Dr. O'Toole.

STATEMENT OF TARA O'TOOLE, UNDER SECRETARY, SCIENCE AND TECHNOLOGY DIRECTORATE, U.S. DEPARTMENT OF HOMELAND SECURITY

Dr. O'TOOLE. Thank you, Mr. Chairman, distinguished Members of the committee. I am very pleased to be here today to talk about the progress made in the Science and Technology Directorate.

Our mission, as you noted, Mr. Chairman, is to strengthen America's security and resiliency by providing innovative technologies and technologic analyses and assessments, knowledge products in other words, for the Homeland Security enterprise.

Since I became Under Secretary, the Directorate has undertaken a number of initiatives to enable us to work smarter and increase taxpayers' return on investment.

I believe we have answered and closed virtually all of the recommendations made by the NAPA committee in 2009, which I have closely studied. These initiatives aim to further our three top goals, which are: First of all, to rapidly transition successful technologies to use in the field; second, to identify and meet, again rapidly, the top needs of the U.S. first responder communities; and, third, to leverage the technical and scientific capacity of S&T scientists and engineers in ways that assist DHS components in their efforts to

improve operational effectiveness, gain efficiencies, and carry out the selection and acquisition of new technologies.

One of the first initiatives of my tenure was the adoption of a portfolio review process that is used by other very successful Governmental and private-sector labs, including ERDC in Mississippi. Every project in S&T now undergoes an R&D portfolio review. Each project is evaluated by a panel of outside experts, including representatives from the components, and scored against specific criteria to ensure that we are investing in projects that have high impact, that are technically sound, that are desired by and are aligned with our customers' priorities, are appropriately funded, and are progressing in the research queue adequately.

It was clear from the first portfolio review—we have done three of these now—that S&T was investing in far too many projects given our limited funding. So even when we had a successful prototype developed, very often it didn't go anywhere either because S&T didn't have the money to do pilot field tests and training, or because the components' priorities had shifted where they didn't have money or were prepared to move it into an acquisition phase. So we have now reduced the number of projects in our portfolio from 283 in 2010 to 158 today, a decrease of nearly 60 percent. I would point out this is before the fiscal year 2012 budget cuts hit.

This reduction in projects ensures that there is a clear focus to what we are doing, we have strategies worked out with each of the components as to what we are going to pursue. It also ensures that we have adequate resources on each project to ensure that they are funded through successful transition to use, whether that is from commercial adoption or adoption by the components.

The portfolio scoring scheme also ensures that we are pursuing the right mix of projects, based, again, on intense discussions with the component leadership and the operators. As a result of these and other changes, the number of projects in our portfolio, now deemed to be both high-impact and highly feasible—that is, likely to succeed—has almost doubled in the past 2 years from 38 to 63 percent.

This is, in the reckoning of the independent contractor who runs this process, a benchmark, a very high level of performance comparing to all of the other 50 or so R&D labs who used this particular portfolio review process.

Another initiative is our Apex projects, which were designed to enhance our contributions to strategic high-level problems identified by component leaders. They demonstrate a new model of working based upon multidisciplinary teams, very strong collaborative partnerships with the operators, and top-level commitment to the projects.

We have two of these underway. One is for the U.S. Secret Service and aims to strengthen their remote protective operations. It is proving very successful. Unfortunately, much of it is classified. A second one, called the Secure Transit Corridor, with CBT, which aims essentially to build an easy pass, a green lane that allows us to ship goods from Canada through the United States to Mexico and back very rapidly.

A key lesson that we learned in the Apex projects was that forging a true partnership between the technical team and the opera-

tors is really a key to success. An innovation throughout the world demonstrates this. If you have a deep, very clear understanding of the problem to be solved, which is best gotten by the people who have the problem—the operators—and a very lucid and comprehensive understanding of the technical options for solutions, that is when you get to success.

So we have tried to repeat that lesson in all of our work. In the future, S&T will be much more likely to invest our resources in an area where the operators—that is, components and first responder communities—are willing to actively collaborate with us from the beginning to the end of the project.

We have also adopted two approaches to increasing return on investment of our R&D initiatives. These two initiatives, referred to as technology foraging and collaboration with others—tech foraging refers to a very complex process of scanning the entire horizon of research and development going on across the global R&D community, including other Federal agencies, the private sector, universities, and international partners.

The point is to identify technologies which could be adopted or adapted to new environmental conditions, new purposes or at new scales, and applied to DHS needs. It leverages investments made by others and can also rapidly—it can increase the rapidity with which it can transfer new solutions to use in the field.

Let me just note two examples. One is the blackboard cover—I am sorry, the backboard cover. The backboards are the devices that emergency medical responders use to carry people out of an accident scene. A problem, which was identified by a first responder on our website, is that they get messy and contaminated with blood and other body fluids and there is no really fast, assured way to clean them off.

We went out and we found that Tyvex fibers, the stuff that you wrap houses in, are impermeable, cheap, and light. For \$60,000, in 8 months we had a product in the field, which is a very disposable, lightweight, cheap cover that is now in wide use.

A second example of tech foraging involves the repurposing of NOAA weather radars to track unidentified vessels entering our ports. We discovered that there is an existing radar system, which can be reprogrammed using software that allows a different processing of the radar signals so that we can ID and track boats that do not have inherent tracking and tagging systems, and we are doing this now with the U.S. Coast Guard. Very low-cost, again, and very rapid creation of a new capability for DHS.

The second initiative, which is quite important, is collaboration with others, which refers to joining as partners with other R&D organizations, whether the Federal Government, agencies, or universities, or the private sector, to create new technologies of use to DHS. There are many examples of this in my testimony, and I would be happy to elaborate further.

We have many very strong partnerships with the private sector, as evidenced by the fact that they are sharing the cost of R&D in many instances, and we have taken a lot of steps to make it easier for them to work with the S&T Directorate, although I must say the private sector is always amazed by how difficult it is to work with the U.S. Government, no matter what we do.

I would like to turn now in closing just to make a few observations about the proposed budget cuts. I think we have implemented smart, disciplined, cost-effective measures in our R&D program, and we have offered invaluable assistance and acquisition procurements to DHS.

The fiscal year 2012 House funding level for the Directorate's R&D account now, not taking out management and administration, was \$398 million, as was noted. This is a record low investment for R&D in Homeland Security.

Of this amount, more than half must be spent to maintain laboratory operations and on other mandatory spending such as the SAFETY Act, university programs, and so forth. This leaves \$106 million for discretionary R&D, and an 80 percent cut in R&D compared to our fiscal year 2010 levels.

Mr. LUNGREN. Dr. O'Toole, I don't want to interrupt you on this subject, but you have gone into 10 minutes now in your opening statement.

Dr. O'TOOLE. One sentence?

Mr. LUNGREN. Yes, sure.

Dr. O'TOOLE. Okay. Half of this amount would be needed to pay existing commitments and shut down projects we could no longer afford. In the end, with the fiscal year 2012 House budget, we are left with \$45 million to support all R&D investments for all of DHS and all of the first responders. This would be a very dire set of circumstances for DHS and would leave us, essentially, funding only R&D and aviation security and nothing else.

Thank you, Mr. Chairman.

Mr. LUNGREN. Thank you very much.

[The prepared statement of Dr. O'Toole follows:]

PREPARED STATEMENT OF TARA O'TOOLE

NOVEMBER 17, 2011

INTRODUCTION

Good morning Chairman Lungren, Ranking Member Clarke, and distinguished Members of the committee. Thank you for the opportunity to testify before you today on behalf of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T). My testimony will describe the Directorate's strategic direction and top priorities of our directorate while highlighting some of our successes in support of the third-largest Federal agency in a time of austere budgets. Over the past 2 years, the Directorate has built on the achievements of the initial years of DHS to create an organization with a growing ability to help the Homeland Security Enterprise achieve its missions. S&T is building stronger partnerships with first responders and DHS Components to gain a deeper understanding of their top needs and operational environments. We have focused our technology development process to rapidly deliver technologies to use in the field. We have expanded the application of the technical talent of S&T's engineers and scientists to include assessments of operational problems and acquisition requirements. We have embarked on an ambitious effort to make the best possible use of taxpayers' dollars through identifying technology investments made by others which might meet homeland security needs through collaborations with others in the Federal Government, universities, the private sector, and abroad.

MISSION OF THE DHS S&T DIRECTORATE IS BROAD, VARIED, AND SERVES MANY PARTNERS

The mission of DHS S&T is to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions for the Homeland Security Enterprise. Congress created the S&T Directorate as part of the Homeland Security Act of 2002, to "conduct basic and applied research, development, dem-

onstration, testing, and evaluation activities relevant to any or all elements of the Department.”¹⁶ S&T also has a statutory responsibility to transfer useful technologies and information to first responder communities, State, and local governments, and to the private sector.

In the past 8 years, S&T has undergone many changes and continues to evolve. The extraordinary breadth and diversity of DHS’s missions requires S&T to address a wide range of programs including Components’ near-term needs for new operational capabilities and improved operational effectiveness, efficiency, and safety. S&T also has responsibilities related to understanding and creating solutions to biological and chemical threats, and to conducting the research and development (R&D) required to meet homeland cybersecurity needs. Investments in near-term, incremental solutions must be balanced against investments in potentially game-changing technologies that will take longer to mature. DHS S&T’s work is usually identified with technology development, but equally as important are the Directorate’s contributions to homeland security in the form of analyses or “knowledge products.” These include analyses of alternative technological options; assessments of complex issues such as the relative risk of different biological or chemical threat agents; operational testing and evaluation of technologies proposed for acquisition; and the creation of consensus standards which enable cost-effective progress across many fields. Additionally, over the past year, S&T has begun a major strategic effort, in collaboration with the Under Secretary for Management, to improve DHS acquisition processes.

INVESTING S&T’S RESOURCES: MAXIMIZING BENEFIT, BALANCING RISK

S&T fully recognizes the need to be a responsible steward of taxpayers’ dollars and to clearly demonstrate the value the S&T Directorate brings to the Homeland Security Enterprise (HSE). This is particularly important in R&D endeavors, where the time between initial research investments and useable products is typically measured in years or even decades, and where risk—and the possibility of failure—is necessarily part of the picture. New technological capabilities and the design of sound analytical processes and acquisition decisions offer solutions to many of the challenges confronting the Department and are also essential, potentially powerful cost-saving tools. Moreover, the scope of the HSE’s need for technologies and technical assistance requires that we make careful judgments about where to invest S&T’s limited resources. My predecessor as Under Secretary established Integrated Product Teams consisting of representatives from DHS Components, whose purpose was to select and rank “capability gaps” which S&T then tried to address through technology development. This was an important step in linking S&T activities to Components’ needs, but the selected projects sometimes failed to reflect the strategic priorities of the leadership. In addition, some projects yielded successful prototypes but failed to transition to actual use in the field, sometimes because research efforts in S&T were not paired with Component acquisition programs, sometimes because Components’ priorities had shifted, and sometimes because there were no funds to support realistic pilots and training programs. Due to these shortcomings, S&T has established the goal of transitioning R&D products to use as a top priority. To achieve this end, we made several changes to the process for selecting R&D projects.

On-going Review of the R&D Portfolio

All individual R&D projects, including proposed “new starts,” undergo evaluation using a “portfolio review” process to ensure that they are supported by operational partners (i.e. one or more DHS Component or First Responder communities), are technically sound, have the potential to make a meaningful mission impact, and are progressing adequately. Each project is judged against specific metrics, determined by S&T with input from the Components, designed to address elements essential to programmatic success in the context of DHS’s Quadrennial Homeland Security Review (QHSR) missions. These metrics assess the project against six strategic imperatives, namely:

- *Impact.*—Is our portfolio making a significant impact on our customer’s mission?
- *Transition.*—Are we transitioning relevant products to the field?
- *Technical Positioning.*—Is our investment positioning the organization for the future?
- *Customer Alignment.*—Are our projects aligned with well-understood customer requirements?

¹⁶ U.S.C. Sec. 182(4).

- *Customer Involvement*.—Do we have the appropriate level of customer interaction?
- *Innovation*.—Are we sufficiently innovative in the way we approach our challenges?

Measuring all of our projects against this framework provides a transparent and “shareable” view of all R&D within S&T; enables more strategic, longer-term budget decisions; ensures efficient delivery to the component or end-user; and nurtures effective communication throughout the process. This particular review model has been used by both Federal and private R&D organizations, including the prize-winning Army Engineering, Research, and Development Laboratory in Mississippi.

A major observation stemming from the first review of the R&D portfolio in 2009 was that S&T was pursuing a much larger number of projects than could be adequately supported within our budget. Many projects were failing or languishing for years because they lacked the resources needed to succeed. Thus we decided to reduce the number of projects, instill annual reviews of budget adequacy and progress, and fund each selected project through to “use in the field”, whether it was transition to a commercial venture or a DHS pilot operation. This strategy resulted in some projects receiving more funds, while others were eliminated or significantly reformulated. Additionally, we placed a greater emphasis on integration of projects with the DHS Component partners’ operational needs and acquisition planning cycles because even the highest-impact project is of little utility without the Components’ ability to procure it. We have already begun to see the fruit of these decisions.

Apex Projects Demonstrate the Importance of Strong Partnerships Between S&T and Operators

Apex projects are intended to solve problems of strategic operational importance identified by a Component leader. The Apex model is designed to demonstrate a new framework for working with Components, based on top-level commitment to the project, collaborative partnerships, and multidisciplinary teams. Each Apex project is codified in a signed charter agreement between the head of a DHS Component and the Under Secretary for S&T. Together, we approve the project’s goals and approach, providing a leadership imprimatur which energizes both S&T and the partner organization. The S&T team is then mirrored by an equally able, multidisciplinary team from the partner Component. The first Apex effort focused on improving the remote protective operations of the U.S. Secret Service (USSS) and has proven very successful. Another Apex initiative, which began in March 2011, is a partnership with U.S. Customs and Border Protection to develop a secure transit corridor for goods shipped between Mexico, the United States, and Canada.

A key lesson of the Apex experience is that forging a true partnership between the technical team and the operators is essential to success. Going forward, S&T will be more likely to invest its resources in areas where operators—whether they are DHS Components or first responders—are willing to actively collaborate on the project. Innovation requires a deep, precise understanding of the problem to be solved. This requires insights from operators, who best know the needs and constraints of the operational reality, and technical experts who have a grasp of the range of available solutions and how to analyze possible trade-offs. Equally as important is the imperative to integrate new technologies or analytical approaches into the whole “system” that makes up the operational reality. For example, technologies which are extremely expensive, require constant care and feeding, or intensive training are not suitable to many DHS operations.

S&T Resource Allocation Strategy: Creating a Balanced, High-impact R&D Portfolio

To better support the entire Homeland Security Enterprise, we are developing an S&T Resource Allocation Strategy (STRAS) which reflects lessons learned from our Apex experience and reviews of our R&D portfolio as well as dialogue among representatives from the Components, the first responder community, and S&T.

STRAS is highly collaborative and based on focused interactions with partner organizations coupled with a rigorous examination of the problems at hand. STRAS begins with an understanding of S&T’s current research and development efforts on behalf of Components as well as on-going internal, Component-sponsored R&D efforts. The systems analysis explicitly maps how the operational process functions and highlights potential capability gaps. Based on this systems analysis and understanding of the on-going R&D efforts, a strategic plan will be jointly developed and agreed to by the Component and S&T. A formal written agreement will codify the joint effort; periodic updates will ensure that projects are progressing and will ultimately lead to fielding of an operational capability, including, if appropriate, the transition of research products and prototype technologies into field pilots and ac-

quisition plans. This strategic approach to S&T resourcing allows for development of a managed, balanced portfolio, but retains the inherent flexibility to support “out-of-cycle” or emergent Component requests for assistance.

S&T uses a modified version of the STRAS process to identify efforts for the first responder community. S&T’s First Responder Group, which was created during the 2010 strategic realignment, is entirely focused on connecting with and addressing the needs of first responders. We use a variety of Nation-wide outreach methods to examine and identify appropriate local, State, and Federal roles and responsibilities for developing response capabilities. These groups further ensure that technology, training, and policy investments by S&T and the Federal Emergency Management Agency are aligned with these capabilities and best support the priorities of the first response community. Key partners such as the InterAgency Board for Equipment Standardization and Interoperability and S&T’s First Responder Resource Group help us capture the diverse voice of the emergency response community’s needs and goals for policy, operational doctrine, and technology—with the ultimate goal of meeting the challenges of catastrophic mission response. S&T analyzes these practitioner-identified gaps to select projects for investment. Multiple jurisdictions across the country have partnered with S&T to host pilots and operational demonstrations of research products to field commercially viable, operationally tested technologies.

Beyond R&D: Using S&T’s Technical Expertise to Provide Analytical Support to DHS

S&T’s work extends beyond technology development. Component support also includes operational analysis, requirements generation, test and evaluation, and acquisition support. Through the leadership of our Acquisition Support and Operations Analysis (ASOA) group, S&T has been formally incorporated into DHS’s new integrated investment life-cycle—we will be working on the “front end” of the acquisition process assisting in the development of technically specific and feasible requirements. Getting requirements right on the “front end” greatly improves the odds of a successful transition at the end of the program. S&T provides systems engineering support throughout the “middle” of the investment life-cycle to assist Components with items such as risk management and ConOps development.

Additionally, S&T has a statutory responsibility on the “back end” of acquisition in testing and evaluation. S&T has been at the forefront of improving the Department’s overall acquisition process through the establishment of DHS’ operational test and evaluation (OT&E) process. The OT&E process ensures that programs that come before the Acquisition Review Board have been thoroughly and appropriately vetted. This is the final step before the Department makes significant investment into final production and fielding of the acquired system ensures that the system meets its documented operational requirements and provides the required capability.

A MODEL FOR HIGH IMPACT: LEVERAGING INVESTMENTS BY OTHERS AND CREATING PRODUCTIVE COLLABORATIONS

Wherever possible, S&T attempts to identify R&D activities in which others have already invested and then adopt, adapt, or further develop these investments to satisfy the needs of the HSE. The austere budget realities facing the United States and our allies will likely encourage collaboration as organizations seek to augment their own R&D investments with outside resources.

Technology Foraging: Higher ROI, Faster Transitions

S&T is committed to getting as high of a return on investment (ROI) of resources as possible. To this end, and to meet our goal of rapidly delivering products to use, we are establishing “technology foraging” as part of every technology development project. Technology foraging refers to a complex process of scanning the horizon for technologies that are already in use or being developed, and adopting these technologies for new purposes, new environmental conditions, or at new scales. Technology foraging leverages the work being done by industry, in other Federal agencies, at universities, and by our international partners, against possible applications to DHS’s needs. It is an extremely challenging task because of the vast and continuously shifting body of R&D unfolding in public and private sectors around the world. However, when done correctly, technology foraging can have a large impact on S&T’s efficiency and effectiveness. S&T is moving to a more disciplined and comprehensive approach to technology foraging which requires all project managers to review investments by others in technologies we might adapt or adopt.

For example, the U.S. Coast Guard (USCG) has identified a need to be able to track small vessels approaching a seaport. While most large vessels have communication and tracking devices, along with tagging systems for identification, many

small vessels, including those that may be used for illicit activities, called “dark boats” do not. S&T, in partnership with the National Oceanic and Atmospheric Administration (NOAA) and USCG, has developed software that relies on currently deployed coastal NOAA weather radar systems to process the radar signal differently, enabling the USCG to identify and track small vessels.

Private Sector Partnerships: Finding and Importing Good Ideas

Partnering with the private sector is one of S&T’s highest priorities. Small business is an important engine of innovation and job creation and S&T utilizes a variety of approaches to engage the private sector. Under my tenure, S&T established the position of Chief Commercialization Officer, which leads engagement with industry. As a result, S&T’s coordinated outreach to the private sector has grown considerably. In 2010, S&T interacted with over 6,500 companies informing them on how to work with DHS and soliciting their ideas. Furthermore, better integration and promotion of our research efforts with the private sector has resulted in companies investing their own internal research and development funds to bring S&T-developed technology to the market. One example is Honeywell, Inc.’s investment in S&T’s Geo-spatial Location Accountability and Navigation System for Emergency Responders (GLANSER), a tool which allows incident commanders to locate and track personnel inside enclosed areas. Honeywell, Inc. committed over 25 percent of the project’s total cost to develop and commercialize GLANSER. Also, Raytheon, Inc. invested 40 percent of the total costs for the Controlled Impact Rescue Tool, a technology that enables first responders to quickly cut through cement to rescue people from collapsed structures.

S&T’s Small Business Innovation Research (SBIR) Program actively works to develop technology solutions to homeland security issues that are innovative and accelerate transition into the marketplace. Since its inception in 2004, 316 companies in 43 States received S&T SBIR Phase I awards to demonstrate concept feasibility and one-third of these received Phase II awards, which often culminate in a prototype. Our SBIR program has resulted in 26 patents with 11 more in process. Additionally, 17 products are on the market, including 10 commercial or open-source cybersecurity-related products. Not only is S&T finding solutions to homeland security needs, but we are creating new jobs. Fifty-six companies responded to our July 2010 survey and reported that 359 net jobs have been created through SBIR funding.

Collaboration with Other Federal Agencies

DHS S&T staff have been highly active participants and leaders in numerous, ongoing Federal Interagency efforts at both policy and programmatic levels. I co-chair the National Science and Technology Council’s Committee on Homeland and National Security, along with Mr. Zack Lemnios of the Department of Defense (DoD) and Mr. Phil Coyle, Associate Director for National Security and International Affairs of the White House Office of Science and Technology Policy. This committee has a comprehensive membership involving key Executive branch agencies such as DoD, the Department of Energy, the Department of Health and Human Services (HHS), the Department of Justice, and the Environmental Protection Agency (EPA) and many others. Coordination on this committee enables S&T to form and maintain relationships with other science and technology organizations that can be translated into collaborative programs that maximize and leverage available expertise and resources. Additionally, our scientists serve on 32 Committees and Working Groups across the Interagency. These Working Groups and Committees examine the full range of homeland security issues, such as chemical, biological, radiological/nuclear and explosives (CBRNE) detection and recovery, infrastructure protection, and homeland security policy.

S&T collaboration with other Federal agencies also includes a rich array of joint projects to advance mutual goals. To highlight a few examples of S&T partnering with other Federal agencies:

- S&T has been working with the Defense Threat Reduction Agency (DTRA), EPA, and HHS on several interagency efforts that will increase resilience and recovery following a biological weapons attack, whether the attack targets civilian or military assets.
- S&T and the Defense Advanced Research Projects Agency (DARPA) are collaborating on an effort that is investigating lightweight, blast-resistant materials that will provide enhanced security in shipping air cargo, again benefiting both military and civilian security.
- Working with DoD, DOJ, and the intelligence community, we’re focusing on the development of two different approaches to verify familial linkages for refugee and asylum and adoption applications. S&T expects to transition this to the

U.S. Customs and Immigration Service (USCIS). Our Federal partners have contributed \$23.5 million to the effort.

- We've partnered with DARPA to leverage their \$25 million basic research investment in advanced data collection and analysis methods to develop the next generation of automated target recognition software for explosive detection systems.
- Working in partnership with DoD and the DOE National Laboratories, we have begun an effort to develop a rapid clinical diagnostic capability that can detect whether someone has been exposed to a range of bioterror agents before symptoms appear.

S&T has also begun engaging with the private sector via investments through In-Q-Tel. In 1999, the Central Intelligence Agency supported the establishment of In-Q-Tel as a not-for-profit strategic investment firm designed to bridge the gap between new advances in commercial technology and the technology needs of the U.S. intelligence and security communities. Most In-Q-Tel investments combine funds from more than one partner agency, allowing S&T to leverage significant investments from the intelligence community.

S&T's first project via In-Q-Tel was just announced with a company called Genia Photonics. This company developed a tunable laser source for the medical community and S&T is investigating the feasibility of this technology to perform non-contact, trace explosives detection. S&T expects to close four more In-Q-Tel deals in the next few months. All of these projects are expected to produce transition-ready technologies in the next 12 to 24 months. S&T's total investment of \$6.7 million is leveraging \$11.5 million in investments by other Government agencies. In addition, In-Q-Tel reports that \$1 of Government investment can attract \$10 in private sector funding.

S&T's collaborations with other agencies at both the policy and programmatic level enable us to reach beyond the resources of DHS alone in order to better provide capabilities that strengthen our homeland security efforts.

University Partnerships

Leveraging the investment and expertise of academia is a key part of S&T's strategy to meet the needs of the Department. To this end, S&T is supporting nine university-based Centers of Excellence (COEs). These consortia of colleges, universities, and private sector partners pursue a mixed portfolio of basic and applied research addressing both short- and long-term homeland security needs. DHS Components can directly engage the COEs for specific research; to date, Components have invested a total of \$21.9 million in the Centers. The COEs estimate that they've attracted an additional \$46 million in funding from non-DHS sources including Federal, State, and local agencies, and private sector partners in 2010.

The COEs have been successful because they've built a reputation for delivering high-impact work with direct, practical application. For example, investigators from the Coastal Hazards COE (CHC) at the University of North Carolina-Chapel Hill assisted the USCG by tracking the likely storm surge/wave impact of Hurricane Irene. CHC's information led the USCG to relocate a Command Center, just before its previous location was damaged by the hurricane. The expertise and foresight of CHC minimized the hurricane's disruptions to USCG's rescue and response operations and the Center has received commendations from the USCG's senior leadership.

International Collaborations

S&T has bilateral agreements with 12 international partners, which enable DHS and other agencies in the HSE to leverage funds, manpower, and facilities in support of our mission. In fiscal year 2011, we had 134 active bilateral projects, including \$15 million in contributions from our international partners. Examples include \$11 million from The Netherlands for a Levee Integrity Monitoring project, \$1.5 million from Singapore to build and test a Hybrid Composite Container, and \$1.2 million from Sweden for the International Submillimeter-Wave Standoff Imager Project, an effort aimed at increasing the capacity to scan large, unstructured crowds for concealed objects, as opposed to conventional checkpoints. Our international projects provide a cost-effective, collaborative approach to common homeland security problem sets, capitalizing on our international partners' expertise and resources.

SELECTED ACHIEVEMENTS OF THE S&T DIRECTORATE

Since I assumed this role, we have made many changes and have achieved some notable successes, even in the face of significant budget constraints. A hallmark of the past 2 years in S&T has been the unrelenting focus we've placed on

transitioning our R&D efforts to use in the field. Commercialization of successful R&D projects is one important means of accomplishing this goal. We have significantly improved our ability to work with private sector partners to commercialize our investments. Another approach to transitioning to use is to closely partner with users throughout the development process to ensure that final products meet users' end needs and are incorporated into Component acquisition plans.

I will briefly enumerate a few of our success stories highlighting the transition to use in the field as well as our analytical and technical capabilities.

Transition to Use in the Field

- S&T partnered with Mine Safety Appliance (MSA) to integrate and certify S&T's lighter and smaller profile, self-contained breathing apparatus (SCBA) cylinder array into a full SCBA ensemble that could be National Fire Protection Association (NFPA) and National Institute for Occupational Safety and Health (NIOSH) tested/certified for use by firefighters. MSA invested its own money for this effort; its financial commitment was equal to 65% of the project's total cost. This will be the first major redesign in decades of this critical piece of first responder safety equipment.
- Consolidated Edison provided almost half of the total project costs to partner with S&T on a new superconducting cable that can join multiple power substations in an interconnected web. This resilient electric grid will help protect against the type of power surges that took down the power grid in the entire Northeast in 2003. Consolidated Edison is installing the S&T technology for testing at its facility in 2013.
- S&T has developed a next generation explosives trace detection device that is ten times more sensitive than existing systems, can detect narcotics as well as explosives, and is similarly priced as existing machines. The FLIR Systems, Inc. device will soon complete TSA qualification testing. S&T anticipates that the device will be commercially available within 1 year.
- On the cyber front, DHS is responsible for protecting the ".com" and ".gov" cyber-networks. S&T's Domain Name System Security (DNSSEC) project protects the public by preventing internet users from being covertly redirected to malicious websites that look like legitimate sites, such as banks, but attempt to steal personal information. DNSSEC has been and is in wide use by 32 top level domains (such as ".com", ".gov", ".uk", etc.) S&T won the 2011 National Cybersecurity Innovation award for DNSSEC in the category of "Building a Federal Cybersecurity Research Program that Results in Substantial Cyber Risk Reduction".
- S&T, working with the U.S. Department of Agriculture, has developed a next generation vaccine against a strain of Foot and Mouth Disease (FMD). This year the vaccine passed a major milestone and entered live animal trials; it holds the promise of eliminating the billion-dollar threat that FMD poses against our Nation's agricultural sector. Finally, S&T has had great success in the past 2 years in improving information sharing for first responders across all levels of government through its Virtual USA (vUSA) program. vUSA is a blend of process and technology that provides a virtual pipeline to allow data, such as the operational status of critical infrastructure, emergency vehicle locations, weather and traffic conditions, and evacuation routes, to be shared by different systems and operating platforms with no changes to current systems. vUSA was chosen as a White House Open Government Initiative and has been used across the country to provide situational awareness and decision support for the DeepWater Horizon oil spill and this year's Mississippi River flooding. States in the Southeast (11 States), Pacific Northwest (4 States), and the Central U.S. Earthquake Consortium (8 States) are currently using vUSA. The network will continue to expand to other State agencies, businesses, and non-profit groups.

Technical and Analytical Capabilities

- S&T teamed with CBP and the S&T-managed Federally Funded Research and Development Center, the Homeland Security Studies and Analysis Institute (HSSAI), to conduct an analysis of alternatives for the Southern Border's virtual fence. The result was a recommendation to discontinue the SBInet program and focus on other approaches.
- S&T has worked closely with U.S. Secret Service (USSS) on the Apex Science and Technology for Operational Research Enhancement (STORE) program to deliver needed technologies, and more importantly, help them develop a systems-based approach to show the impact and cost-versus-benefit of technology enhancements on their protective mission. This aspect of the program was es-

sential to USSS's basis for their technology acquisition planning and budgeting process.

CONCLUSION

The people of S&T constitute the core source of technical expertise available to the Homeland Security Enterprise. In the past 2 years we have realigned the Directorate's structure, and revised many of the processes by which we choose and pursue our work, and formed valuable partnerships with other R&D organizations, universities, the private sector, and abroad—all with the intent of more effectively and efficiently advancing the missions of the Homeland Security Enterprise. We have made it our first priority to achieve rapid transition of research and development projects to use in the field. We have also expanded the reach of S&T's technical talent to improve DHS project management and acquisition processes.

To these ends, S&T has revamped project selection processes to ensure we are investing in problems of highest importance to HSE operators. We have established Apex projects to enable us to invent and implement solutions to large, complex, high-priority problems. We have demonstrated the power of intensive collaboration and devised processes to make such partnerships a cornerstone of our work, whether with our HSE partners or in collaboration with partner R&D organizations. We are placing a strong emphasis on technology foraging—on seeking and using technology investments by others both to improve S&T's return on investment and to reduce development time. We have reduced the number of projects we pursue, improving the likelihood that chosen efforts have sufficient resources to succeed in a timely way and are carefully tracked throughout development. We have restructured our organization to dedicate significant resources to analysis of operational and acquisition needs and to instill a more systems-oriented approach throughout DHS activities.

Throughout American history, much of the country's wealth, and many of our successes, have come from our ability to forge practical solutions to difficult problems. We have excelled at harnessing science to serve human purposes and to produce innovative technologies which create new capacities that transform once impossible, costly, or dangerous goals into feasible activities. Congress designed S&T to continue this tradition of innovative problem-solving in the service of protecting homeland security. I believe the S&T Directorate is making significant contributions to these ends and is becoming increasingly better prepared to make such contributions. This progress is due to the hard work of S&T's people, to our deepening understanding of the precise problems confronting our operational partners, and to the Directorate's increasing capacity to identify and make use of the innovation of others in the private sector, in universities, in the National labs and around the world. I am honored to lead the DHS S&T Directorate and look forward to your questions.

Mr. LUNGREN. Now, Mr. Maurer, you are recognized.

STATEMENT OF DAVID C. MAURER, DIRECTOR, HOMELAND SECURITY AND JUSTICE ISSUES, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. MAURER. Good morning, Chairman Lungren, Ranking Member Thompson, and other Members and staff. I am pleased to be here today to discuss the findings from our prior work looking at research and development at the Department of Homeland Security and other departments and agencies.

As you know, R&D is the front end of a long, complex process that translates good ideas into systems that enhance Homeland Security. It is important to recognize and practice how difficult it is to do this. Managing R&D requires accepting risk and some degree of failure while still ensuring new and innovative technologies make the leap from labs to real-world use. Getting this balance right ensures a steady flow of new technologies to help front-line operators carry out their missions. S&T has laid responsibility for this within DHS. S&T also plays a key role in evaluating and overseeing DHS testing and evaluation.

Over the past 2 years, S&T has reorganized to better achieve its goals and work more closely with DHS components. At the same time, DHS has—S&T is managing a decline in budget resources, requiring the Directorate to reprioritize its efforts. This is not the first time a Federal agency has faced these challenges. In the past we have reported on the transformation of R&D efforts in the Federal Government stemming from changing priorities and reduced resources.

My testimony today focuses on three topics: The findings from our prior work related to S&T's test and evaluation efforts; S&T's recent reorganization; and key findings from our past work on managing Federal R&D. I will briefly summarize the key points from all three of these areas.

First, in June of this year, we reported that S&T was, for the most part, properly executing its oversight requirements for testing and evaluation of acquisition programs. However, additional steps were needed to ensure that all requirements were met. Specifically, S&T did not consistently document its review and approval during key portions of the acquisition process. DHS agreed with our recommendations and is taking actions to address them.

Second, since 2009, S&T has conducted a reorganization, underwent a new strategic planning process, crafted new strategic goals, and has developed a draft strategic plan which is currently in the process of being finalized. S&T is also committed to an annual review of its portfolio of basic and applied R&D projects.

In sum, these efforts represent a comprehensive attempt by S&T to re-look at the way it carries out its R&D mission. We are currently assessing these issues as part of an on-going review of R&D at DHS for the Senate Committee on Homeland Security and Governmental Affairs. We will report on our findings next year.

Finally, our prior work on R&D at other Federal agencies could provide insight for S&T as it moves forward. For example, during the 1990s, we issued a series of reports on Federal efforts to restructure R&D in the wake of the end of the Cold War, and efforts to balance the Federal budget. More recently, we have issued reports on R&D at the Departments of Defense, Energy, and DHS, as well as at the Environmental Protection Agency. The key findings across this body of work could potentially help S&T's efforts to meet DHS' R&D needs.

For example, we have reported that developing comprehensive R&D strategies with clear roles, responsibilities, and visibility over the full range of R&D efforts mitigates the risk of duplication and overlap.

Organizations that have successfully restructured R&D aligned R&D activities with the needs of the eventual users, determined what was needed to support these activities and collected reliable data on the costs involved. Department-wide R&D efforts should have systems in place to ensure success in meeting objectives, and monitor and report on progress. Individual programs should have clearly-defined missions that align and collectively build through achieving broader Departmental and National priorities.

Since our assessment of research and development at DHS is currently underway, we are not in a position today to comment on whether DHS has successfully addressed all of these issues. How-

ever, we believe that the findings from our prior work can provide valuable insights for both DHS and the Congress.

Mr. Chairman, that concludes my statement. Thank you for the opportunity to testify. I look forward to your questions.

[The prepared statement of Mr. Maurer follows:]

PREPARED STATEMENT OF DAVID C. MAURER

NOVEMBER 17, 2011

DHS RESEARCH AND DEVELOPMENT: SCIENCE AND TECHNOLOGY DIRECTORATE'S TEST AND EVALUATION AND REORGANIZATION EFFORTS

Chairman Lungren, Ranking Member Clarke, and Members of the subcommittee: I am pleased to be here today to discuss our prior work examining the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) and Research and Development (R&D) efforts. The Homeland Security Act of 2002 created DHS and, within it, established S&T with the responsibility for conducting National research, development, test, and evaluation (T&E) of technology and systems for, among other things, detecting, preventing, protecting against, and responding to terrorist attacks.¹ Since its creation in 2003, DHS, through both S&T and its components, has spent billions of dollars researching and developing technologies used to support a wide range of missions including securing the border, detecting nuclear devices, and screening airline passengers and baggage for explosives, among others. S&T has a wide-ranging mission, which includes conducting basic and applied research of technologies,² and overseeing the testing and evaluation of component acquisitions and technologies to ensure that they meet DHS acquisition requirements before implementation in the field.³ In recent years, we have reported that DHS has experienced challenges in managing its multibillion-dollar technology development and acquisition efforts, including implementing technologies that did not meet intended requirements and were not appropriately tested and evaluated. These problems highlight the important role that S&T plays in overseeing DHS testing and evaluation.

S&T has reorganized to better achieve its goals and provide better assistance to DHS components in developing technologies. In addition to the challenge of implementing its varied mission, S&T is also managing a decline in available R&D resources. S&T's fiscal year 2011 appropriation decreased 20 percent from fiscal year 2010 and, while its fiscal year 2012 appropriation has not yet been enacted, both the House and Senate marks for the agency are lower than what was appropriated in fiscal year 2011.⁴ As a result, S&T has had to adjust resources and re-prioritize its efforts. In the past, we have reported on issues related to the transformation and reorganization of R&D efforts in the Federal Government, particularly related to shifting of priorities and managing a reduction in resources.⁵ In addition, we identified DHS R&D as an area for potential costs savings in our March 2011 report regarding opportunities to reduce potential duplication in Government programs, save tax dollars, and enhance revenue.⁶ Specifically, we reported that DHS could take further actions to improve its management of R&D and reduce costs by ensuring

¹ Pub. L. No. 107-296, § 302(5), 116 Stat. 2135, 2163 (2002).

² According to S&T, basic research includes scientific efforts and experimentation directed toward increasing knowledge and understanding in the fields of physical, engineering, environmental, social, and life sciences related to long-term National needs. Applied research includes efforts directed toward solving specific problems with a view toward developing and evaluating the feasibility of proposed solutions.

³ S&T's Test & Evaluation and Standards office is responsible for overseeing key requirements that DHS components are required to follow in DHS's Test and Evaluation directive.

⁴ The fiscal year 2012 appropriations bill passed by the House of Representatives would appropriate about 42 percent less for S&T than what was appropriated in fiscal year 2011, while the bill passed by the Senate appropriations committee would provide almost 5 percent less.

⁵ GAO, *Homeland Security: DHS Needs a Strategy to Use DOE's Laboratories for Research on Nuclear, Biological, and Chemical Detection and Response Technologies*, GAO-04-653 (Washington, DC: May 24, 2004); *Department of Energy: Uncertain Progress in Implementing National Laboratory Reforms*, RCED-98-197 (Washington, DC: Sept. 10, 1998); *Best Practices: Elements Critical to Successfully Reducing Unneeded RDT&E Infrastructure*, RCED-98-23 (Washington, DC: Jan. 8, 1998).

⁶ GAO, *Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue*, GAO-11-318SP (Washington, DC: Mar. 2011). See also related GAO products at the end of this statement.

that testing efforts are completed before making acquisition decisions and cost-benefit analyses are conducted to reduce R&D inefficiencies and costs.

My testimony today focuses on the key findings from our prior work related to S&T's test and evaluation efforts, S&T's recent reorganization efforts, and key findings from our past work related to Federal R&D. Specifically, this statement will address:

- the extent to which S&T oversees T&E of major DHS acquisitions and what challenges, if any, S&T officials report facing in overseeing T&E across DHS; and
- S&T's recent reorganization efforts and how key findings from our prior work on R&D in the Federal Government can inform how S&T moves forward.

This statement is based on reports and testimonies we issued from March 1995 to July 2011 related to DHS's efforts to manage, test, and deploy various technology programs; transformation of Federal R&D; and selected updates conducted from July 2011 to the present related to S&T's reorganization efforts.⁷ For the updates, we reviewed recent S&T testimonies and documentation related to the reorganization as well as information on annual S&T appropriations and budget requests from fiscal years 2009 to 2012. For our past work, we reviewed DHS directives and testing plans, interviewed DHS, Department of Energy, Department of Defense, Environmental Protection Agency, and other agency officials, reviewed documentation from these agencies, visited laboratory facilities, and examined agency databases, among other things. We conducted this work in accordance with generally accepted Government auditing standards. More detailed information on the scope and methodology from our previous work can be found within each specific report.

S&T COULD TAKE ADDITIONAL STEPS TO ENSURE THAT DHS T&E REQUIREMENTS ARE MET; OFFICIALS CITED CHALLENGES TO OVERSEEING T&E ACROSS DHS

S&T Oversight of DHS Testing and Evaluation

In June 2011, we reported that S&T met some of its oversight requirements for T&E of acquisition programs we reviewed, but additional steps were needed to ensure that all requirements were met.⁸ Specifically, since DHS issued the T&E directive in May 2009, S&T reviewed or approved T&E documents and plans for programs undergoing testing, and conducted independent assessments for the programs that completed operational testing during this time period. S&T officials told us that they also provided input and reviewed other T&E documentation, such as components' documents describing the programs' performance requirements, as required by the T&E directive. DHS senior-level officials considered S&T's T&E assessments and input in deciding whether programs were ready to proceed to the next acquisition phase. However, S&T did not consistently document its review and approval of components' test agents—a Government entity or independent contractor carrying out independent operational testing for a major acquisition—or document its review of other component acquisition documents, such as those establishing programs' operational requirements, as required by the T&E directive. For example, 8 of the 11 acquisition programs we reviewed had hired test agents, but documentation of S&T approval of these agents existed for only 3 of these 8 programs. We reported that approving test agents is important to ensure that they are independent of the program and that they meet requirements of the T&E directive.

S&T officials agreed that they did not have a mechanism in place requiring a consistent method for documenting their review or approval and the extent to which the review or approval criteria were met. We reported that without mechanisms in place for documenting its review or approval of acquisition documents and T&E requirements, such as approving test agents, it is difficult for DHS or a third party to review and validate S&T's decision-making process and ensure that it is overseeing components' T&E efforts in accordance with acquisition and T&E directives and internal control standards for the Federal Government. As a result, we recommended that S&T develop a mechanism to document both its approval of operational test agents and component acquisitions documentation to ensure that these meet the requirements of the DHS T&E directive. S&T concurred and reported that the agency has since developed internal procedures to ensure that the approval of test agents and component acquisition documents are documented.

⁷ See related GAO products list at the end of this statement.

⁸ GAO, *DHS Science and Technology: Additional Steps Needed to Ensure Test and Evaluation Requirements Are Met*, GAO-11-596 (Washington, DC: June 15, 2011).

Challenges in Coordinating and Overseeing T&E Across DHS

We also reported in June 2011 that S&T and DHS component officials stated that they face challenges in overseeing T&E across DHS components which fell into 4 categories: (1) Ensuring that a program's operational requirements—the key performance requirements that must be met for a program to achieve its intended goals—can be effectively tested; (2) working with DHS component program staff who have limited T&E expertise and experience; (3) using existing T&E directives and guidance to oversee complex information technology acquisitions; and (4) ensuring that components allow sufficient time for T&E while remaining within program cost and schedule estimates.

Both S&T and DHS, more broadly, have begun initiatives to address some of these challenges, such as establishing a T&E council to disseminate best practices to component program managers, and developing specific guidance for testing and evaluating information technology acquisitions. In addition, as part of S&T's recent reorganization, the agency has developed a new division specifically geared toward assisting components in developing requirements that can be tested, among other things. However, since these efforts have only recently been initiated to address these DHS-wide challenges, it is too soon to determine their effectiveness.

S&T RECENTLY REORGANIZED AND OUR PRIOR R&D WORK COULD INFORM HOW S&T MOVES FORWARD

Since 2009, S&T has undertaken a series of efforts related to its organizational structure. S&T underwent a new strategic planning process, developed new strategic goals, and conducted a reorganization intended to better achieve its strategic goals. These efforts were implemented after a 2009 National Academy of Public Administration study found that S&T's organizational structure posed communication challenges across the agency and that the agency lacked a cohesive strategic plan and mechanisms to assess performance in a systematic way, among other things.⁹ In August 2010, S&T reorganized to align its structure with its top strategic goals, allow for easier interaction among senior leadership, and reduce the number of personnel directly reporting to the Under Secretary of S&T. Additionally, after the Under Secretary was confirmed in November 2009, S&T instituted a new strategic planning process which helped inform the development of new strategic goals. The new strategic goals announced in August 2010 include:

- rapidly developing and delivering knowledge, analyses, and innovative solutions that advance the mission of DHS;
- leveraging its expertise to assist DHS components' efforts to establish operational requirements, and select and acquire needed technologies;
- strengthening the Homeland Security Enterprise and First Responders' capabilities to protect the homeland and respond to disasters;
- conducting, catalyzing, and surveying scientific discoveries and inventions relevant to existing and emerging homeland security challenges; and,
- fostering a culture of innovation and learning in S&T and across DHS that addresses mission needs with scientific, analytic, and technical rigor.

According to S&T, the agency has developed a draft strategic plan that provides its overall approach to meeting these strategic goals, which is currently in the process of being finalized.

Moreover, according to testimony by the Under Secretary of S&T in March 2011, to ensure that individual R&D projects are meeting their goals, S&T has committed to an annual review of its portfolio of basic and applied R&D and all proposed "new start" projects. According to S&T, the review process uses metrics determined by S&T, with input from DHS components, that are aligned with DHS priorities. These metrics consider:

- the impact on the customer's mission;
- the ability to transition these products to the field;
- whether the investment positions S&T for the future;
- whether the projects are aligned with customer requirements;
- whether S&T has the appropriate level of customer interaction; and,
- whether S&T is sufficiently innovative in the way it is approaching its challenges.

We are currently reviewing DHS and S&T's processes for prioritizing, coordinating, and measuring the results of its R&D efforts for the Senate Committee on Homeland Security and Governmental Affairs and we will report on this issue next year.

⁹National Academy of Public Administration, *Department of Homeland Security Science and Technology Directorate: Developing Technology to Protect America* (Washington, DC: June 2009).

Our prior work related to R&D at other Federal agencies could provide insight for S&T as it moves forward with new structures and processes operating within potential fiscal constraints. During the 1990s, we issued a series of reports on Federal efforts to restructure R&D in the wake of changing priorities and efforts to balance the Federal budget. More recently, we have issued reports on R&D issues at the Department of Defense (DOD), Department of Energy (DOE), the Environmental Protection Agency (EPA), and DHS. Although the specific recommendations and issues vary from department to department, there are key findings across this body of work that could potentially help inform S&T's efforts to meet DHS's R&D needs, as well as Congressional oversight of these activities. Since our assessment of R&D efforts at DHS is currently under way, we have not determined the extent to which these key findings from our prior work are applicable to DHS's R&D efforts or the extent to which DHS already has similar efforts under way. However, our prior work could provide valuable insights into how DHS could leverage the private sector to help conduct R&D, restructure R&D efforts in response to fiscal constraints, and develop comprehensive strategies to mitigate the risk of duplication and overlap. For example:

- We reported on Federal agencies that have restructured their research and development efforts in response to fiscal constraints. For example, in January 1998, we reported on efforts by Federal agencies, such as DOD, the DOE National Laboratories, and NASA, to streamline their R&D activities and infrastructure. We reported that restructuring research, development, testing, and evaluation to meet current and future needs required interagency agreements and cross-agency efforts, in addition to on-going individual efforts.¹⁰ Additionally, we reported on five elements that were useful in the successful restructuring of R&D in corporate and foreign government organizations. For example, we found that successful restructuring of R&D activities included having a core mission that supports overall goals and strategies, clear definitions of those responsible for supporting that mission, and accurate data on total costs of the organization's activities.
- In addition, we have reported that comprehensive strategies mitigate risk of duplication and overlap.¹¹ For example, we reported in March 2011 that DOD did not have a comprehensive approach to manage and oversee the breadth of its activities for developing new capabilities in response to urgent warfighter needs, including entities engaged in experimentation and rapid prototyping to accelerate the transition of technologies to the warfighter, and lacked visibility over the full range of its efforts.¹² As a result, we recommended that DOD issue guidance that defined roles, responsibilities, and authorities across the Department to lead its efforts. DOD agreed with this recommendation.
- Within DHS itself, we reported in May 2004 that DHS did not have a strategic plan to guide its R&D efforts. We recommended that DHS complete a strategic R&D plan and ensure that the plan was integrated with homeland security R&D conducted by other Federal agencies.¹³ We also recommended that DHS develop criteria for distributing annual funding and for making long-term investments in laboratory capabilities, as well as develop guidelines that detailed how DOE's laboratories would compete for funding with private sector and academic entities. DHS agreed with our recommendations. While S&T developed a 5-year R&D plan in 2008 to guide its efforts and is currently finalizing a new strategic plan to align its own R&D investments and goals, DHS has not yet completed a strategic plan to align all R&D efforts across the Department, as we previously recommended.
- Our work on DOE National Laboratories provides additional insights related to oversight of R&D efforts that could be useful for DHS S&T. In 1995, we reported that DOE's National laboratories did not have clearly-defined missions focused on accomplishing DOE's changing objectives and National priorities.¹⁴ DOE, at that time, managed the National laboratories on a program-by-program basis which inhibited cooperation across programs and hindered DOE's ability

¹⁰ GAO, *Best Practices: Elements Critical to Successfully Reducing Unneeded RDT&E Infrastructure*, RCED-98-23 (Washington, DC: Jan. 8, 1998).

¹¹ GAO-11-318SP.

¹² GAO, *Warfighter Support: DOD's Urgent Needs Processes Need a More Comprehensive Approach and Evaluation for Potential Consolidation*, GAO-11-273 (Washington, DC: Mar. 1, 2011).

¹³ GAO, *Homeland Security: DHS Needs a Strategy to Use DOE's Laboratories for Research on Nuclear, Biological, and Chemical Detection and Response Technologies*, GAO-04-653 (Washington, DC: May 24, 2004).

¹⁴ GAO, *Department of Energy: National Laboratories Need Clearer Missions and Better Management*, RCED-95-10 (Washington, DC: Jan. 27, 1995).

to use the laboratories to meet Departmental missions. We recommended, among other things, that DOE develop a strategy that maximized the laboratories' resources. In responding, DOE said that it had undertaken a new strategic planning process which resulted in a strategic plan. Though DOE developed a strategic plan intended to integrate its missions and programs, in 1998 we reported that the laboratories did not function as an integrated National research and development system and recommended that DOE develop a comprehensive strategy to be used to assess success in meeting objectives, monitor progress, and report on that progress.¹⁵ DOE acknowledged that it needed to better focus the laboratories' missions and tie them to the annual budget process, but that it would take time to accomplish.

- More recently, we reported in June 2009 that DOE could not determine the effectiveness of its laboratories' technology transfer efforts because it has not yet defined its overarching strategic goals for technology transfer and lacks reliable performance data.¹⁶ Instead, individual DOE programs such as the National Nuclear Security Administration and DOE's Office of Science articulated their own goals for technology transfer at the National laboratories. We recommended, among other things, that DOE articulate Department-wide priorities and develop clear goals, objectives, and performance measures. DOE generally agreed with our findings.
- Lastly, our work on Environmental Protection Agency (EPA) laboratory facilities also offers insights into the importance of planning and coordination in managing R&D.¹⁷ Specifically, we reported in July 2011 that EPA has yet to fully address the findings of numerous past studies that have examined EPA's science activities. These past evaluations noted the need for EPA to improve long-term planning, priority setting, and coordination of laboratory activities, establish leadership for agency-wide scientific oversight and decision making, and better manage the laboratories' workforce and infrastructure. We recommended, among other things, that EPA develop a coordinated planning process for its scientific activities and appoint a top-level official with authority over all the laboratories, improve physical and real property planning decisions, and develop a workforce planning process for all laboratories that reflects current and future needs of laboratory facilities. EPA generally agreed with our findings and recommendations.

Chairman Lungren, Ranking Member Clarke, and Members of the subcommittee, this concludes my prepared statement. I would be pleased to respond to any questions that you may have.

Mr. LUNGREN. I thank you both for your testimony, and I would now start the questioning. Each Member will have 5 minutes, and if we have time we might go into a second round.

Dr. O'Toole, this is something that you referred to in your written testimony at the very end, and maybe you will have to submit a response after today, but something has come up yesterday when we were having a hearing over on the Judiciary Committee with respect to a fix on the problem of intellectual property theft via the internet. This has to do with movies, downloads of music, and so forth.

The fix, which I can't describe in great detail—and that is why I say I may ask you to answer it later—that was presented in the bill that was before us has alarmed some engineers in the internet space that it would in some ways undercut what you have been doing with the Domain Name System Security Project.

There was some sense that was raised with me that that project, while it is going forward, has not fully developed and needs to have

¹⁵ GAO, *Department of Energy: Uncertain Progress in Implementing National Laboratory Reforms*, RCED-98-197 (Washington, DC: Sept. 10, 1998).

¹⁶ GAO, *Technology Transfer: Clearer Priorities and Greater Use of Innovative Approaches Could Increase the Effectiveness of Technology Transfer at Department of Energy Laboratories*, GAO-09-548 (Washington, DC: June 16, 2009).

¹⁷ GAO, *Environmental Protection Agency: To Better Fulfill Its Mission, EPA Needs a More Coordinated Approach to Managing Its Laboratories*, GAO-11-347 (Washington, DC: July 25, 2011).

buy-in from a number of elements in the private sector. There was some concern that if the legislation we are considering in the other committee were to go forward, it would undercut this particular response.

First of all, where do you see the maturity of the DNS project today, and is there a problem with buy-in from the private sector on that; and have you heard anything about a worry about legislation attempting to deal with that problem of the theft of intellectual property interfering with the project?

Dr. O'TOOLE. Well, on your third question, Mr. Chairman, no, I haven't. But I am happy to look into it and get back to you.

DNSSEC is quite mature. This is an initiative meant to protect the internet and, in particular, meant to protect users of the internet from being highjacked to illicit sites where you can steal your password, you know, your money, your identity, and so forth. It has been adopted by over 30 of the largest domains, including dot-com, dot-gov, dot-org, dot-UK, so it is quite mature. It is just that the internet is a huge universe, so getting all of the dot-whatsits on-board takes time.

Mr. LUNGREN. Sure.

Dr. O'TOOLE. But we have made a lot of progress. It would be a shame to undermine it, but I am sure there is some kind of solution here and I am happy to get back with you on it.

Mr. LUNGREN. Okay. I know that Stewart Baker publicly stated that he was fearful that this project, which is a good project that has received, I think, support from all administrations—

Dr. O'TOOLE. Yes.

Mr. LUNGREN [continuing]. That had been in charge at the time could be undone by this.

Dr. O'TOOLE. Yes.

Mr. LUNGREN. So that concerns me when he says that, and some other folks come to me, and I am just trying to hash it out. This is not a partisan issue. This is not even a question of jurisdiction among committees, although it could be. It, rather, is a concern that was expressed, frankly, when we had witnesses yesterday, and no one had the technical knowledge on it. So if you could help us on that, if we could pursue that further, I would really appreciate it.

Dr. O'TOOLE. Be happy to.

Mr. LUNGREN. All right. On the question of the Apex projects, as you outline it, it sounds great and it sounds like it allows you to focus on a means by which you can—I will use the word “make judgments” at an earlier stage as to how successful something is going to be, and then make some commitments towards it, strategic importance, et cetera.

I guess my question would be: What you outlined sounds terrific; why would that not apply to all projects that would be brought before you?

Dr. O'TOOLE. Many of the elements of Apex projects will be applied to all projects. Frankly, when we began this, I was using it as a stalking horse to model two things. One was multidisciplinary team approach, and second was a new way wherein S&T works with the components. That starts with an agreement between me and the component head.

In the past, we were doing a lot of technology, at the request of the components, that turned out to be very tactical. Some operator wanted it, but it wasn't necessarily a top priority of the people leading the component, and it never made it into their acquisition cycle.

So the Apex projects are very highly resourced. We can't do every project this way, but those two elements, we are going to solve the problem, not just create a gizmo. We are going to have buy-in from the operators from the beginning, and we are going to work in multidisciplinary teams, not just S&T's team, but we are going to be matched by a team on the operator side. Those elements are going to be part—already are part of our R&D efforts.

Mr. LUNGREN. Very good. My time has expired, but when I get to the second round I want to ask you about how that applies to the BioWatch issue.

The Ranking Member of the full committee is recognized for 5 minutes.

Mr. THOMPSON. Thank you very much, Mr. Chairman.

Dr. O'Toole, I understand that you looked at the effects of the proposed budget cuts across the board. Can you share with me the effect that that would have on the Small Business Innovative Research Awards if the cuts go forward?

Dr. O'TOOLE. Certainly. We currently have 60 small business awards. It would go down to four. We have created almost 3 dozen patents under the small business awards and have involved businesses in 43 States over the years. We have been very successful with our SIBR efforts, and we would lose a lot of momentum under this budget.

Mr. THOMPSON. Is your testimony that these small businesses, probably going from 60 to 4, would not be able to produce a real product—well, obviously the numerical number would go, but could they really go anywhere else and get resources to do what they do?

Dr. O'TOOLE. A number of them would go out of business, there is no doubt about that. You know, there is a vicious cycle at work here. In this economic climate, as the Chairman said, what we need is more innovation to create more jobs and more opportunity. But there is not that much money around for innovation, and R&D does require an up-front investment. It has to be prudent, it has to be well-targeted, it has to be well-managed. But you have to start with something to get something, and the small businesses in particular are having a hard time getting over that hump.

Mr. THOMPSON. The other part of the budgetary crisis that I am concerned about if it goes forward is the retention of people over time that we put an awful lot of investment in. Have you made some analysis of professional personnel, if the cuts go forward, that we might lose in the Department?

Dr. O'TOOLE. Well, in the Department as a whole, we already have a deficit of engineers and technical experts. That is why S&T's expertise is so important to the components to do operational analyses.

A lot of the big acquisition problems in the Department have been the result of the absence of S&T involvement. In SBInet, for example, we were not involved until we suggested that CBP do an AOA, which resulted in the elimination of the virtual fence. So that

would be a problem across DHS. We would not be hiring those people, as is now contemplated.

In S&T, what I have been trying to do is take those program managers who no longer have money to manage, and make them part of the team in order to drive the existing projects forward faster to completion and success.

At some point, you know, in our budget cuts, that does not become manageable and people will be let go. But I am hoping not to reach that point immediately. The M&A account for S&T has not changed.

Mr. THOMPSON. Thank you.

Mr. Maurer, as you indicated, you reviewed three areas: Funding; the recent reorganization; and some of the R&D efforts. I pretty much took from your review that GAO was reasonably satisfied with what they saw in those areas. Am I kind of summarizing the results?

Mr. MAURER. Yes. The report that we issued back in June was looking at the role that S&T was playing in overseeing testing and evaluation across the Department as part of the acquisition process. By and large, we were satisfied with the role that S&T was playing, particularly compared to some of the past acquisition processes and practices within DHS.

You know, we found that it was basically a compliance review. We were looking at whether the testing and evaluation specialists within S&T were doing what they were supposed to be doing under DHS directives, and we found that for the most part they were. They were interacting with the components, they were providing advice on a major multibillion-dollar acquisition system, so that was good for us to see.

The areas where S&T needed to improve more was just in documenting and showing that that had actually taken place, and so they have taken action to address those recommendations. We are satisfied about that.

Our on-going work that we are doing for your colleagues in the Senate is getting at the more central issue of how R&D is being managed across the entire Department, so that is looking at how the resources are being aligned relative to strategic priorities, not just in S&T but in other components that conduct research and development in the Department.

We are also going to be looking at how well that is being coordinated between S&T and the various components, as well as the extent to which DHS has a good handle on understanding the progress that they are making towards the goals they have set out in the R&D realm.

Mr. THOMPSON. Thank you. I yield back.

Mr. LUNGREN. All right, the gentleman, Mr. Walberg, is recognized for 5 minutes.

Mr. WALBERG. Thank you, Mr. Chairman, and thanks to the panelists for being here today. Director O'Toole, following up on the previous discussion, GAO testified that S&T has developed a draft strategic plan to meet the strategic goals outlined by you in August 2010.

It is difficult for us to assess whether S&T's investments address Homeland Security's strategic goals and objectives without a stra-

tegic plan. It has been more than a year since these goals were released. When can we expect to see this plan finalized?

Dr. O'TOOLE. Congressman, I appreciate your impatience and share it. It is finalized. This is a matter of formatting the report so that it is in accordance with OMB practices. It is a formatting issue, but it should be out very shortly. The essence of the plan has been documented in previous testimony and in shortened versions of the plan.

We have also changed a few things because the world has changed since we first wrote the plan, and so some of our specific goals under our large strategies have shifted somewhat, but it is essentially done. I will make sure you have an early copy.

Mr. WALBERG. Yes, before the world changes too much more.

Dr. O'TOOLE. Well, that I can't promise.

Mr. WALBERG. None of us can, that is for certain. You have stated as well that the S&T Directorate engaged with the Office of Science and Technology Policy to develop a Federal Homeland Security R&D strategy. What is the status of that strategy?

Dr. O'TOOLE. I expect that to be finished towards the first of the year, though it does have to go through interagency approval which—who knows?

But it is very—it is in draft at this point. It is well underway. We are looking at the cross-agency strategy for management, chemical, biological, and nuclear R&D, as well as R&D related to domestic IEDs.

Mr. WALBERG. Okay, okay. Well, we encourage that as well. Data, data, data are helpful to us also in making decisions here.

Moving over to cybersecurity issues, who else in the Government is funding cybersecurity R&D, and how do you collaborate and assure that the minimal conflicts take place in this R&D?

Dr. O'TOOLE. Many National security agencies are funding R&D. DHS is the only entity doing R&D for the dot-gov and the civilian sector per se. We are in close contact and collaboration with many of these other agencies, with most of them I believe, and we participate in a monthly classified meeting with the security agencies on the classified aspects of R&D relevant to us.

We have very deep and on-going collaborations, for example, with DARPA. They are using our test bed and, in fact, supplying the hardware to expand that test bed. We are working with the intelligence community. We, for example, are taking advantage of IQT, the entity invented by the IC that allows us to connect with the commercial sector, and we have a deal underway that involves a classified cyber fix.

So we are very much engaged with the other agencies, but DHS does have the primary responsibility of creating fixes for the civilian sector.

Mr. WALBERG. Okay. Do you have any examples of successful interactions with the private sector that you could share with us—

Dr. O'TOOLE. Yes.

Mr. WALBERG [continuing]. That you could share with us without having to fill us in afterwards?

Dr. O'TOOLE. Sure. We, for example, have convened a group from the financial sector to talk about how we might solve some of their problems, which I probably shouldn't articulate in open session.

We have done the same with SCADA systems, for example, the process operating controls that govern everything from chemical plant operations to dam operations. They have been very successful.

We have created many solutions from the private sector that have already been adopted by the likes of Microsoft and McAfee, and we recently put out a broad area announcement that collected a thousand responses, several hundred of which we are going to fund. We are also getting resources from Australia and Great Britain to help fund some of those very good ideas from the private sector that have come in.

Mr. WALBERG. Thank you, I appreciate that.

Mr. LUNGREN. The Chairman now recognizes the gentlelady from California, Ms. Richardson, for questions.

Ms. RICHARDSON. Thank you, Mr. Chairman.

Dr. O'Toole, I view this hearing really as two important points that we needed to uncover. One was: What improvements and mechanisms have you put in place to ensure the effectiveness of our dollars? No. 2, I think, is to have a real clear understanding of the budget implications.

Unfortunately, we are glad with all the information that you have prepared for us, but we didn't have enough time. I am willing to give you 2 minutes of my time if you would like to go back and look at your notes too, really, because I think it is very important for this committee for you to be able to summarize and clearly say the implications of these budget cuts upon your Department.

Dr. O'TOOLE. Thank you. Well, I mean the essence has been outlined. The House budget is an 80 percent cut in our discretionary R&D, and it would leave us with this \$45 million, which is about what we are spending today on explosive detection in aviation security and other behavior-based efforts related to securing the airways.

Everything else would go away. I mean, we can list, you know, borders, border security, cargo security, biodefense, cybersecurity. There would be no money for any of that. We would have to spend some of the fiscal year 2012 money in shutting down commitments that we couldn't continue. Again, our laboratory expenses are almost \$200 million.

The Senate mark leaves us in a slightly better condition; it is \$657 million. Again, half of that would have to go to operating costs and essential commitments. It would leave us as a viable R&D organization, but barely. Even at that level, we would be forced to focus on only four priority areas. There is a point in R&D where you can't just peanut-butter your efforts. You have to achieve a critical mass of intellectual capital and investment in an area in order to succeed. In that instance we would be forced to concentrate on the four priority areas of aviation security, cybersecurity, biodefense, and first responder needs. Everything else would go away.

In neither scenario does Congress provide adequate funding to build the National Bio-Agro Facility, which would leave the country

without a high-containment laboratory capable of handling contagious foreign animal diseases. This incurs a real risk to the country. We would have no way, in the event of an outbreak of these diseases, to handle them safely. We would be dependent upon work done by Australia or Canada or others, leaving at risk 10 percent of our economy.

So, again, I think we are doing a credible job of managing our budget. I think that we in S&T leverage our skills and capability against the needs of DHS in ways that helps them work more efficiently.

Certainly, I think we have already been a big help in ensuring that acquisitions start out with the right requirements, are appropriately handled, and come out on time, under budget, and deliver the technology you intended to get.

We would have a very hard time maintaining our people under these budgets, which would, again, decrement the skill set that we have to use, even in an advisory mode, against the needs of DHS. So it is basically a decision not to have an S&T Directorate.

Ms. RICHARDSON. Thank you for your frank layout of the current situation that we are facing.

Mr. Maurer, you had mentioned that you expected to have a report ready next year. Could you give us, the committee, a sense of when that report will be ready?

Mr. MAURER. We just actually started to work on that last month. We had our entrance conference with the folks at S&T back in October. We are still in the early stages. We haven't negotiated a committed issue date for that product for our signed clients, but at this point I would anticipate having final results available sometime in the summer or early fall of next year. We will keep you posted on that as we are conducting the work.

Ms. RICHARDSON. Thank you. Then, Dr. O'Toole, what impact will the proposed cuts to S&T have on first responders and their ability to respond to emergencies? Let me give you an example of something I am working on in the district.

Last week I had an opportunity to go to Beverly Hills Police Department that has really been on the forefront of the ISIS system, and then I know we are bringing back forward the proposal on the L.A. RIK system, which is a regional system for first responders.

Could you share with us what you think some of these implications would be. Is it—I have now gone into my—okay, if you could give us a sense of that.

Dr. O'TOOLE. Well, under the House mark, first responder work goes away. Under the Senate mark, I would retain it, but we would have far fewer resources.

You know, again, S&T is the only entity in the U.S. Government dedicated to working with first responders, technology and R&D needs, amazingly. They have far more needs than we can meet as it is. We have established, again in response to the NAPA report, a very robust process for trying to gather and understand those needs and set priorities with the first responder communities.

They have 11 top needs now that were established last summer, and we probably can't address more than two or three of them. So all of these programs and the support that they are being given would go away under the House mark, and they would be

a little better off under the Senate mark, but certainly decremented.

Ms. RICHARDSON. Thank you, Mr. Chairman. That concludes my questions.

Mr. LUNGREN. Okay. I am going to start a second round.

Dr. O'Toole, when you were talking about how you were using the Apex program, it prompted me to think of the BioWatch program. The S&T invested millions of dollars in coming up with a candidate, contender, whatever you want to call it, for a system of biological detectors. But when the Office of Health Affairs moved forward with its plan to test and ultimately procure a next-generation system, the one that came out of S&T was taken off the table.

Can you explain to the committee the disconnect that occurred between S&T and one of the component parts? Is that the kind of thing you are trying to avoid with Apex, or might we see the same sort of thing? In these days when we are talking about millions being taken away, and then we find a program where we invested millions, and it just seemed to be taken off the table, was it just one of the things we thought looked good and it just turned out not to be, that happens sometimes, or what?

Dr. O'TOOLE. Well, as David said, R&D is risky. The BioWatch program, as you noted, Mr. Chairman, is now operated by OHA. These questions about what the next-generation technology will be are part of a procurement procedure. So I am limited in what I can say. Let me just clarify that—

Mr. LUNGREN. Well, am I wrong in my articulation of the facts, that I thought—

Dr. O'TOOLE. No.

Mr. LUNGREN [continuing]. S&T had developed tens—

Dr. O'TOOLE. No, you are correct.

Mr. LUNGREN [continuing]. Of millions of dollars towards developing something, and then that was not part of what is being considered?

Dr. O'TOOLE. Yes. We supported a number of performers in developing biodetection technologies that could very rapidly identify bioweapons in aerosol form. One such technology that we had supported entered into the Phase I testing that OHA did, and failed that testing. I think that is about as much as I can say. I would be happy to go back for the record and put this in writing.

Mr. LUNGREN. Okay. Let me ask you a hypothetical: With the Apex approach that you have now, are there certain measurement points at which you might, because of your closer cooperation with the component, you might be able to make a decision sooner rather than later that, well, we spent \$8 million, we are not going to go spend another \$10 million because it doesn't appear that what we have been projecting fits in what the component is going to need?

Dr. O'TOOLE. Yeah. You certainly aim to do that in all well-managed R&D projects.

Mr. LUNGREN. Right. Is there anything about Apex that makes it different than what has happened before?

Dr. O'TOOLE. Yes. You would have a—well, Apex and the portfolio review, okay.

Mr. LUNGREN. Okay.

Dr. O'TOOLE. We are aiming to have, you know, clear process controls on what projects we move forward on. But let me point out that the testing that OHA is doing is of the same ilk. They are doing now, testing to see if these technologies perform according to their requirements. So though from one perspective, which I certainly understand, it looks like S&T has spent a lot of money on a technology that apparently failed, OHA is trying to responsibly test these technologies against each other before it makes an even bigger investment in procuring the systems and putting them in the field.

Mr. LUNGREN. Mr. Maurer, would you have any comments on that?

Mr. MAURER. Yeah, absolutely. I think as a general proposition, we have testified and reported in the past on problems that DHS has had in prior programs where they hadn't adequately tested technology before making big multibillion-dollar decisions on what to buy. So from that perspective, it is a very good idea, indeed, to make sure things are properly tested before you move too far down the road on the acquisition and procurement side of the house.

Mr. LUNGREN. What about the connection between S&T and the component parts and the coordination earlier on, so that maybe—and again hypothetically—

Mr. MAURER. Sure. Sure.

Mr. LUNGREN [continuing]. Maybe before you continue to go down the spending path, you realize that the ultimate decision-maker in terms of the component might be setting up a criteria that would make it less likely that that which you have been putting your money in would qualify for?

Mr. MAURER. As a general proposition, absolutely. You want to have as close collaboration as you can get between the folks that are developing the technology and the people that are actually going to be using it.

Mr. LUNGREN. Are you seeing improvement in that in S&T?

Mr. MAURER. That is part of our on-going work. That is certainly something we can report out on next year. We are encouraged by our discussions with S&T at this point, and the things that they have talked about. But as you know, part of what GAO does is, we have heard sort of the first line of arguments, the discussions with the Under Secretary and her staff. It sounds very promising. But as part of our work, we are going to be verifying. We are going to see if that is what is actually taking place. So stay tuned on that front.

Mr. LUNGREN. Trust but verify.

Mr. MAURER. Yeah.

Mr. LUNGREN. All right. I believe that will conclude our hearing. I want to thank both of you for being here. I want to thank both of you for the work that you are doing and continue to do. Thank you for your valuable testimony, and the Members for their participation.

The Members of the committee may have some additional questions for the witnesses. We would ask you, if you receive them, to respond to us in a timely fashion in writing. The hearing record will be held open for 10 days.

This subcommittee stands adjourned.
[Whereupon, at 11:06 a.m., the subcommittee was adjourned.]

APPENDIX

QUESTIONS FOR TARA O'TOOLE FROM HONORABLE YVETTE D. CLARKE

Question 1a. Dr. O'Toole, in the fiscal year 2011 and fiscal year 2012 budgets, the administration proposed transferring the Transformational R&D program from the Domestic Nuclear Detection Office (DNDO) to the S&T Directorate, explaining that this move will further consolidate R&D across the Department. You have testified in other hearings that moving this program to the S&T Directorate would reduce duplicative efforts in program management and "create a better environment for R&D coordination in support of the DHS mission." In contrast, DNDO Director Warren Stern testified that the decision had "pluses and minuses." While the House-passed appropriations act rejects this transfer, the Senate appropriations act supports it. Now, the Department states that it has "reconsidered" the proposed transfer and prefers to keep the Transformational R&D program within DNDO. I have a list of questions that I will probably follow up on after the hearing, but initially:

What is the Department's current position regarding the requested transfer?

Answer. Response was not received at the time of publication.

Question 1b. Are all DHS components in agreement regarding this transfer?

Answer. Response was not received at the time of publication.

Question 1c. What tangible, quantifiable benefits would consolidating the Transformational R&D program from DNDO to the S&T Directorate have?

Answer. Response was not received at the time of publication.

Question 1d. What are the potential negatives?

Answer. Response was not received at the time of publication.

Question 1e. What additional documentation will the administration be sending to Congress regarding its position and fiscal year 2012 appropriations?

Answer. Response was not received at the time of publication.

Question 1f. Why should Congress approve the administration's request?

Answer. Response was not received at the time of publication.

Question 2. In your planning for fiscal year 2012, which areas will your investment in basic research yield the greatest results? How will you prioritize basic research with the proposed sharply reduced R&D budget?

Answer. Response was not received at the time of publication.

Question 3. Dr. O'Toole: Does S&T have the capability to perform rapid business and technical reviews to screen unsolicited homeland security technology proposals submitted to the Secretary? If not, is this a function that you believe S&T would be able to do if authorized?

Answer. Response was not received at the time of publication.

Question 4. Dr. O'Toole, many of us believe that S&T struggles to work with Department components because DHS hasn't established clear guidelines and requirements for funding research. Most say, the Integrated Product Team (IPT) process is a good way of bringing components to the table, but it's an extremely informal mechanism to hand out millions of dollars in research. Please explain any steps you have taken to make sure basic and applied homeland security research is identified, prioritized, funded, and evaluated by S&T.

Answer. Response was not received at the time of publication.

QUESTIONS FOR TARA O'TOOLE FROM HONORABLE LAURA RICHARDSON

Question 1a. The DHS Science and Technology Directorate is responsible for developing technologies for other DHS components' programs and is specifically tasked by the Homeland Security Act of 2002 to perform testing and evaluation of anti-terrorism technology. An example of a DHS component program is the Office of Health Affairs (OHA), BioWatch Generation-3 system that is being developed to detect the presence of airborne biological pathogens. S&T spent tens of millions of dollars on the development, validation, and transition of a next-generation assay technology

for OHA's BioWatch Generation-3 program. Under Phase I of the Gen 3 program the S&T technology was rejected by OHA claiming the technology did not meet system testing requirements. In August a draft Request for Proposals for Phase II was published and involves full rate production of as many as 2,500 units. Dr. O'Toole, as one of the Federal Government's top experts on the prevention and effects of bio-terrorism, I would like to understand exactly how involved you were, personally, in the evaluation of BioWatch Gen 3, Phase 1 technology tests.

Did you concur with the decision to stop testing in Phase I?

Answer. Response was not received at the time of publication.

Question 1b. To what extent have you been engaged in the anticipated RFP for BioWatch Gen 3, Phase II thus far?

Answer. Response was not received at the time of publication.

Question 1c. Does the Secretary of DHS support you and/or your office having a formal and substantial coordinating role with OHA on Phase II to ensure the testing and evaluation of the Gen 3 technology is validated by scientists capable of interpreting complex data on this biothreat detection threat technology?

Answer. Response was not received at the time of publication.

Question 1d. In previous testimony before the House Appropriations Committee in February 2010, you said that a company S&T funded to develop an autonomous bio-detection sensor for Biowatch Gen 3 was a real "success story" for how S&T supports industry, including small businesses, in bringing new technologies to the homeland security mission. It is my understanding that this technology was tested along with one other technology by the Office of Health Affairs and in the middle of the tests OHA stopped testing the S&T-funded detector but kept paying for testing for technology of the other company. How can industry, be it a small business or a large company, be persuaded to develop new technologies if they are not permitted to complete the testing phase?

Answer. Response was not received at the time of publication.

Question 1e. Do you have an opinion regarding if it is wise to award to a single supplier when the threats are still evolving and the complex instruments to detect them are still in development?

Answer. Response was not received at the time of publication.

QUESTIONS FOR TARA O'TOOLE FROM CHAIRMAN DANIEL E. LUNGREN

PRIORITIZATION & PROGRAM REVIEW

Question 1. Dr. O'Toole's testimony indicated that she is reducing the number of projects that are funded, instilling annual reviews of on-going work, and funding each project through to use in the field. She also indicated that S&T is starting to see this effort bear fruit.

What percentage of S&T's R&D efforts have resulted in deployment of a new, improved technology?

Answer. Response was not received at the time of publication.

Question 2. Are the Apex projects superseding the IPT process in serving as the major mechanism for obtaining and prioritizing the needs of DHS operational components?

Answer. Response was not received at the time of publication.

Question 3. Considering the Apex projects are one-on-one efforts between S&T and another component or end-user, what mechanism exists to prioritize R&D across disciplines (e.g., who decides and how is it decided whether a border security project is higher or lower priority than an aviation security project?), as well as to find synergies across the needs of the components to get more bang for the buck?

Answer. Response was not received at the time of publication.

Question 4. What is the status of plans to replace or improve the IPT process? What improvements have been made or plan to be made? What funding lines (e.g. HSARPA R&D, Centers of Excellence, etc.) are under the purview of the IPT process?

Answer. Response was not received at the time of publication.

Question 5. How does S&T track or measure whether its R&D results are meeting homeland security objectives?

Answer. Response was not received at the time of publication.

Question 6a. The S&T Directorate has established a portfolio review process that it uses to assess the impact and feasibility of its R&D activities.

Why does the S&T Directorate not employ a more traditional peer review process using other scientists to judge the scientific merit of proposed research?

Answer. Response was not received at the time of publication.

Question 6b. How are the views of customers, such as first responders and DHS operational components, incorporated in the portfolio review process?

Answer. Response was not received at the time of publication.

Question 7a. To what extent do the other components of DHS use the HSSAI and HSSEDI and is that work funded by S&T or the component?

Do they primarily support the activities of the S&T Directorate or others?

Answer. Response was not received at the time of publication.

Question 7b. How do these FFRDCs affect the S&T Directorate's activities, such as its prioritization of R&D activities?

Answer. Response was not received at the time of publication.

Question 8. How is S&T improving the performance of its University Centers of Excellence and their alignment with homeland security needs?

Answer. Response was not received at the time of publication.

R&D COORDINATION

Question 9a. What actions is S&T undertaking to coordinate R&D among its peers within the Department?

How does this coordination manifest itself?

Answer. Response was not received at the time of publication.

Question 9b. What written documents support these coordinative efforts?

Answer. Response was not received at the time of publication.

Question 9c. How is S&T institutionalizing this coordination so that it can continue into future years?

Answer. Response was not received at the time of publication.

Question 10. Please describe how S&T coordinates its R&D agenda with those of other departments to ensure that unnecessary duplication of effort is avoided and gaps do not exist between the efforts of the various homeland security R&D conducting agencies?

Answer. Response was not received at the time of publication.

BALANCE BETWEEN S&T'S MISSIONS—R&D, T&E, AND ACQUISITION SUPPORT

Question 11a. Dr. O'Toole has stated that S&T is focused on getting technologies out within 18 months. Who is looking farther out in time to ensure DHS will have the ability to address adaptive adversaries?

Are there other entities S&T is relying on to invest in long-term R&D or does this present a gap?

Answer. Response was not received at the time of publication.

Question 11b. If S&T maintains some core capability to address emerging threats, what proportion of S&T's budget is dedicated to this effort as opposed to focusing on current threats?

Answer. Response was not received at the time of publication.

Question 12a. The focus of the Homeland Security Advanced Research Projects Agency (HSARPA) has shifted several times since its creation. Currently HSARPA contains all of the technical divisions and receives the bulk of S&T's funding.

What is the proper role for HSARPA, i.e., should it focus on prototyping and near-term technology development, high-risk/high-reward R&D, or some other role?

Answer. Response was not received at the time of publication.

Question 12b. What proportion of S&T's resources should be devoted to HSARPA in future years?

Answer. Response was not received at the time of publication.

Question 12c. If HSARPA invests in high-risk, high-reward projects, what proportion of funding do you expect to be dedicated to this effort and what is the optimal success rate or tolerable failure rate to ensure that sufficiently challenging projects are undertaken?

Answer. Response was not received at the time of publication.

Question 13a. Currently, the S&T Directorate provides oversight of testing and evaluation (T&E) activities conducted by other DHS entities. Other agencies, such as the Department of Defense, have independent testing and evaluation entities.

How would establishing an independent testing and evaluation entity within DHS, outside of S&T, change the current state of testing and evaluation?

Answer. Response was not received at the time of publication.

Question 13b. How does S&T in its current form ensure there are no conflicts of interest since it has responsibility as both the developer of technology and the test and evaluation authority?

Answer. Response was not received at the time of publication.

Question 13c. What additional authorities does S&T require?

Answer. Response was not received at the time of publication.

Question 14. When will all major acquisitions be fully compliant with S&T's T&E policies?

Answer. Response was not received at the time of publication.

Question 15a. Please describe how S&T views the roles of the DOE National laboratories versus S&T's other FFRDCs versus the private sector.

What factors determine whether S&T expends funds through a National lab, other FFRDC, or in the private sector?

Answer. Response was not received at the time of publication.

Question 15b. What is the appropriate balance for S&T between funding work in Government laboratories versus open competition in the private sector?

Answer. Response was not received at the time of publication.

TECHNOLOGY FORAGING

Question 16. What is S&T's approach to "technology foraging" and how does it differ from S&T's normal way of doing business such as market research, Requests for Information, reading technical journals, attending scientific conferences, and conducting internet searches?

Answer. Response was not received at the time of publication.

Question 17. Is there dedicated funding for the technology foraging effort? In what budget line item does it appear? Will external contractors be used?

Answer. Response was not received at the time of publication.

Question 18. How formal is the technology foraging process within S&T? Is S&T incorporating technology foraging into all new program starts and does S&T plan to incorporate technology foraging as part of the acquisition support S&T provides to the components?

Answer. Response was not received at the time of publication.

THE NATIONAL BIODEFENSE AND ANALYSIS COUNTERMEASURES CENTER (NBACC)

Question 19. Is the NBACC fully up and running? If not, why not?

Answer. Response was not received at the time of publication.

Question 20. The NBACC is maintained at about \$30 million per year. However, we understand there is currently unused space at the lab. Can the laboratory space that is complete but vacant be leased to other Federal entities that may be looking for upgraded facilities?

Answer. Response was not received at the time of publication.

Question 21a. This committee has learned that severe corrosion of the pipes in several areas of the laboratory was discovered, in places where the pipes had never even been used.

Can you please explain how this could have happened in a brand-new, unused laboratory?

Answer. Response was not received at the time of publication.

Question 21b. Please provide the precise cost of remediation and how far back, in terms of time until full operational capability, these problems have set the lab.

Answer. Response was not received at the time of publication.

Question 22a. I understand that approximately \$76,000 is spent annually on casework at the NBFAC, but annual costs to maintain the capability to do that casework total about \$3.1 million, not including overhead.

Please provide a detailed breakdown of the activities associated with the costs to maintain the casework capability.

Answer. Response was not received at the time of publication.

Question 22b. What results have been generated by the NBFAC that have enabled cases to be tried successfully in a court of law?

Answer. Response was not received at the time of publication.

Question 23. Is the NBACC leveraging historical knowledge and understanding of bioterror agents that exists within the Department of Defense and U.S. allies, such as the United Kingdom, to the maximum extent possible, including the threat from dual agents?

How is S&T facilitating NBACC's ability to access such information? (Submit classified information as necessary to the committee under separate cover.)

Answer. Response was not received at the time of publication.

QUESTIONS FOR DAVID C. MAURER FROM CHAIRMAN PETER T. KING

Question 1a. The S&T Directorate provides oversight of testing and evaluation (T&E) activities conducted in other DHS entities. Other agencies, such as the Department of Defense (DOD), have independent testing and evaluation entities.

Do you think it would be beneficial for DHS to similarly have an independent OT&E authority outside of S&T?

Question 1b. Could there be potential conflicts because S&T is currently both the developer and the T&E authority?

Question 1c. How would establishing an independent testing and evaluation entity within DHS change the current state of testing and evaluation?

Answer. We believe it is necessary for DHS's T&E oversight authority to be independent of the programs it oversees to ensure that DHS has non-biased information when making decisions about acquiring new technologies. We reported in June 2011 that the Director of Operational Test and Evaluation within S&T's Test & Evaluation and Standards Division (TES) oversees T&E of components' acquisition programs to ensure that they meet the requirements of DHS's T&E directive.¹ As a separate office within S&T, we reported that TES is independent of the component acquisition program management offices that it oversees and is separate from the offices within S&T that conduct R&D. We reported that TES met some of its oversight requirements for T&E of acquisition programs we reviewed, but we recommended that S&T better document its review and approval of component documentation to ensure that the requirements of the DHS T&E directive are met. S&T agreed and reported that it has since developed internal procedures to ensure that their review and approvals are documented. We did identify one case in which TES was serving as the operational test agent for a DHS program—the Advanced Spectroscopic Portal—and, as a result, was not in a position to independently assess the results of operational testing as required by the T&E directive. We recommended that DHS arrange for an independent assessment of this program's test results. DHS agreed and stated that it has since identified another entity to serve as the test agent instead of TES.

Our work did not specifically assess where the T&E oversight function should be placed within DHS and did not compare DHS's structure with that of DOD. However, the purpose and organization of DOD T&E activities underscores the importance of independent T&E efforts. We have reported that developmental testers help reduce program risk by evaluating performance at progressively higher levels of component and subsystem levels, thus allowing program officials to identify problems early in the acquisition process.² Within DOD, the operational testing organization provides information regarding the operational effectiveness and suitability of weapon systems and can assist in managing program risk. DOD developmental testing and operational testing activities were under one organization—the Director of Test and Evaluation—prior to 1983. In 1983, Federal law established the position of the Director, Operational Test and Evaluation, who is appointed by the President and confirmed by the Senate. The Director is required by law to submit to the Secretary of Defense and the Congress annual reports summarizing DOD's operational test and evaluation activities.³ In 2009, the developmental testing organization began reporting to the Under Secretary of Defense for Acquisition, Technology, and Logistics through the Director, Defense Research and Engineering.

Question 2a. GAO's prior work in 1995 on DOE National Laboratories showed the labs did not have clearly-defined missions focused on accomplishing DOE's changing objectives and National priorities.

Given S&T's changing focus today, how do you think S&T could go about creating a tighter linkage between the labs and S&T's mission and goals to maximize the labs as a resource?

Question 2b. Do you have any thoughts on how a potential consolidation of DOE's National labs that the recent DOE IG report suggested would affect S&T and how S&T could go about ensuring homeland security needs are factored into any decisions made by DOE?

Answer. We reported on DHS's use of the DOE National Laboratories for R&D purposes in May 2004—1 year after DHS and S&T had begun operations.⁴ In that report, we recommended that S&T develop and better communicate to DOE's laboratories and other potential contributors to homeland security R&D efforts criteria for distributing annual project funding and for making long-term investments in laboratory capabilities for homeland security R&D. We also recommended that DHS

¹ GAO, *DHS Science and Technology: Additional Steps Needed to Ensure Test and Evaluation Requirements Are Met*, GAO-11-596 (Washington, DC: June 15, 2011).

² GAO, *Defense Acquisitions: DOD Needs to Develop Performance Criteria to Gauge Impact of Reform Act Changes and Address Workforce Issues*, GAO-10-774 (Washington, DC: July 29, 2010).

³ 10 U.S.C. § 139.

⁴ GAO, *Homeland Security: DHS Needs a Strategy to Use DOE's Laboratories for Research on Nuclear, Biological, and Chemical Detection and Response Technologies*, GAO-04-653 (Washington, DC: May 24, 2004).

develop specific guidelines that detail the circumstances under which DOE laboratories and other Federal R&D programs would compete for contracts with private sector and academic entities. We are currently reviewing DHS and S&T's processes for prioritizing, coordinating, and measuring the results of its R&D efforts for the Senate Committee on Homeland Security and Governmental Affairs and we will report on our results next year. While we are not focusing specifically on S&T's use of National labs, we will assess how S&T prioritizes its R&D activities, how it selects projects, and what entities conduct R&D.

The findings of DOE's Office of Inspector General in its recent report on management challenges in the Department of Energy are generally consistent with our prior work.⁵ For example, the DOE IG report questioned whether the laboratories' missions are clear, well-understood, and properly coordinated and whether the laboratory complex was appropriately sized. This is consistent with our 1995 report that found that DOE's National laboratories did not have clearly-defined missions focused on accomplishing DOE's changing objectives and National priorities.⁶ This inhibited cooperation across DOE programs and hindered DOE's ability to use the laboratories to meet Departmental missions. In addition, DOE's IG raised doubts about whether the significant proportion of scarce science resources that are being diverted to administrative, overhead, and indirect costs for each laboratory are sustainable in the current budget environment. This complements findings from two of our reports. In September 2005, we reported that it is difficult to compare indirect costs across laboratories because laboratory contractors define indirect costs differently. In June 2010, we found that the National Nuclear Security Administration (NNSA) could not accurately identify the total costs to operate and maintain facilities and infrastructure for three National laboratories because of differences in sites' cost accounting practices.⁷

In any consolidation of the laboratories, the research requirements of all of DOE's customers would need to be considered in any decision-making process. This is particularly important for the DHS-directed work at the DOE National laboratories because, under a 2003 memorandum of agreement between DHS and DOE, research for DHS is given the same priority at the DOE National laboratories as DOE-directed research. However, in 1998 we reported that the laboratories did not function as part of an integrated National research and development system. Therefore, an independent panel, as recommended by DOE's IG, that would, among other things, comprehensively examine alternatives for realigning DOE's laboratory complex, may be a useful step to better defining overall Governmental research objectives. This may also help in developing performance measures to assist the National laboratories to accomplish the broad array of research requirements across the Federal Government.

Question 3. Given all of S&T's recent changes, including in its organizational and management practices and the shifting scope of its mission, do you believe S&T would benefit from updating its last 5-year R&D plan (fiscal year 2008–2013) and if so, please explain some of the benefits.

Answer. We believe that strategic planning is important to help ensure that an agency's efforts and resources are aligned with their mission and goals. As I noted in my testimony, we reported in May 2004 that DHS did not have a strategic plan to guide its R&D efforts and recommended that it complete such a plan and ensure that it was integrated with homeland security R&D conducted by other Federal agencies.⁸ DHS agreed with our recommendation and while S&T developed a 5-year R&D plan in 2008 to guide its efforts and is currently finalizing a new strategic plan to align its own R&D investments and goals, DHS has not yet completed a strategic plan to align all R&D efforts across the Department. Moreover, as noted in my testimony, our prior work on Federal R&D efforts could provide valuable insights into how DHS could develop comprehensive strategies. For example, we reported in June 2009 that DOE could not determine the effectiveness of its laboratories' technology transfer efforts because it has not yet defined its overarching strategic goals for

⁵ DOE Office of Inspector General, *Special Report: Management Challenges at the Department of Energy*, DOE/IG-0858 (Washington, DC: Nov. 10, 2011).

⁶ GAO, *Department of Energy: National Laboratories Need Clearer Missions and Better Management*, GAO/RCED-95-10 (Washington, DC: Jan. 27, 1995).

⁷ GAO, *Department of Energy: Additional Opportunities Exist for Reducing Laboratory Contractors' Support Costs*, GAO-05-897 (Washington, DC: Sept. 9, 2005) and GAO, *Nuclear Weapons: Actions Needed to Identify Total Costs of Weapons Complex Infrastructure and Research and Production Capabilities*, GAO-10-582 (Washington, DC: June 21, 2010).

⁸ GAO-04-653.

technology transfer and lacks reliable performance data.⁹ We recommended that DOE explicitly articulate Department-wide priorities for technology transfer efforts and develop clear goals, objectives, and performance measures in line with identified priorities. We have also reported that leading private companies have strong strategic planning practices to identify the right technologies to pursue and prioritize resources. Strategic planning is an important early step in a company's ability to eventually deliver the highest-priority technologies to various product lines.¹⁰ The leading private companies we visited underwent strategic planning at least annually, and this process enabled corporate management to conduct portfolio analysis, determine which projects appeared to be relevant and feasible, and identify new thrust areas as new ideas come to light. Projects that were no longer relevant or feasible were eventually terminated. This type of strategic planning was critical to ensuring that the right technologies were ultimately transitioned to the right product line in an economical and timely way.

We are currently reviewing DHS and S&T's processes for prioritizing, coordinating, and measuring the results of its R&D efforts for the Senate Committee on Homeland Security and Governmental Affairs and we will report on our results next year. As part of this work, we will review the 5-year R&D plan that S&T developed in 2008 and assess DHS and S&T's efforts to develop an R&D strategic plan for the department.

Question 4. Do you see a role for S&T beyond being the T&E authority in the Department's acquisition of technology? For one, should S&T be conducting Technology Readiness Assessments to ensure a technology is sufficiently mature before proceeding through major acquisition gates?

Answer. We believe that the technical knowledge and expertise within S&T should be leveraged to the greatest extent possible to help DHS in the development and acquisition of new technologies to ensure that they work most effectively when implemented. S&T recently reorganized and established new strategic goals, one of which is to leverage its expertise to assist DHS components' efforts to establish operational requirements, and select and acquire needed technologies. As part of this reorganization, S&T established the Acquisition Support and Operations Analysis Group to help provide this assistance to components. In Under Secretary O'Toole's testimony, she noted that S&T has now been incorporated into DHS's new integrated investment life cycle and will be working on the "front end" of the acquisition process assisting in the development of program requirements, which greatly improves the odds of a successful transition at the end of the program. She also noted that S&T will provide systems engineering support throughout the "middle" of the investment life cycle to assist components with items such as risk management and developing concepts of operation. Additionally, S&T has responsibility for conducting oversight of T&E requirements on the "back end" of the acquisition process, which helps to ensure that technologies have been appropriately tested prior to acquiring and deploying them.

Our work has not specifically assessed S&T's role in conducting technology readiness assessments (TRA) and has not compared DHS with DOD. However, we can provide some information about how DOD conducts TRAs that may be useful. In DOD, the program manager, in conjunction with an independent team of subject matter experts, are responsible for conducting a TRA, and the Assistant Secretary of Defense for Research and Engineering provides the Milestone Decision Authority, an independent assessment and review concerning whether the technology in the program has been demonstrated in a relevant environment. Although we have not evaluated the effectiveness of this process, it appears to be working well. We have recently reported that DOD weapons acquisition programs are now beginning with much higher levels of technology readiness than when we first started reporting this information in 2003.¹¹

While the recent changes at S&T seem promising, it is too soon to assess what impact S&T's reorganization and focus on assisting components will have until DHS programs have been subjected to these new processes over time. The extent to which DHS leverages expertise within S&T will determine S&T's impact on the development and acquisition of new technologies across the Department. We are currently reviewing DHS and S&T's processes for prioritizing, coordinating, and measuring

⁹GAO, *Technology Transfer: Clearer Priorities and Greater Use of Innovative Approaches Could Increase the Effectiveness of Technology Transfer at Department of Energy Laboratories*, GAO-09-548 (Washington, DC: June 16, 2009).

¹⁰GAO, *Best Practices: Stronger Practices Needed to Improve DOD Technology Transition Processes*, GAO-06-883 (Washington, DC: Sept. 14, 2006).

¹¹GAO, *Defense Acquisitions: Assessments of Selected Weapon Programs*, GAO-10-388SP (Washington, DC: March 30, 2010).

the results of its R&D efforts for the Senate Committee on Homeland Security and Governmental Affairs and we will report on our results next year. As part of this review, we will review S&T's recent reorganization, its focus on providing technical assistance to components, and the associated impact on DHS components. We are also currently assessing DHS's acquisition management activities for the same committee and will report on our results next year as well.

