THE DHS AND DOE NATIONAL LABS: FINDING EFFICIENCIES AND OPTIMIZING OUTPUTS IN HOMELAND SECURITY RESEARCH AND DEVELOPMENT

HEARING

BEFORE THE

SUBCOMMITTEE ON CYBERSECURITY, INFRASTRUCTURE PROTECTION, AND SECURITY TECHNOLOGIES

OF THE

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THE DHS AND DOE NATIONAL LABS: FINDING EFFICIENCIES AND OPTIMIZING OUTPUTS IN HOMELAND SECURITY RESEARCH AND DEVELOPMENT

Thursday, April 19, 2012

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 10:02 a.m., in Room 311, Cannon House Office Building, Hon. Daniel E. Lungren [Chairman of the subcommittee] presiding.

Present: Representatives Lungren, Walberg, Long, Clarke, and Richardson.

Mr. LUNGREN. The Committee on Homeland Security—the Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies will come to order. The subcommittee is meeting today to examine the National Labs of the Department of Homeland Security and the Department of Energy; and the homeland security research and development they produce.

I have been advised that we expect votes in 10 or 15 minutes, one short order of votes, and then we will come back. Then we have votes 2 hours thereafter. So we will try and proceed and get as much as we can get done before we have those votes. I apologize for this but this is the last day of the week that we are in session, so they allow votes before noon. With the permission of the Minority, we are going to start. When the Ranking Member arrives, I will recognize her for her opening statement.

First of all, I want to thank you for being here. I think this is an important issue because as much as anything else, we are going to stay on the cutting edge in the areas of responsibility for the Department of Homeland Security if we, in fact, maintain our technological edge. We have tremendous resources with the Department. We have tremendous resources specifically with the National Labs. The question is: Are we doing the best job to ensure that we get the best bang for the buck?

The No. 1 stated goal of the DHS Science and Technology Director is to, "deliver knowledge, analyses, and innovative solutions that advance the security mission of the Department." The Homeland Security Act of 2002 included the necessary statutory authorization for DHS to work with these labs in support of homeland security needs. It also established a special relationship allowing

DHS to use the DOE Lab system on an equal basis. In addition, the DHS Office of National Laboratories coordinates with DOE to meet mission goals and avoid duplication.

As I said before, these labs are wonderful resources which deliver critical homeland security capabilities. DHS Labs—like Plum Island—have provided crucial advances in Foot-and-Mouth Disease vaccine to protect our agricultural infrastructure. Plum Island, because its isolated environment offers unique safety features for this type of contagious science work.

The Chemical Security and Analysis Center is another DHS Lab in Aberdeen, Maryland, which studies hazardous chemical release scenarios and how they impact our emergency response protocols. Our DOE Labs, some dating back to World War II and the start of the nuclear age, have been indispensible partners in our National security efforts. DOE and DHS Labs across the country bring together the best scientists to push the limits of research and biodetection, cutting-edge nuclear detection capabilities for our ports and characterize the explosive threats in our aviation environment.

Because the labs are such a significant piece of the Department's research and development efforts, we must ensure that they will be used efficiently and in-line with Congressional intent. The lab operations, along with S&T program costs, total hundreds of millions of dollars annually. Because of these substantial investments, our subcommittee has a responsibility to closely scrutinize the operations.

Are the labs costs reasonable? Are there cost savings to be found? Is DHS prioritizing National Lab work appropriately? Does DHS view the labs as a short-term contract or long-term, strategic partner? Is existing laboratory capacity sufficient to meet our needs or is more infrastructure justified? The last question is of particular importance with regard to the proposed National Bio- and Agro-Defense Facility.

It is my hope that oversight from this subcommittee will encourage S&T to work more efficiently with its shrinking budget in support of its homeland security mission. I look forward to the testimony from our witnesses today. Look, our Governmental system was born out of a skepticism of Government and, frankly, I think that is good. But if skepticism turns to cynicism, we are in bad shape. We have to wrestle, as you do, with these budget constraints that we have.

We have an obligation not only to make those tough decisions, but to make those decisions explainable and understandable to our constituents so they, in fact, would support those programs that are necessary. That is part of our inquiry here today. So we very much appreciate your being here. Again, I apologize that we will have interruptions for votes. As soon as the Ranking Member gets here, I will recognize her for opening statement.

[The statement of Chairman Lungren follows:]

STATEMENT OF CHAIRMAN DANIEL E. LUNGREN

APRIL 19, 2012

We meet today to discuss the Department of Homeland Security's use of the Nation's extensive National Laboratory infrastructure. This infrastructure is a valuable

asset supporting our homeland security mission with innovative R&D technology products to secure the homeland.

The No. 1 stated goal of the DHS Science and Technology Directorate is to "deliver knowledge, analyses, and innovative solutions that advance the security mission of the Department." The Homeland Security Act of 2002 included the necessary statutory authorization for DHS to work with these laboratories in support of Homeland Security needs. It also established a special relationship allowing DHS to use the DOE Lab system on an equal basis. Finally DHS, through the Office of National Laboratories coordinates with DOE to meet mission goals and avoid duplication.

These labs are wonderful resources which deliver critical homeland security capabilities. DHS Labs like Plum Island have provided crucial advances in foot-and-mouth disease vaccine to protect our agricultural infrastructure. This work can only be done at Plum Island. The Chemical Security and Analysis Center is another DHS Lab in Aberdeen, MD which studies hazardous chemical release scenarios and how that impacts our emergency response protocols.

Our DOE Laboratories, some dating back to World War II and the start of the nuclear age, have been indispensable partners in our National security efforts. DOE Labs across the country bring together the best scientists to push the limits on biodetection, develop cutting-edge nuclear detection capabilities for our ports, and characterize the explosive threats in our aviation environment.

Because the labs are such a significant piece of the Department's research and development efforts, we must ensure that they are being used efficiently and in line with Congressional intent. Hundreds of millions of dollars are being spent on our labs annually ($600 million estimated).

Because of these substantial investments, we must carry-out rigorous oversight. Are these costs reasonable? Are there cost savings to be found? Is DHS prioritizing National Lab work appropriately? Does DHS view the labs as a short-term contractor or as a long-term strategic partner? Is existing laboratory capacity sufficient to meet our needs, or is more infrastructure justified? This last question is of particular importance with regard to the proposed National Bio- and Agro-Defense Facility.

It is my hope that oversight from this subcommittee will encourage S&T to work more efficiently with its shrinking budget, to support the homeland security mission.

I look forward to the testimony from our witnesses today from the Science and Technology Directorate and our Domestic Nuclear Detection Office, the primary customers of these labs. We also welcome two current DOE Lab employees and the Congressional Research Service for their perspective on these questions.

Mr. LUNGREN. I would like to introduce our witnesses here. Dr. Gerstein is the Deputy Under Secretary for Science and Technology at Department of Homeland Security. Before joining DHS, he served as principal director of countering weapons of mass destruction within the Office of the Secretary of Defense. For policy, he served on four different continents, participating in homeland security and counter-terrorism peacekeeping, humanitarian assistance and combat, in addition to serving for over a decade in the Pentagon, various high-staff assignments.

Following return from active duty, Dr. Gerstein joined L–3 Communications as vice president for homeland security services, a league and organization providing WMD preparedness and response, critical infrastructure, security, emergency response capacity genuine, and exercised support to U.S. and international customers. That is just a portion of his resume.

We appreciate what you have done and we thank you for the service now.

Dr. Gowadia.

Ms. GOWADIA. Gowadia.

Mr. LUNGREN. Gowadia, excuse me.

Dr. Gowadia is the Deputy Director of Domestic Nuclear Detection Office at the Department of Homeland Security. Prior to this assignment, she served as assistant director of DNDO's Mission

Management Director, where she was responsible for ensuring an effective link between user requirement, operational support, technology development across nuclear detection architecture.

Dr. Gowadia was appointed to the Senior Executive Service 2006, to serve as DNDO's first assistant director of assessments, previously served as program executive for DHS' Science and Tech Countermeasures test beds. Again, an impressive resume and we appreciate your service.

Dr. Daniel Morgan, a Specialist in Science and Technology Policy in the Resources, Sciences, and Industry Division at Congressional Research Service. I might just throw in that I think Congressional Research Service is an indispensable arm of the Congress and one that doesn't get a whole lot of attention but we thank you for your expertise and allowing us, sort of, a third-party review of things when we take a look at that.

Dr. Morgan specialized in Research and Development programs at the Department of Homeland Security, Department of Energy, and NASA. He has a Ph.D. in Physics from University of Texas at Austin and B.S. in Physics and Math from MIT. Previously a study director at National Academy of Sciences.

We thank all of you. We would ask you to attempt to summarize your statements in 5 minutes. We have your written statements; they will be made a part of the record in their totality. We would ask you to speak in the order in which I introduced you.

Other Members are reminded that statements may also be submitted for the record.

[The statements of Ranking Member Clarke and Ranking Member Thompson follow:]

STATEMENT OF RANKING MEMBER YVETTE D. CLARKE

APRIL 19, 2012

Mr. Chairman, thank you for holding this hearing on the National Laboratories and how the Department can best utilize these valuable resources to accomplish our homeland security goals.

Mr. Chairman, I too, want to welcome our witnesses today, some have traveled from the great State of California, and we appreciate their participation. I also want to welcome Deputy Under Secretary Gerstein to the subcommittee. He is relatively new to his position, obviously well qualified, and since arriving has provided enthusiastic and knowledgeable leadership efforts to S&T. During his short time on the job, he has proven to be a valuable asset to Under Secretary O'Toole. I am looking forward to his testimony today.

The Department, and S&T in particular, supports a broad range of scientific and engineering research and development. Its purposes are wide-ranging and address specific concerns such as chemical security, biodefense, transportation security, and nuclear detection.

An important segment of the Department's laboratory's effort is that it fosters the development of our country's scientific, engineering, and technical workforce, which influences students at our universities and even high schools. When teachers and students can see that there is interesting and substantial work to be done in the sciences at our laboratories, they show an incredible amount of interest in striving to work there. Important things go on in our laboratories, and they are seen as good and significant places to work.

Our scientists, researchers, engineers, and technicians work hard to deliver solutions grounded in science and supported by innovative engineering, and this strengthens U.S. innovation and competitiveness in the global economy.

This committee has a long-standing interest in the strength of the Department's research and development enterprise and in providing support for its R&D activities.

We must anticipate the needs of our laboratories and the DOE Labs, and provide the best support and oversight that can help provide solutions to our toughest scientific, technical, and programmatic challenges.

However, recent and projected budget cuts passed by the Majority are driving difficult decisions such as the prioritization, and sometimes the elimination, of R&D projects. This is causing stress among competing priorities within the Department's S&T Directorate and its R&D portfolio.

Congress will play a central role in defining the Nation's R&D priorities as it makes decisions with respect to the size and distribution of homeland security R&D funding.

We have expressed our serious concerns about the drastic decreases voted on by this Congress, and passed by the Majority, in the level of Federal funding for homeland security R&D funding. As the fiscal year 2013 appropriations process moves forward, it faces two overarching issues: The extent to which the Federal R&D investment can grow, and what little R&D funding available will be prioritized and allocated. The Department and particular, the S&T Directorate, will need to justify and make transparent its R&D investments.

President Obama's science advisor, John Holdren, and others—have raised concerns about the potential harm of a "boom-bust" approach to Federal R&D funding as seen in past, like rapid growth followed by much slower growth, flat funding, or even decline.

Critics assert that there has been a variety of damages from this boom-bust cycle, including interruptions and cancellations of needed research projects, decreased student interest in pursuing graduate studies, and reduced employment prospects for the large number of researchers with advanced degrees.

More broadly, in a 2009 speech before members of the National Academy of Sciences, President Obama put forth a goal of increasing the National investment in R&D to more than 3% of the U.S. gross domestic product (GDP). But, as they say, the devil is in the details, and the details are what we are to hear about today.

This subcommittee and full committee have been real supporters of the Department's R&D and National Labs, but we need a better, clearer understanding of how things have gotten better, how management oversight of R&D projects has increased, and what is the path forward as we look toward the drastic funding cuts coming out of this Congress.

Mr. Chairman I yield back.

STATEMENT OF RANKING MEMBER BENNIE G. THOMPSON

APRIL 19, 2012

Thank you for holding this hearing to review the Department of Homeland Security's involvement with the National Laboratories.

When the Department was created, the use of laboratories by DHS was one of the first questions posed.

We all understood that the labs could serve as important incubators for products and technologies that would enhance this Nation's security.

We all understood that some of these efforts may be expensive to undertake and have very low profit margins—making them unattractive to the private sector.

Yet, we all believed that research and development could yield new tools to fight terrorism.

At that time, we agreed about the importance of research and development. We decided to permit DHS unprecedented access to labs owned by the Department of Energy.

The Office of National Laboratories within S&T was created to coordinate research and development efforts within DHS Labs and DOE Labs.

Regardless of the location, the goal of the research would be the same—to support the homeland security mission.

The alignment of DHS Labs within the mission programs of the S&T Directorate has been changed over the years.

This committee needs to understand how these reorganization efforts improve the ability of DHS' Office of National Labs to coordinate and oversee research and development projects that improve this Nation's security.

Additionally, because research and development is often a long and expensive process, this committee needs to understand how the current climate of fiscal austerity will impact the work of these labs.

In a previous hearing, we were told that budget cuts would severely hamper ongoing research projects and may cause new research to come to a standstill.

Given the budgetary decisions made by my colleagues on the other side of the aisle, it is extremely important that Members of this committee have a clear understanding of the Department's research and development strategy.

While we certainly should know about the role of the Office of National Labs, our focus must be broader.

We must have an in-depth understanding of the strategy and rationale that determines how homeland security research and development funds are allocated—both in the Government labs and in the private sector.

Thank you and I yield back.

Mr. LUNGREN. So, Dr. Gerstein.

STATEMENT OF DANIEL M. GERSTEIN, DEPUTY UNDER SECRETARY FOR SCIENCE AND TECHNOLOGY, DEPARTMENT OF HOMELAND SECURITY

Mr. GERSTEIN. Well, thank you, Chairman Lungren.

Well, good morning to everyone. Good morning, Chairman Lungren, distinguished Members of the committee. It is a great privilege to testify here today on this very important National security topic, our laboratories.

I would begin my remarks by putting our laboratories in context. In the 1930s and 1940s, the U.S. National Laboratories ushered in the Nuclear Age. In a monumental effort, nuclear weapons—engineers and scientists developed the nuclear weapons that saw the end of the Cold War, served as a deterrent during the Cold War stand-off, and continue to provide deterrents today.

These facilities have redirected their work and combined with other National and international laboratories, including our own DHS Labs, to provide technology solutions for the major threats and challenges we face today as a Nation. From threats in cyberspace to home-made explosives to bio-defense, this network of labs leverages science and technology for the benefit of the Nation.

In the DHS Science and Technology Directorate, our vision is to support the Homeland Security enterprise by being operationally focused, developing innovative solutions, and building partnerships. I want to use this framework to discuss the importance of the DHS S&T internal labs, as well as our vital collaborations with international, interagency, and university lab partners.

First, operational focus. All of the labs that S&T operates have strong customer alignment. They seek to identify technology options and knowledge products that improve the effectiveness, efficiency, and safety of the entire homeland security enterprise. For example, our National Urban S&T Laboratory, NUSTL, located in Manhattan, is working with New York City on the Securing the Cities initiative, in coordination with DNDO, to provide a robust detection and interdiction capability against radiological threats.

Our National Biodefense Analysis and Countermeasures Center, NBACC, and the Chemical Security Analysis Center, CSAC, both conduct science-based threat characterization studies that are used by first responders, local communities, the Department, and across the interagency for preparedness and response planning.

Next is innovation; the seed corn of our future. At Plum Island Animal Disease Center, we are developing an innovative, recombinant Foot-and-Mouth Disease vaccine. That is a breakthrough capability, affecting our $1 trillion per year agricultural industry in the United States. Collaboration between one of our DHS Centers

of Excellence at Texas A&M, the U.S. Department of Agriculture, and DHS is moving the vaccine toward licensure, after which a commercial company will sell it. Truly a great story.

By its very design, NBACC is an innovative National security asset. Born out of the 2001 Amerithrax attacks, the laboratory is developing forensics and threat characterization capabilities that were not even contemplated at the time of the attacks.

Finally, building partnerships. As a matter of the highest priority, we partner with DHS components, the interagency international partners, and academia. We are collaborating across a wide variety of critical mission areas. An example of this work is the recent Recovery Transformer Project, RecX, worked with Idaho National Labs, which demonstrated the ability to dramatically reduce down-time in the event of a large-scale power outage.

I would be remiss if I did not discuss several important issues with regard to our labs. First is governance and sharing. We are working to encourage partnerships so that we can better collaborate across the entire laboratory enterprise. In these fiscally constrained times, this is both necessary and the responsible thing to do.

Second, the fiscal environment is stressing the balance between infrastructure and R&D. We cannot have one without the other. The example is the National Bio- and Agro-Defense Facility, NBAF, that is intended to replace, modernize, and enhance the mission of the current Plum Island facility. Due to fiscal constraints, we are evaluating the affordability of building this facility; however, we must be careful not to mortgage our future in times of austerity and postpone the innovative solutions our Nation needs.

Finally, I would like to share with you some strategies that we are using to achieve this long-term vision. A Mission Executive Council, or MEC, is composed of the Department of Defense, Homeland Security, Department of Energy and the intelligence community and it now meets regularly to discuss strategic planning for the utilization of the DOE Labs.

S&T's internal portfolio review process has been allowing us to make informed, strategic decisions about how best to use the scarce resources that are at our disposal. We will continue to use this process in addition to implementing a systems approach for all of our S&T programs. Recently we have also held the first-ever consolidated laboratory review. All of our internal labs reported out on their on-going efforts and we began a strategic planning process that included discussion of common strategies, best practices, and cost-saving measures. We will continue to hold these meetings quarterly to improve our lab governance.

In summary, let me state unequivocally that our S&T Labs and those of our partners are National assets. Just as our laboratories ushered in the Nuclear Era, we look forward to our network of laboratories identifying new and innovative ideas and capabilities. With this network as a foundation, we firmly believe that achieving our value-added proposition of operational focus, innovation, and building partnerships is well within reach.

Thank you for giving me the opportunity to appear here today. I look forward to your questions.

[The prepared statement of Mr. Gerstein follows:]

PREPARED STATEMENT OF DANIEL M. GERSTEIN

APRIL 19, 2012

INTRODUCTION

Good morning Chairman Lungren, Ranking Member Clarke, and distinguished Members of the committee. I thank you for this opportunity to testify today on behalf of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T). My testimony today will describe the critical role of the laboratories—both DHS S&T Laboratories and the external laboratories including those from within the interagency, universities, and international partners—in supporting the missions of DHS as well as providing technology and knowledge solutions for a variety of interagency partners.

In the 1930s and 1940s, the U.S. National Laboratories ushered in the Nuclear Age. In a monumental effort, scientists and engineers developed nuclear weapons that led to the end of World War II, served as a deterrent during the Cold War stand-off, and continue to provide deterrence today. The threats we faced were different, but the laboratories that helped the United States prevail in the past remain integral to our Nation's security. These facilities have redirected their work and joined with other National and international laboratories to provide technology solutions for the major threats and challenges we face as a Nation today. From threats in cyberspace to home-made explosives to biological agents, the network of interagency [1] laboratories leverages American science and technology expertise for the benefit and protection of the Nation.

The interagency laboratories provide invaluable capabilities that are unmatched in their relationship with the decision-maker and end-user. These capabilities are essential to the Department of Homeland Security (DHS), the Homeland Security Enterprise (HSE) and our Nation's Research and Development (R&D) enterprise. In the current budget environment, there will be a temptation to fund near-term priorities while sacrificing the future. In my judgment, this would be a mistake. On a daily basis, the technologies and knowledge products developed by our laboratories are helping the DHS and law enforcement operators perform their jobs more efficiently, effectively, and safely. Many of these technologies and knowledge products require long-term investments to come to fruition.

DHS S&T VALUE-ADDED PROPOSITION FOR SUPPORTING THE HOMELAND SECURITY ENTERPRISE

The mission of DHS Science and Technology Directorate is to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions for the Homeland Security Enterprise. Accomplishing this mission requires a robust and vibrant system of laboratories.

Established under the Homeland Security Act of 2002 (HSA), under section 302 of the HSA, the Secretary, acting through the Under Secretary for Science and Technology, is responsible for, among other things, "conducting basic and applied research, development, demonstration, testing, and evaluation activities that are relevant to any or all elements of the Department . . . "[2] However, the reach of DHS S&T extends well beyond the operational components of the Department. The S&T Directorate works closely with our partners at all levels of the Homeland Security Enterprise, including first responders, State, Tribal, territorial, and local governments, and private industry.

To meet the diverse needs of the Homeland Security Enterprise, DHS S&T pursues a strategy which is operationally focused, highly innovative, and founded on building partnerships between operators and scientists and engineers across the dynamic R&D landscape. To this end, S&T provides the HSE with strategic and focused technology options and operational process enhancements. S&T provides the technical depth and reach to discover, adapt, and leverage technology solutions developed by Federal agencies and laboratories, State, local, and Tribal governments, universities, and the private sector—across the United States and internationally.

[1] The term "interagency laboratories" is intended as an umbrella term to reflect both the DOE-owned National Laboratories and the laboratories owned by other Federal agencies such as DHS and DoD.

[2] 6 U.S.C. § 182(4)

GAINING OPERATIONAL CAPACITY AND INNOVATION THROUGH OUR LABORATORIES

In the pursuit of high-impact technologies and knowledge products for the Homeland Security Enterprise, the S&T Office of National Laboratories (ONL) oversees and manages S&T's laboratory operations, infrastructure, and construction to support research, testing, and evaluation, and technology development needs. These laboratories provide specialized technical expertise and world-class research facilities to DHS and other partners. Together, S&T's five facilities support a diverse portfolio of capabilities to serve the Homeland Security Enterprise.

Built specifically for DHS, the National Biodefense Analysis and Countermeasures Center (NBACC) is a one-of-a-kind facility dedicated to defending the Nation against biological threats. Located in Frederick, Maryland, this 160,000-square-foot facility is a critical resource for understanding the risks posed by malicious use of biological agents. The capabilities contained in this facility did not exist prior to the Amerithrax attacks in 2001. NBACC consists of two centers. The National Bioforensic Analysis Center (NBFAC) conducts technical forensic analyses in support of attribution investigations. As a partner with the Federal Bureau of Investigation, the NBFAC is available to support operations 24 hours a day, 7 days a week. The National Biological Threat Characterization Center (NBTCC) conducts experiments and studies to better understand the risks, vulnerabilities, and hazards from current and emerging biological agents. Together, they possess a variety of scientific capabilities including genomics, aerobiology, bacteriology, virology, toxicology, and bioforensic studies. NBACC was recently awarded accreditation as a Biosafety Level 4 (BSL–4) facility, making it one of six such facilities in the United States. As a true interagency facility, NBACC brings DHS, law enforcement, defense, and intelligence community partners together to better defend against high-priority biological threats.

The Plum Island Animal Disease Center (PIADC), built in 1954, has served the front line of the Nation's defense against diseases that could devastate markets for livestock, meat, and other animal products. Located off the tip of Long Island, the mission of PIADC crosses three areas: Animal disease diagnostics, research and development, and education. With the U.S. Department of Agriculture and DHS staff, PIADC is capable of diagnosing Foreign Animal Diseases (such as Foot-and-Mouth Disease) and is working to develop countermeasures to such diseases. As a BSL–3 facility, its research programs include developing new diagnostic tools and preventatives (such as vaccines and antivirals) for Foot-and-Mouth Disease and other Foreign Animal Diseases. Since 1971, it has provided training to veterinarians on how to recognize Foreign Animal Diseases. Facility upgrades to this aging facility are underway to allow the laboratory to meet on-going mission requirements in foreign animal disease research. One major recent accomplishment includes the completed field-testing of the first licensed Foot-and-Mouth Disease vaccine, which could be manufactured in the United States.

The Transportation Security Laboratory (TSL) protects our Nation's transportation systems through research, development, testing and validation of explosives technology detection systems. A key partner to the Transportation Security Administration (TSA) and based outside Atlantic City, NJ, testing at TSL helps S&T develop products related to explosive detection on persons and in checked baggage and small parcels, containerized cargo inspection, conveyance protection, and infrastructure protection. The laboratory has a long history of success, garnering international recognition for its role in the development of standards, protocols, and test articles necessary for detection technology assessments. One such success was the Explosive Effects and Survivability Group's (EESG) rigorous testing of the Hardened Unit Load Device, a blast-resistant aircraft cargo container.

The National Urban Security Technology Laboratory (NUSTL) serves as a Federal technical resource and authority to State and Local First Responders and promotes the successful development and integration of homeland security technologies into operational end-user environments. Located in New York, NY, this unique laboratory provides a testing, evaluation, and assessment test bed in a true urban environment. NUSTL supports the Domestic Nuclear Detection Office's (DNDO) Securing the Cities (STC) initiative, which seeks to design and implement architecture for coordinated and integrated detection, and interdiction of illicit radiological materials. In this pursuit, NUSTL uniquely supports local responders agencies' training and exercise events, adding to the overall goal of building self-sufficiency among the partners. In fiscal year 2011, NUSTL supported DNDO training of almost 1,000 students in 24 Preventive Radiological and Nuclear Detection (PRND) classes. In addition to training support, NUSTL has tested over 6,000 radiation detectors for STC partners and other emergency responders, ensuring that each of these detectors works as specified. Between NUSTL's training support, technology testing, and the

development of capabilities such as the Radiological Emergency Management System (REMS), the NUSTL Lab is working to build a first-response capability in New York City which is uniquely capable of preventing and responding to radiological events and could serve as a model for other large cities. Staff at NUSTL also develop low-cost detection technologies such as the "thin profile dosimeter," for which DHS was granted a patent.

The Chemical Security Analysis Center (CSAC) provides a scientific basis for the awareness of chemical threats and the attribution of their use. Based in Edgewood, MD, CSAC draws upon expertise in chemical defense, chemical agents, and toxic industrial chemicals. The Center analyzes chemical threat characterization data, including toxic industrial chemicals and chemical warfare agents, and integrates science-based risk assessments using physical, chemical, and toxicological information that is widely used. In an emergency, CSAC can support other agencies and organizations with expert analysis. For example, with the recent "Jack Rabbit" project, CSAC scientists gathered scientifically validated data on an accidental release of toxic inhalation hazards for chemical release models, shelter-in-place guidance, hazard assessment at rail transit and chemical storage facilities, and improved planning, response, and mitigation strategies.

A potential replacement for the aging PIADC is the National Bio- and Agro-Defense Facility (NBAF), which is currently awaiting construction in Manhattan, Kansas. Authorized for construction under the Department of Homeland Security Appropriations Act, 2009 (Pub. L. 110–329, Div. D. Sec. 540), NBAF was expected to be fully offset by the proceeds from the sale of Plum Island. Since then, the financial landscape has changed significantly. Today, we face the overall funding constraints of the Budget Control Act of 2011 (Pub. L. 112–25), which are impacting both the Department and S&T's budgets. Additionally, due to the current economic climate, the sale of Plum Island is not likely to provide adequate funds in the foreseeable future requiring appropriated funds for construction, and estimated construction costs for NBAF have increased by more than 30 percent as a result of construction delays and additional safety engineering requirements. At the same time, Congressional appropriations have not kept pace with the costs to build the facility expeditiously.[3] Given these fiscal challenges while considering the evolving security threats to U.S. agriculture, we have asked the National Academy of Sciences (NAS) to convene an expert committee, in conjunction with the interagency, to conduct a scientific assessment of the requirements for a large-animal foreign and emerging diseases research and diagnostic laboratory in the United States.

While there is no current large animal Biosafety Level 4 (BSL–4) facility like NBAF operating in the United States, the challenge of building NBAF highlights the dilemma faced by all Federal Government research and development (R&D) organizations as they balance funding priorities for infrastructure and for research in a constrained budget environment. Effective innovation is the core of the U.S. economy and U.S. National security; it requires investment in both facilities and research and development (R&D). The United States must robustly fund both of these activities in order to maintain the capability needed to respond to the diverse threats against which the DHS is charged to protect the United States.

To maximize the effectiveness of our labs, DHS S&T has been working diligently to bring these diverse facilities together to develop a shared sense of purpose for this critical mission; this will ensure a higher degree of focus and customer alignment. In January, leadership from each of the labs came together for the first time to discuss development of a corporate vision for the S&T Laboratories. We have already seen important results from this meeting in just the few months since. For example, although the communities they serve are largely different, NUSTL and CSAC Labs have found common interest in testing chemical detectors in a first responder environment. We are currently developing a corporate vision for our labs which includes fostering common best practices. These kinds of collaborative relationships are now explicitly part of the S&T focus, and we will continue to provide opportunities and oversight to encourage superior collaboration.

BUILDING KEY PARTNERSHIPS OUTSIDE DHS S&T

Building upon our significant internal laboratory capabilities, we have developed a network of external partners which includes DOE and other interagency, university (through our DHS Centers of Excellence (COE) program) and international laboratories which provide necessary collaboration and important economies in these

[3] In fiscal year 2012, Congress appropriated $50 million of the $150 million the administration requested for NBAF.

lean fiscal times. They also serve as a foundation for achieving our value-added proposition.

Department of Energy (DOE) Laboratory Partnerships

The DOE National Laboratories play a critical role in assisting S&T in providing innovative science-based solutions to complex homeland security problems. S&T selects the best performer-based technology projects relying on a variety of factors, including the type of project deliverable (e.g. prototype, knowledge product, or demonstration), technical area of expertise, and cost.

The DOE National Laboratories are particularly well-suited to provide multi-disciplinary research and development capabilities to solve complex National security problems. The National Labs possess a legacy of excellence in scientific discovery, including 48 Nobel Prize winners since 1977 and over 800 R&D 100 awards. The world-class facilities that make up the National Labs allow for multi-disciplinary research, including leading-edge work with: Advanced scientific computing research, material sciences, basic energy sciences, biological and environmental research, high-energy physics, and nuclear physics. Certain labs possess unique facilities and infrastructure that are not found in the private sector. These capabilities include super-computing for biodefense activities and testing for certain characteristics of home-made explosives.

The focused work of the DHS-DOE National Laboratory network has introduced significant technology innovations and knowledge products for the Homeland Security Enterprise. For example, innovations from Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratory (SNL) are spearheading explosives trace detection systems used to more rapidly screen passengers and cargo at airports. Advances in the development of a resilient electric grid are being performed with the collaboration of Oak Ridge National Lab (ORNL), Argonne National Lab (ANL), and Pacific Northwest National Lab (PNNL). The recent, highly successful deployment and demonstration of the Recovery Transformer Project (RecX) stands to dramatically reduce downtime in the event of a large-scale power outage; a highly valuable technology tool developed by Idaho National Lab (INL). These technologies and many other innovations from our National Labs are helping the Homeland Security Enterprise become more resilient, efficient, and effective in executing the DHS missions.

Since joining DHS S&T in August 2011, I have been meeting with our partners at the DOE National Labs. At a recent trip to Sandia National Laboratory, I saw a demonstration of their capabilities with home-made explosives mitigation, cybersecurity, cutting-edge biological agent characterization, and many others. I have also met with Pacific Northwest National Lab, Lawrence Livermore National Lab, and Oak Ridge National Lab to hear about the work they are doing on behalf of DHS and to discuss further collaborations. I am preparing to attend demonstrations at Oak Ridge National Laboratory and also at DOD's MIT Lincoln Laboratory this year. These visits are not just for information sharing and interagency discussion. Visits like this help S&T leadership make informed decisions about where our investments are able to ensure the biggest impact and the most effective transition to the field.

Other Laboratory Partnerships

No discussion of research and development laboratories would be complete without a mention of the other laboratories that support the HSE. DHS also relies on collaboration and support from laboratories across the interagency, such as those within the Department of Defense (e.g. laboratories within the Services) and National Institutes of Standards and Technology (NIST) within the Department of Commerce. Recent meetings with the Army's Picatinny Arsenal in New Jersey have focused on the development of a software interface that will allow the current families of command-and-control software to communicate between State and local fusion centers, first responders, and the military support to civil authorities components to more readily share critical information in times of disaster.

The S&T Centers of Excellence (COE) also provide the Department direct and important access to laboratories within academia. The S&T Office of University Programs (OUP) coordinates these valuable partnerships with laboratories across the Nation. These diverse Centers of Excellence provide access to cutting-edge capabilities in such areas as cybersecurity, biodefense, and disaster mitigation to name a few. Recent efforts have provided important operational capacity as well as highly innovative solutions that have had an immediate impact. Examples include the Coastal Wave Surge Model from the Coastal Hazards Center at Jackson State University and UNC–Chapel Hill. Recently, this COE allowed the U.S. Coast Guard to

track the likely storm surge and wave impact of Hurricane Irene and quickly share those data with operational partners.

A final sector of laboratory collaboration extends beyond the borders of the United States. Leveraging the expertise and capabilities of our international partners allows us to not only jointly shoulder the financial burden but also benefit from the unique perspective of our allies. For example, DHS S&T is pursuing agreements with the governments of Canada and Australia to collaborate on work with agricultural biodefense. These agreements not only improve information sharing and the exchange of best practices, they provide a minimum response mechanism as the United States develops its own BSL–4 agriculture capability. In addition to biodefense, DHS S&T engages internationally on diverse priority areas facing the Homeland Security Enterprise.

SUPPORTING THE LABORATORIES AND BRINGING VALUE TO THE HOMELAND SECURITY ENTERPRISE (HSE)

Funding research at our various laboratory partners while managing the S&T internal laboratories represents a significant investment from DHS. The direct reimbursement from S&T to our external lab partners and the maintenance, operation, and research costs of our internal labs was $241.6 million ($100 million for S&T Lab operations, $38 million for research and, $103.6 million for DOE) in fiscal year 2011. Under the Department's fiscal year 2012 appropriation, the S&T R&D budget was cut by 56 percent, resulting in eliminating over 100 on-going projects, overall. Despite all of the budget turbulence, the maintenance and operations funding for the S&T internal laboratories has remained relatively constant.

The value of these laboratories has been recognized by many DHS components as well, which have been keen to take advantage of the technical expertise and reach offered by these facilities. For fiscal year 2011, DHS invested over $300 million at DOE Labs. The three largest component investors for fiscal year 2011 were DHS S&T, the Domestic Nuclear Detection Office (DNDO), and Customs and Border Protection (CBP). These investments partially support laboratory overhead costs for research activities.

The fiscal year 2013 budget request includes funding for critical Research and Development (R&D) programs to improve homeland security through state-of-the-art solutions and technology. The proposed R&D funding level in fiscal year 2013 is commensurate with that in fiscal year 2011 and will enable S&T to support the needs of front-line operational components, while conducting R&D work in priority areas such as: Explosives (aviation security); Bio-Threat Security; Cybersecurity; and First Responders. Programs receiving funding were carefully chosen to ensure high-priority initiatives maintain adequate funding. The increases are as follows:

- *Biological defense—$58.2 million*.—S&T will focus on the development of tools to detect either an intentional or natural biologic event, with a focus on rapid point-of-care bio-diagnostic technologies, cost-effective indoor sensors, bioforensics, and mandated CBRN risk assessments.
- *Explosives defense—$44.4 million*.—S&T's efforts will concentrate on technologies that assist TSA and other partners in detecting explosives, with an emphasis on Home-Made Explosives (HMEs) and other advanced threats.
- *Cybersecurity—$18.1 million*.—S&T's Cybersecurity Division is supporting the White House Comprehensive National Cybersecurity Initiative with a variety of unclassified research programs. S&T is the only funding agency in the U.S. Government for unclassified cybersecurity research that supports the public and private sectors, and the global internet infrastructure.
- *First Responders—$23.2 million*.—As the only Federal organization that provides technical assistance to the First Responder community, S&T will continue efforts to identify technologies, formulate standards, and develop knowledge products that enhance the productivity, efficiency, and safety of first responders. Priority investment areas include: Interoperable communications, data sharing systems, field-ready detection equipment, and enhancements to protective gear.

The balance of fiscal year 2013 funding level will allow S&T to resume R&D work in important areas that received little or no funding in fiscal year 2012 such as: Border Security, Chemical Attack Resiliency, Counterterrorism R&D, and Information Sharing and Interoperability.

BUILDING A COLLABORATIVE, CROSS-CUTTING LABORATORY NETWORK

The importance of building collaborative partnerships between the diverse laboratories in this country cannot be overstated. In the pursuit of innovative products which maximize our use of resources, DHS S&T is seeking interagency collaboration. In fact, the increasing pull on the same resources led the major National secu-

rity departments and agencies—DHS, DOE, DoD, and the Office of the Director of National Intelligence (ODNI)—to form the Mission Executive Council (MEC), an executive-level forum at which strategic planning for the utilization of the DOE National Laboratory capabilities is coordinated and discussed.

The impetus for forming the council was to take collective stock of the technical capabilities required by the principal departments with National security missions (DoD, DHS, DOE, and ODNI) and to present them to DOE as a whole. Within the forum, the Mission Executive Council was developed to engage the charter members, fostering a better understanding of long-term mission needs and serving as an opportunity to partner with DOE to identify and preserve the mission essential capabilities that are stewarded by the National Laboratory Complex.

By collectively identifying joint scientific and technical requirements, we believe we are securing in an efficient manner the necessary resources to conduct our respective missions. The increased visibility across the National security community of our joint needs in response to evolving threats fosters a sounder and more efficient planning and operating environment. DHS's participation is directed by the Deputy Secretary of DHS along with the leadership of the Under Secretary of DHS S&T and the Director of DNDO.

CONCLUSION

Our Nation's laboratories provide an invaluable capacity that assist in evolving our understanding of current and future homeland security risks and opportunities, as well as creating new and innovative capabilities, knowledge products, and process enhancements that will improve the Department's operational capacity today and in the future. Further, our laboratories allow us to share the costs, benefits, and ideas that are imperative to our National and homeland security and are in the very spirit of innovation and scientific discovery.

Our experiences are evidence that we must continue to invest in both the infrastructure and the science as we rise to meet the threats and challenges of the 21st Century that we face today and in the future.

Just as the National Laboratories ushered in the Nuclear Era, we look forward to our system of laboratories bringing forward new ideas and capabilities critical to the enduring security of our Nation. We look forward to continuing to expand the network of laboratories including internal S&T, DOE, other interagency, university and international facilities. With this network as a foundation, we firmly believe that achieving our value-added proposition—operational focus, innovative, building partnerships—in support of the Homeland Security Enterprise is within reach.

In this pursuit, I am honored to serve in a leadership position at the DHS S&T Directorate and look forward to your questions.

Mr. LUNGREN. Thank you very much, Dr. Gerstein.

Dr. Gowadia, please.

STATEMENT OF HUBAN A. GOWADIA, DEPUTY DIRECTOR, DOMESTIC NUCLEAR DETECTION OFFICE, DEPARTMENT OF HOMELAND SECURITY

Ms. GOWADIA. Good morning, Chairman Lungren and distinguished Members of the subcommittee. Thank you for the opportunity to appear before you today with Doctors Gerstein and——

Mr. LONG. Ma'am, is your microphone on? It is? Can you pull it a little closer? Thank you.

Ms. GOWADIA. Is that better?

Thank you for the opportunity, again, to appear before you this morning with Doctors Gerstein and Morgan to discuss the important partnership the DNDO has with the Department of Homeland Security and Department of Energy National Laboratories. DNDO works closely with S&T to facilitate work with the laboratories to help deliver critical homeland security capabilities, bringing their unique expertise, skills, and infrastructure to bear on our nuclear detection and forensics mission.

In addition, DNDO's strong, in-house, technical expertise on nuclear matters provides an important foundation for optimizing our

work within National Labs. While my written testimony provides a larger overview of the range of programs we have at the laboratories, this morning I would like to highlight just a few illustrative examples.

I would like to begin with our long-standing partnership with the Department of Homeland Security's National Urban Securities Technology Laboratory, or NUSTL. Although the lab participates in multiple DNDO efforts, primarily we leverage NUSTL's strong ties to local law enforcement agencies in the New York City region to support our Securing the Cities program. Here, we collaborate with State and local partners to design and implement the regional architecture to detect and interdict illicit nuclear materials.

As I am sure you are aware, much of our Nation's expertise in nuclear weapons and technical nuclear issues resides primarily at the DOE National Laboratories. As such, they serve as important partners in preventing nuclear terrorism. At DNDO, we recognize the labs' strength in analysis and long-term research, particularly in addressing complex problems that have high technical risk and are not immediately attractive to industry for development.

DNDO sponsors research and development activities across the National Laboratory Complex that have resulted in significant technical gains by way of new, more capable detector materials as well as cutting-edge technologies. For instance, Lawrence Livermore led a team that included Oak Ridge National Laboratory, Fisk University, and R&D, in the development of strontium iodide. This is a new scintillator that won an R&D 100 Award and will allow us to build cheaper detectors with enhanced resolution, thereby increasing our deployable capabilities.

Over time, DNDO has steadily improved its specimen evaluation and red team capabilities by leveraging our enduring partnership with the laboratories. We rely on the DOE National Labs for these assessment activities since they are the Nation's repositories of special nuclear material and have the expertise, infrastructure, and ability to handle these materials, both in significant quantities and in threat-relevant configurations.

Additionally, in order to appropriately assess the global nuclear detection architecture, DNDO has engaged Los Alamos National Laboratory to develop the Probabilistic Effectiveness model. This allows us to simulate adversary tactics and capabilities and so we are able to define strategies to mitigate gaps and vulnerabilities in the architecture. DNDO is also responsible for supporting the Nuclear Detection Operations of our Federal, State, and local partners.

Sandia National Laboratory plays a critical role in these efforts. Sandia scientists have developed the DHS isotope ID; this is an algorithm that is used by National spectroscopists to analyze radiation spectra and assist our law enforcement partners in the alarm adjudication process.

In recognition of the Nation's dwindling nuclear experience, DNDO supports the intellectual infrastructure at the laboratories. We lead interagency efforts to restore and maintain a highly-qualified nuclear forensics workforce by collaborating with labs on a National, nuclear forensics expertise development program.

Now, these are just a few examples of our important nuclear security work at the National Laboratories. I would have liked to share highlights on every lab with which we have collaborative efforts. But in the interest of time, I will suffice it to say that we have efforts across the entire National Laboratory Complex to ensure that they contribute to our mission. Recognizing their critical role in our nuclear security mission, we have obligated a significant portion of our budget to the laboratories for various projects on nuclear detection and forensics.

In recent years, diminishing budgets have regrettably resulted in the commensurate decrease in funds we have invested at the labs. Large cuts in our transformational and applied research budget, as well as our systems acquisition budget, have negatively impacted the number and size of projects that we are able to fund. However, we continue to use our constrained resources as efficiently as possible to address critical homeland and, particularly, nuclear security needs.

In conclusion, I would like to emphasize that DNDO has a robust and effective working partnership with the DHS and the DOE National Laboratories.

Thank you, again, Chairman Lungren, Ranking Member Clarke, and distinguished Members of the subcommittee, for this opportunity to be with you this morning and talk about our collaborative efforts at the laboratories.

[The prepared statement of Ms. Gowadia follows:]

PREPARED STATEMENT OF HUBAN A. GOWADIA

APRIL 19, 2012

Good morning Chairman Lungren, Ranking Member Clarke, and distinguished Members of the subcommittee. I am pleased to testify today with my colleague from the Science and Technology Directorate (S&T), Deputy Under Secretary Daniel Gerstein. I appreciate the opportunity to highlight the important work executed by the Department of Homeland Security (DHS) and Department of Energy (DOE) laboratories to support and implement the global nuclear detection architecture (GNDA) and advance technical nuclear forensics.

As you know, the Domestic Nuclear Detection Office's (DNDO) unique mission requires coordination with multiple intra- and interagency partners to develop and enhance the GNDA; develop technical nuclear detection capabilities; measure detector system performance; ensure effective response to detection alarms; advance and integrate nuclear forensics efforts; conduct transformational research and development for nuclear detection and forensics technologies; and implement the domestic portion of the GNDA. Countering nuclear terrorism is a whole-of-Government challenge, and DNDO works with Federal, State, local, Tribal, international, and private-sector partners to fulfill this mission.

DNDO WORK WITH S&T AND DHS LABORATORIES

Within DHS, work at DHS National Laboratories is coordinated through S&T's Office of National Laboratories. DNDO works closely with S&T on operational support, test, and evaluation efforts relevant to the mission of both organizations, including evaluating nuclear detection capability of existing explosives detection systems and non-intrusive inspection radiography systems that can be used for nuclear and contraband. DNDO and S&T leverage joint needs and efforts efficiently through established DHS processes and integrated product teams.

A good example of our coordination is the Securing the Cities (STC) program. The STC program, initiated in the New York City region, is designed to enhance the Nation's ability to detect and prevent a radiological or nuclear attack in the highest-risk cities. In order to perform nuclear detection-focused activities, DNDO has worked through S&T to engage with the National Urban Security Technologies Laboratory (NUSTL), formerly the Environmental Measurements Laboratory, to support

STC in the New York City region. With support from the DOE Brookhaven National Laboratory, NUSTL ensures the sustainment of nuclear detection equipment purchased for STC operational partners. This includes the initial receipt of detection equipment, operations checks, and distribution of STC equipment for all regional partners. NUSTL provides training equipment for radiation detection courses and radiological sources for training and exercise purposes. NUSTL also supports the STC program by providing for receipt, storage, and shipping of training materials, and provides subject matter expertise to the STC committees.

Beyond STC, NUSTL also assists with DNDO's technology test and evaluation activities by providing test scientists and technical expertise supporting test plan development and execution. Most recently, NUSTL staff supported the Gryphon test campaign with a test scientist to help prepare and conduct the evaluation of airborne radiation detection equipment.

Additionally, DNDO has collaborated with S&T's Transportation Security Laboratory (TSL) to evaluate the potential of existing explosives detection systems for detecting radiological or nuclear threats in baggage or small cargo at airports. DNDO worked with TSL to utilize their expertise and facilities for testing equipment used in airport environments. TSL focuses on explosives detection, and their specialized facilities, labs, and knowledgeable teams have proved a good partner for this effort.

DNDO WORK WITH DOE NATIONAL LABORATORIES

Much of the Nation's expertise in nuclear weapons and technical nuclear issues resides at the DOE National Laboratories and they serve as an important partner in preventing nuclear terrorism. This work is also coordinated through the S&T Office of National Laboratories. DNDO utilizes the National Laboratories across its mission space to execute, support, advance, and analyze our work on nuclear detection and forensics, as appropriate. My testimony outlines the funding spent at the National Laboratories and highlights some of the important, collaborative work conducted over the past few years.

Architecture planning

DNDO engages with the National Laboratories to study the architecture and inform the development of plans for future implementations of the GNDA. This includes studies and analyses of the threat, adversaries, technical capabilities, and architecture pathways. This work informs the prioritization and implementation of the nuclear detection architecture by providing a framework for determining our ability to reduce risk and efficiently deploy resources.

The National Laboratories support DNDO's efforts to analyze and improve the GNDA through the development of specific architecture studies, Concept of Operations analyses, and detector modeling efforts. National Laboratory support of DNDO architecture studies typically focuses on specific programs, operating environments, modes of transportation, and/or specific threats and directly feeds into and supports the ensuing solutions development process. The National Laboratories also provide important inputs and support for annual and Congressionally-mandated architecture documentation, like the Joint Interagency Annual Report on the GNDA and the Radiological and Nuclear Terrorism Risk Assessment.

Nuclear Detection Research and Development

Part of DNDO's mission includes leading and conducting research and development activities for nuclear detection and forensics. The National Laboratories play a critical role in providing innovative ideas, establishing technical feasibility, developing prototype systems, and supporting characterization and analysis for transformational and near-term research and development projects.

Annually, DNDO releases a competitive Call for Proposals (CFP) for Exploratory Research to the National Laboratories and other Federal centers. The competitive CFP solicits proposals that may lead to dramatic improvements in National capabilities for nuclear/radiological detection and forensics. Topics areas for this research are defined from prioritized gaps in the GNDA, technology needs defined by DNDO and DHS operational components, and remaining technology hurdles discovered in prior research. National Laboratories are encouraged to compete for project funding early-stage exploratory research. National Laboratories have contributed to advances in many technical areas including detector materials development, passive detection techniques, neutron detection and helium–3 replacement technologies, shielded special nuclear material (SNM) detection, modeling and algorithms, and nuclear forensics. In fiscal year 2012, DNDO is supporting 11 Exploratory Research projects at the National Laboratories, focusing on early stage and basic research that can be developed into new technologies for improving nuclear detection capabilities or operations.

The National Laboratories also provide technical expertise, technology characterization planning, and data analysis support to DNDO's Advanced Technology Demonstration (ATD) Program. This program strives to take innovative technology that has been proven in a laboratory environment, often by a National Laboratory, from a laboratory bench-top prototype into a full-scale performance test unit, and characterize its performance in a simulated operation environment. The National Laboratories have played a major role in each of the eight ATD projects initiated to date. We recognize and leverage the fact that they have the proper mix of technical expertise and scientific rigor to assist in the development and characterization of advanced technology.

Program Support for Deployments

Another important area of on-going work with National Laboratories is in the field of program support. DNDO uses National Laboratories to provide specialized technical support services. For example, DNDO has a long and continuing relationship with the Pacific Northwest National Laboratory (PNNL) to support deployment and calibration, as well as analyses, tests, and developmental technology studies for the Radiation Portal Monitor (RPM) program. In this role, PNNL has supported the RPM program throughout the purchase and deployment of current-generation systems and DNDO has further leveraged the laboratory's expertise to provide analyses of possible improvements, life extensions, and other related work on RPMs. Similarly, other National Laboratories also provide work to develop and test relevant technologies.

Test, Evaluation, and Standards

Testing and evaluation of nuclear detection systems is a key area where DNDO leverages DOE National Laboratory facilities and expertise. For test infrastructure, DNDO has worked closely with DOE National Laboratories and other DOE facilities. Our standards-based testing must be augmented with Government-sponsored performance and scenario-based testing against threat quantities of special nuclear materials. This type of testing can only be conducted at specially-designed and secure facilities. To this end, DNDO constructed the Radiological and Nuclear Countermeasures Test and Evaluation Complex at the Nevada National Security Site. This facility was designed to be the Nation's premier test complex for evaluating radiological and nuclear detection systems against significant quantities of highly-enriched uranium and plutonium. DNDO also maintains testing capabilities across the National Laboratory complex to fulfill unique developmental, performance, and operational testing needs.

For example, DNDO's collaboration with the European Union's (EU) Joint Research Center (JRC) and the International Atomic Energy Agency on a 3-year effort known as the Illicit Trafficking Radiation Assessment Program (ITRAP+10) to survey the world market for radiological and nuclear detection systems is supported by several DOE National Laboratories. Collectively, the United States and our European partners will test nearly 100 devices across nine different categories of detection equipment. To date, devices have been proposed for testing by 27 vendors from 11 countries. Testing is underway at the EU–JRC's facility in Ispra, Italy, and at the Savannah River National Laboratory, Oak Ridge National Laboratory (ORNL), and PNNL. ITRAP+10 will provide the opportunity to ensure that standards for radiological and nuclear detection devices are clearly defined, comprehensive, and realistic, and promote greater homogeneity in United States and international detection standards. Once completed, the tests will provide Federal, State, and local law enforcement valuable information about which radiological detection and identification instruments can best serve their operational needs. In addition, manufacturers will gain insights that may allow them to improve devices that are already available or in development.

In addition, DNDO's Graduated Radiological/Nuclear Detector Evaluation and Reporting (GRaDER®) Program enables manufacturers to have their commercial, off-the-shelf radiological and nuclear detection equipment tested by various DOE National Laboratories that have been accredited by the National Institute of Standards and Technologies under the National Voluntary Laboratory Accreditation Program. The purpose of the GRaDER® program is to determine whether these radiation detectors comply with National consensus and technical capability standards adopted by DHS, allowing our operational partners in Federal, State, local, and Tribal agencies to make better-informed decisions on the procurement of radiological and nuclear detection equipment. DOE National Laboratories are important partners in this effort.

Training, Exercise, and Assistance Support

DNDO's training, exercise, and assistance activities use National Laboratories to help establish standards and templates for GNDA activities as implemented by State and local entities. These standards and templates will make it possible for the GNDA to be implemented in a consistent manner across the country, while allowing flexibility for local law enforcement to tailor their programs to meet their needs. Once established, these standards and templates will be sustained by DNDO and the National Laboratories.

Analyses and Reachback

DNDO's Joint Analysis Center (JAC) provides a centralized support capability for the GNDA and its technical underpinnings rely on the expertise at DOE weapons laboratories. The JAC is a 24/7 information and analysis center that provides for situational awareness of the deployed nuclear detection architecture, timely information reporting, and facilitation of technical support for alarm adjudication and resolution. The JAC relies on the National Laboratory-based Secondary Reachback (SRB) Program to provide expert advice and analysis in support of detection operations and adjudication of alarms. SRB scientists also coordinate with the DOE Triage program to assist in the adjudication of detection alarms. The integration of both programs ensures efficiency and consistency by providing technically qualified experts available through Triage and SRB to support operations in the field. The JAC also relies on the Nuclear Assessment Program conducted at the National Laboratories to provide expert technical advice on efforts to define, monitor, and update the evolution of the GNDA.

Red Team Support

DNDO's Red Team activities provide a valuable service for DNDO and our partners, allowing evaluation and assessment of deployed assets and capabilities in an operational environment against realistic threat scenarios. DNDO uses DOE National Laboratory expertise to provide technical, operational, and threat device support for Red Team efforts.

For example, DNDO has engaged Lawrence Livermore National Laboratory (LLNL) to provide operational support to our Red Team's overt and covert testing program that assesses various operational elements of the GNDA. LLNL provides subject matter expertise in detector technology and assists with health physics and source handling to ensure all assessments are conducted in a manner which is safe for the law enforcement officers, the assessment team and the general public.

Likewise, DNDO has engaged ORNL to research, develop, manufacture and deploy unique radiological signature test devices with unique nuclear signatures for use in our overt and covert testing program. These test devices allow DNDO's Red Team efforts to present realistic threat signatures to various operational elements of the GNDA, as well as enabling opportunities for technology test and evaluation scenarios against threat sources. These test devices present operators with radioactive threat signatures that are not normally seen in daily operations and provide a unique opportunity to exercise the adjudication process from the point of detection up through various levels of analysis and response.

Finally, DNDO engaged Los Alamos National Laboratory (LANL) to develop the Probabilistic Effectiveness Methodology (PEM). PEM is a software modeling and simulation tool that replicates adversary motivation, capabilities, and intent; adversary transportation pathways (air, land, and sea), the performance of detector architectures, and individual detector performance. PEM allows for the identification of GNDA gaps and vulnerabilities from an adversary's perspective, modeling various elements of the GNDA and simulating adversary action. In addition, the PEM model can be used to reflect changes in the GNDA and/or adversary capabilities that may impact those gaps and vulnerabilities.

Technical Nuclear Forensics

The field of technical nuclear forensics involves examining materials recovered from radiological or nuclear events of an illicit or hostile nature in order to determine their character and origin. Technical nuclear forensics (TNF) enhances deterrence through improved nuclear security and augments effective National response to such incidents. TNF provides clues to identification and prosecution of illicit smuggling networks and aids attibrution of planned and actual attacks. The DNDO National Technical Nuclear Forensic Center mission is four-fold: (1) Provide centralized stewardship for planning, assessments, and integration of all Federal nuclear forensics and attribution activities, (2) advance the capability to perform nuclear forensics on nuclear and other radioactive materials in a pre-detonation (intact) state, (3) through its expertise development efforts, ensure a robust and enduring

technical nuclear forensics workforce and pipeline, and (4) maintain the *National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States* and annually submit the corresponding Joint Interagency Annual Review. To fulfill this mission, the United States Government, and particularly DNDO, relies upon the pre-eminent expertise residing in eight DOE National Laboratories and two standards development laboratories to conduct nuclear forensics analyses and improve methods through research and development. Laboratory measurements determine physical, chemical, and isotopic properties of materials to provide insights about the material processing history, potential geographic origins, transport pathways, and intended use of the materials.

As mandated in the Nuclear Forensics and Attribution Act, DNDO also leads an interagency effort to restore the expertise pipeline and provide a stable foundation to develop and maintain a highly-qualified nuclear forensics workforce through the National Nuclear Forensics Expertise Development Program (NNFEDP). This program is creating an academic pathway from undergraduate to post-doctorate study in a variety of nuclear and geochemical science specialties directly relevant to technical nuclear forensics, such as radiochemistry, nuclear engineering and physics, isotope geochemistry, materials science, and analytical chemistry. The NNFEDP addresses a pressing need to grow the next generation of scientists in these critical fields which have experienced a decline in recent decades. The program promotes an interdisciplinary approach that emphasizes collaboration among academic programs, universities, and the National Laboratories, to include providing nuclear forensics-related research and mentorship opportunities at the DOE National Laboratories to students at the undergraduate, graduate, and post-doctorate levels.

INTERAGENCY COORDINATION

In order to effectively and efficiently use resources at the DOE National Laboratories, coordination across the USG is essential. While coordination and collaboration with partners has been on-going since DNDO's inception, the Mission Executive Council (MEC) was created in 2010 as a forum for USG to identify and plan strategic science, technology, and engineering (ST&E) capabilities at the National Laboratories. The MEC meets regularly with representatives from across the interagency to ensure that the finite resources at the laboratories are managed appropriately and work is aligned with the most pressing National security needs. S&T and DNDO both have representation on the MEC to facilitate interagency identification of joint scientific and technical requirements that support National security efforts.

OVERVIEW OF DNDO FUNDING AT DOE NATIONAL LABORATORIES

DNDO has obligated a considerable amount of our funding to the National Laboratories for important work on the GNDA and technical nuclear forensics over the past 6 fiscal years. In fiscal year 2012, DNDO expects to obligate approximately $43 million to DOE National Laboratories, including current-year and prior-year appropriations funds. This decrease in funding from prior years is due to significant budget reductions in fiscal year 2012, especially in the Transformational Research and Development and Systems Acquisition areas. In recent years, the majority of funding obligated to DOE National Laboratories has been concentrated on efforts to support research, development, testing, and evaluation, as well as operations support activities, in contrast to earlier funding dedicated to program support for deployment. These investments partially support laboratory overhead costs for research activities.

PATH FORWARD

As I previously mentioned, coordination is a key element of our work with the DHS and DOE National Laboratories. This coordination extends to our planning and prioritization of projects. Our approach at DNDO is evolving at every level to be disciplined and rigorous, while prioritizing our work to make the best use of limited resources. We seek to use the available expertise at our laboratories to implement a responsive, agile nuclear detection architecture and strengthen our nuclear forensics capabilities. While overall funding to DOE National Laboratories from DNDO may be decreasing, due to present fiscal realities, they remain a vital asset for National security research, development, analyses, testing, and program support.

Chairman Lungren, Ranking Member Clarke, I thank you for this opportunity to discuss our work with DHS and National Laboratories and the progress of DNDO. I am happy to answer any questions from the subcommittee.

Mr. LUNGREN. Thank you very much.

We have been called for votes but I am going to see if we could get Dr. Morgan to give his first 5-minute statement, if that is alright. Then, when we break we will come back and start with Ms. Clarke and her opening statement and then go to your questions—go to questions.

Dr. Morgan, please.

STATEMENT OF DANIEL MORGAN, SPECIALIST IN SCIENCE AND TECHNOLOGY POLICY, RESOURCES, SCIENCES, AND INDUSTRY DIVISION, CONGRESSIONAL RESEARCH SERVICE

Mr. MORGAN. Mr. Chairman and Members of the committee, thank you for the opportunity to testify today.

My name is Dan Morgan. I am a specialist in Science and Technology Policy at the Congressional Research Service. My testimony will provide an overview of the DHS and DOE Laboratories and the statutory and policy framework for DHS' use of laboratories. I will then discuss the alignment of missions, planning, and prioritization and efficiency and cost-effectiveness.

Under the Homeland Security Act of 2002, which established DHS, the Department received laboratories from four other agencies; the Plum Island Animal Disease Center from the Department of Agriculture, the Environmental Measurement Laboratory, now the National Urban Security Technology Laboratory, from the Department of Energy, early plans for what is now the National Biodefense Analysis and Countermeasures Center from the Department of Defense and the Transportation Security Laboratory, which was then part of TSA.

The first three of these immediately became part of the Science and Technology Directorate. The Transportation Security Laboratory was transferred to S&T Directorate in 2006. DHS also has plans to construct a new facility to replace the Plum Island Center. Several DHS components have additional, smaller laboratories and centers.

The Homeland Security Act also provided specifically for DHS use of DOE facilities. DHS funds activities at 12 DOE facilities, including 10 of the National Laboratories. The S&T Directorate, the Domestic Nuclear Detection Office and at least eight other DHS components participate. Historically, DHS expenditures at DOE facilities have typically been between $400 and $475 million per year.

The Homeland Security Act gives DHS a special relationship with the DOE Laboratories. First, it allows work for DHS to have the same priority as work for DOE. Second, it directs the laboratories not to charge DHS more than they would charge DOE for similar work. The Homeland Security Act established the Office of National Laboratories within the S&T Directorate to coordinate DHS use of DOE facilities.

Although this office reviews proposed work, it does not have the ability to prevent issuance of a contract and it does not oversee contracts after they have been issued. DHS has expanded the Office's responsibilities to encompass the S&T Directorate's own laboratories. This additional role is not mentioned in the statute. DHS use of DOE facilities is not limited to research and development.

Indeed, in some years, expenditures on operational support exceed expenditures on R&D.

Regarding the alignment of missions, the missions of the DHS Laboratories are generally aligned with specific DHS programs and missions. DOE sets the strategic direction for the DOE Laboratories. Their capabilities encompass many aspects of DHS' mission but not all and this could be a consideration for the committee in identifying areas where DHS needs its own capabilities. Coordination by the Office of National Laboratories could contribute to an alignment between laboratory missions and DHS missions. However, as I mentioned, the Office's gate-keeping and oversight functions are limited.

Regarding planning and prioritization, past studies have examined these mostly at the program level. Planning and prioritization at the laboratory level raised some additional questions. What strategic plans has DHS developed for the DHS Laboratories and for its use of the DOE Laboratories? How does DHS determine whether to assign work to a DHS Laboratory, a DOE Laboratory, or another organization? How are DOE and DHS planning efforts coordinated?

Finally, regarding efficiency cost-effectiveness, Although DHS has a special relationship with the DOE Laboratories, this doesn't include a management role. For this reason, the DOE is probably better able than DHS to address efficiency and cost of the DOE Laboratories. But compared with DOE, there has been only limited, outside scrutiny of DHS Laboratory management. DHS may find some applicable lessons learned in past assessments of other Federal laboratories and it could also draw on an existing literature on R&D performance measurement for guidance in developing metrics for efficiency and cost-effectiveness.

Thank you, again, for the invitation to testify today and I look forward to answering your questions.

[The prepared statement of Mr. Morgan follows:]

PREPARED STATEMENT OF DANIEL MORGAN

APRIL 19, 2012

Mr. Chairman and Members of the committee, thank you for the opportunity to testify today. My name is Daniel Morgan. I am a Specialist in Science and Technology Policy at the Congressional Research Service. My prepared testimony begins with an overview of the Department of Homeland Security (DHS) Laboratories; the Department's use of the Department of Energy (DOE) Laboratories; the statutory origins for both of these in the Homeland Security Act of 2002 (Pub. L. 107–296); and related policies subsequently established by other legislation and by DHS and DOE themselves. It then discusses three specific issues that the committee asked CRS to address:

- the alignment of the missions of the DHS and DOE Laboratories with the overall DHS mission;
- the planning and prioritization of DHS's use of the DHS and DOE Laboratories; and
- the efficiency and cost-effectiveness of that use.

THE DHS LABORATORIES

The Department of Homeland Security (DHS) has a number of laboratories that conduct research and development (R&D), testing and evaluation, and other activities. Most notably, the Department's Directorate of Science and Technology (S&T) has the following five major facilities:

- *Plum Island Animal Disease Center (PIADC).*—Located off the coast of Long Island, New York, PIADC defends against foreign animal diseases by performing diagnostic tests; developing diagnostic tools, vaccines, and antivirals; and training veterinarians to recognize diseases of concern. The PIADC was established in 1952. DHS has plans to construct a new facility, the National Bio- and Agro-Defense Facility (NBAF) in Manhattan, Kansas, to replace PIADC and to engage in expanded activities. In February 2012, however, DHS announced that it is assessing whether and for what purpose a facility like NBAF should be built. The assessment will include a review of alternatives to the current plans.
- *National Biodefense Analysis and Countermeasures Center (NBACC).*—Located at Fort Detrick in Frederick, Maryland, the NBACC has two parts: The National Biological Threat Characterization Center (NBTCC), which aims to understand the science of biological threats, and the National Bioforensic Analysis Center (NBFAC), which aims to identify and attribute the use of biological threats in terrorist and criminal incidents. Construction of the NBACC facility began in fiscal year 2006 and was completed in fiscal year 2010. Final certification of the high-containment laboratories occurred in September 2011. These laboratories operate at the highest level of biocontainment, known as biosafety level 4 (BSL–4), which allows NBACC to perform R&D on pathogens for which no vaccine or treatment exists. Unlike the other S&T Directorate Laboratories, NBACC is operated as a Federally-funded research and development center (FFRDC) by a contractor, Battelle National Biodefense Institute, LLC.
- *Transportation Security Laboratory (TSL).*—Located in Atlantic City, New Jersey, the TSL performs research, development, and validation of solutions to detect and mitigate threats against transportation, especially the threat of improvised explosive devices. The TSL also provides certification testing for Explosive Detection Systems.
- *National Urban Security Technology Laboratory (NUSTL).*—Located in New York City, NUSTL is the new identity of the former Environmental Measurements Laboratory (EML). The primary mission of the EML was monitoring low-level radiation. The NUSTL mission is to test, evaluate, and analyze homeland security capabilities and serve as a technical authority for first responders and State and local entities as they integrate homeland security technologies into urban operational use.
- *Chemical Security Analysis Center (CSAC).*—Located at the Edgewood Area of Aberdeen Proving Ground in Maryland, the CSAC aims to provide a scientific basis for the awareness and attribution of chemical threats. The CSAC was established in interim facilities in fiscal year 2006 and moved to permanent facilities in fiscal year 2009.

These laboratories generally do not receive appropriations directly. Their construction, operation, and maintenance are funded through the S&T Directorate's Office of National Laboratories out of a dedicated Laboratory Facilities budget line item. The fiscal year 2012 appropriation for Laboratory Facilities is $176.5 million. Total expenditures at the laboratories are greater than this, however. The costs of particular projects and programs carried out at the laboratories are funded through the directorate's technical divisions out of funds that also support work at other Federal and non-Federal facilities. The appropriations for these activities do not specify how much will be spent at the DHS Laboratories. In addition, some of the laboratories receive funds from other agencies, such as the Department of Agriculture.

The S&T Directorate and other DHS components also have several smaller laboratories and laboratory-like centers. For example, the Domestic Nuclear Detection Office (DNDO) has an Algorithm Test Bed at the Applied Physics Laboratory of Johns Hopkins University, and the U.S. Coast Guard has a Research and Development Center in New London, Connecticut.

THE DOE NATIONAL LABORATORIES

In addition to these laboratories of its own, DHS makes use of the National Laboratories of the Department of Energy. The Department of Energy has more than 20 laboratories and technical centers in locations around the United States.[1] All are Government-owned, but most are operated by contractors. Some focus on a single field of research, while others are multipurpose. Three—Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Labora-

[1] The term National Laboratories has long been used to refer to the major DOE Laboratories. Since 2005, the term has been defined in statute (Energy Policy Act of 2005, Pub. L. 109–58, Sections 2(3) and 991). Seventeen DOE facilities are designated as National Laboratories.

tories—are commonly referred to as the weapons laboratories because of their work on nuclear weapons, but the weapons laboratories also do work in other areas. The National Nuclear Security Administration, a semiautonomous agency within DOE, is responsible for the three weapons laboratories. The DOE Office of Science has responsibility for 10. Four other DOE offices are responsible for one each.

The DOE National Laboratories generally do not receive appropriations directly. Rather, Congress appropriates funds for specific programs, and DOE then determines whether those funds are spent at a National Laboratory or in some other fashion (such as a contract with a private-sector company or a grant to a university). The annual DOE budget documents do, however, report how DOE funds were allocated to each laboratory in the previous year and provide projected allocations for the coming year. The funding of the various National Laboratories is quite disparate, ranging from the $25 million DOE anticipates spending at Ames Laboratory in Iowa in fiscal year 2012 up to the $1.95 billion it expects to spend at Los Alamos National Laboratory. Total DOE expenditures at the National Laboratories in fiscal year 2012 is expected to be $10.8 billion. In addition, other organizations, such as DHS, the Department of Defense and other Federal agencies, State and local governments, and private companies, can fund work at the National Laboratories through the DOE Work for Others program and other mechanisms.

DHS funds activities at 10 of the 17 DOE National Laboratories: Argonne National Laboratory, Brookhaven National Laboratory, Idaho National Laboratory, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratories, and Savannah River National Laboratory. In addition, DHS funds activities at the Nevada National Security Site and the Oak Ridge Institute for Science and Education, DOE facilities that are not categorized as National Laboratories. Total DOE expenditures at these 10 facilities in fiscal year 2012 is expected to be $9 billion. From fiscal year 2007 to fiscal year 2010, according to DOE, annual DHS expenditures at DOE facilities ranged between $400 million and $475 million. In each of those years, the facility receiving the most DHS funding was Pacific Northwest National Laboratory, and the facility receiving the second-most was either Lawrence Livermore National Laboratory or Sandia National Laboratories.[2]

While the S&T Directorate and the Domestic Nuclear Detection Office are among the heaviest DHS users of DOE facilities, they are by no means the only ones. Both Customs and Border Protection and the National Protection and Programs Directorate are also often heavy users, spending more than DNDO in some years. Between fiscal year 2007 and fiscal year 2010, at least another six DHS components also sponsored work, though at lower levels. The title of today's hearing refers to research and development. The DHS work conducted at DOE facilities is not limited to research and development. Indeed, in some years, research and development account for less than half of the total, with the majority of work for DHS made up of operations support and other types of activity.[3]

STATUTORY ORIGINS OF DHS USE OF LABORATORIES

The Homeland Security Act of 2002, which established DHS, provided specifically for both DHS-owned laboratories and DHS use of the DOE Laboratories.

Statutory Origins of the DHS Laboratories

Four of the five major S&T Directorate Laboratories described above became part of DHS at its establishment, under specific statutory provisions of the Homeland Security Act.

First, the Plum Island Animal Disease Center was transferred to DHS from the Department of Agriculture by Section 310 of the Act. Congress has also given statutory direction regarding this facility's planned successor, NBAF, in each homeland security appropriations act since fiscal year 2009. These additional provisions include mandates for safety and security risk assessments, requirements for outside review of those assessments, and authority for DHS to use receipts from the sale of Plum Island to offset NBAF construction and PIADC decommissioning costs.

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[2] Department of Energy, *Homeland Security Activities at Department of Energy Facilities,* issued annually. The dollar amounts given here are for work conducted through the Work for Others program. The annual reports do not identify the customer for other types of non-DOE-funded work, such as work performed under cooperative research and development agreements (CRADAs). These other types appear to represent only a small fraction of the total.

[3] Department of Energy, *Homeland Security Activities at Department of Energy Facilities,* issued annually, and additional information provided to CRS by DHS and the DOE National Laboratories.

Second, the National Biodefense Analysis and Countermeasures Center, referred to in the Homeland Security Act as the National Bio-Weapons Defense Analysis Center, was transferred to DHS from the Department of Defense by Section 303 of that Act. At the time, it was in the early planning stages and did not yet exist as an actual facility. For the first few years of DHS's existence, the NBACC program conducted research without a dedicated DHS-owned facility through partnerships and agreements with other Federal and private institutions. Construction of the NBACC facility began in June 2006. As noted above, NBACC is operated by a contractor as a Federally-funded research and development center. The Homeland Security Act provides specific authority for DHS to establish or contract with FFRDCs in Section 305.

Third, the Transportation Security Laboratory was previously the Aviation Security Laboratory of the Federal Aviation Administration. It became part of the Transportation Security Administration (TSA) when Congress created the TSA in November 2001.[4] The following year, the Homeland Security Act incorporated TSA into the new Department of Homeland Security. Section 424 of that act required that TSA be maintained as a distinct entity for 2 years, but in September 2003, Congress directed DHS to consolidate the Department's R&D functions in the S&T Directorate.[5] Following this direction, DHS implemented the transfer of TSL from TSA to the S&T Directorate in fiscal year 2006.

Fourth, the Environmental Measurements Laboratory, now NUSTL, was transferred to DHS from DOE by Section 303 of the Homeland Security Act.

The fifth laboratory, CSAC, was established without specific statutory direction. The Under Secretary for S&T has the authority to establish additional laboratories under Section 308(c)(2) of the Homeland Security Act. He or she also has the general authority and responsibility under Section 302 to carry out R&D and related activities through both intramural and extramural programs.

Most of the smaller laboratories and laboratory-like centers were also established under general authorities without specific statutory direction. Pre-existing facilities in other components, such as the Coast Guard R&D Center, became part of DHS under the Homeland Security Act when their parent organization was incorporated into the new department, but they are not specifically named in the act. Regarding DHS components other than the S&T Directorate, Section 306(b) of the Homeland Security Act specifically directed that the establishment of the S&T Directorate did not preclude other components from carrying out their own R&D and related activities.

STATUTORY ORIGINS OF DHS USE OF THE DOE LABORATORIES

The Homeland Security Act (in Section 309) also provided specifically for DHS use of the DOE National Laboratories and sites. Note that the inclusion of the words "and sites" extends the provisions to facilities that are not designated as National Laboratories. For example, the same statutory provisions apply to DHS use of the Nevada National Security Site.

Section 309 authorizes DHS use of DOE facilities through the Work for Others program, joint sponsorship arrangements, direct contracts with a laboratory's managing contractor, cooperative research and development agreements (CRADAs), licensing agreements, or any other method provided by law. In practice, it appears that Work for Others has been the primary method DHS has actually used. Section 309 makes additional specific provisions for each of these mechanisms as well as for cost reimbursement, interagency coordination, and other matters. In February 2003, 3 months after passage of the act, DHS and DOE entered into a memorandum of agreement to establish a framework for implementing this section.[6] The memorandum addresses three types of DOE capability available to DHS:

- DHS use of the resources and expertise of the DOE National Laboratories and other sites, including production plants;
- DOE assets making up the Nuclear Incident Response Team, which come under DHS operational control in certain circumstances; and
- DHS intelligence activities using DOE intelligence personnel, information, technology, and systems.

The first of these three capabilities is the focus of today's hearing.

Subsection 309(a)(2) of the Homeland Security Act gives DHS a special statutory relationship with the DOE Laboratories that allows DHS-funded work to have the

[4] Aviation and Transportation Security Act (Pub. L. 107–71).

[5] H. Rept. 108–280, p. 56. This was the conference report on the Department of Homeland Security Appropriations Act, 2004 (Pub. L. 108–90).

[6] A copy of this memorandum is on-line at *http://www.doecaa.org/Docs/DOE-DHS_MOA.pdf*.

same priority as work funded by DOE itself. Work funded by DHS is to be performed "on an equal basis to other missions at the laboratory and not on a noninterference basis with other missions of such laboratory or site."[7] This language is in contrast with most Work for Others projects, which are conducted on the condition that they may not interfere with DOE activities. Provisions similar to this statutory language are repeated in the 2003 memorandum of agreement.

Another aspect of the special relationship is provided by Subsection 309(e), which directs that DHS not be subject to administrative charges or personnel costs in excess of those that would be charged to DOE for similar work. In particular, the memorandum of agreement and the implementing DOE directive clarify that work for DHS is not subject to the 3% Federal administrative charge usually imposed on Work for Others participants to defray DOE's costs of managing and overseeing the Work for Others program.[8] This 3% Federal administrative charge is a DOE charge, not part of the performing laboratory's overhead charges. Laboratory overhead charges generally apply to DHS projects the same as to any other project.

Subsection 309(g) of the Act established the Office of National Laboratories (ONL) within the S&T Directorate and made it responsible for "coordination and utilization of the Department of Energy National Laboratories and sites under this section in a manner to create a networked laboratory system for the purpose of supporting the missions of the Department." This makes ONL one of the few offices within the S&T Directorate that was specifically established by statute. The directorate has subsequently expanded the scope of ONL's responsibilities to encompass the construction and operation of the S&T Directorate's own laboratories. This additional role is not mentioned in statute.

A DHS management directive establishes policies and procedures for DHS components engaging with the DOE National Laboratories and other FFRDCs.[9] As part of that process, the ONL, acting on behalf of the Under Secretary for Science and Technology, reviews contract statements of work to ensure that they comply with the terms and conditions of the laboratory's prime contract with DOE. This review is designed to increase coordination among the components of DHS. It does not provide ONL with the ability to prevent issuance of a contract or other agreement. The ONL does not provide oversight of contracts after they have been issued.

The statute authorizes a broad scope for DHS use of DOE facilities. In particular, such work is not limited to R&D, or to the S&T Directorate. This is consistent with the patterns of use described above. DHS work at DOE Laboratories is not entirely free of restrictions, however. There are certain categories of DHS work for which the DOE Laboratories may not compete. The DOE implementing directive states that the DOE National Laboratories may not respond to DHS requests for proposals (RFPs) or other DHS solicitations that involve head-to-head competition with the private sector.[10] They may, however, under certain conditions, respond to broad area announcements (BAAs) and other competitive solicitations that do not involve head-to-head private-sector competition.[11]

Some of the early proposals that led to the Homeland Security Act would have transferred one of the DOE Laboratories to DHS ownership. These proposals were rejected. Instead, Section 308(c) authorizes DHS to establish an intramural headquarters laboratory, if the Secretary so chooses, and provides criteria and procedures for the selection of such a facility. To date, a headquarters laboratory has not been established. In the early years of the Department, there was a proposal to designate certain DOE Laboratories as intramural for DHS purposes, and the rest as extramural. This proposal too was ultimately rejected.

ALIGNMENT OF LABORATORY MISSIONS WITH DHS MISSIONS

The committee asked CRS to address the alignment of the laboratories' missions with the DHS mission overall.

The DHS Laboratories are focused on particular topics of specific interest to DHS. The Plum Island Animal Disease Center also hosts an active R&D program for the

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[7] Homeland Security Act of 2002 (Pub. L. 107–296), Sec. 309(a)(2).

[8] DOE Order O 484.1, *Reimbursable Work for the Department of Homeland Security,* approved August 17, 2006, amended March 14, 2011, *https://www.directives.doe.gov/directives/0484.1-BOrder-ac1/view.* This order replaced DOE Notice N 481.1A, which is referred to in the 2003 memorandum of agreement.

[9] Department of Homeland Security, *Establishing or Contracting with Federally Funded Research and Development Centers (FFRDCs) and National Laboratories,* MD 143–04, May 25, 2007. This management directive replaced a similar directive (MD 10400) dated April 25, 2006. With respect to the use of DOE National Laboratories, the content of the two directives is effectively the same.

[10] DOE Order O 484.1, Sec. 4j.

[11] DOE Order O 484.1, Sec. 4k.

Department of Agriculture, and other DHS Laboratories work collaboratively with the Department of Defense and the Federal Bureau of Investigation. In general, though, the missions of the DHS Laboratories are aligned with specific DHS programs and mission needs. How that mission alignment is reflected in the organization of the S&T Directorate has varied from time to time as the directorate has been reorganized. For example, the PIADC and the NBACC, which now report to the Office of National Laboratories, formerly reported to the Chemical and Biological Countermeasures Division. It is not clear whether these organizational changes within the directorate have had any impact on the missions of the laboratories, or whether they were intended only to improve management efficiency.

The situation with respect to the DOE Laboratories is more complex. The capabilities of the DOE Laboratories are vast and varied, and their missions are inherently much broader than the work they do for DHS. While the Homeland Security Act directs that their work for DHS is to be performed on an equal basis with their other missions, DOE remains their primary funder, as well as the overseer of their management and operating contracts. In practice, therefore, DOE retains the primary role in setting their overall strategic directions. Their capabilities include many topics directly relevant to homeland security, especially because of DOE's long-standing National security mission. The DOE Laboratories were not established with a homeland security mission in mind, so their capabilities may not encompass every needed topic. This could be a consideration for the committee in identifying areas where DHS should have its own capabilities.

As noted above, the statutory responsibility of the Office of National Laboratories is to coordinate DHS use of DOE facilities for the purpose of supporting DHS missions. This coordinating role could contribute to alignment between laboratory missions and DHS missions. However, as already noted, the office's gatekeeping and oversight roles are limited. While it serves as one point of contact between DHS and the DOE Laboratories, it is not the only point of contact. Any DHS component can contract with a DOE Laboratory to do work.

In 2007, the S&T Directorate announced an alignment of the DOE Laboratories with the directorate's research divisions. This alignment was not one-to-one. Each division was aligned with multiple laboratories, and several of the laboratories were aligned with multiple divisions. At the time, DHS stated that the alignment would help DHS and DOE staff to develop more enduring professional relationships and a better mutual understanding of each other's capabilities and needs. It is unclear whether this organizational alignment had an impact on the alignment of missions. The S&T Directorate's divisions have since been reorganized, so the divisional alignment with the DOE Laboratories may or may not still be in effect.

PLANNING AND PRIORITIZATION

The committee also asked CRS to address the planning and prioritization of DHS work at the DHS and DOE Laboratories.

Within the constraints mentioned above, the DOE Laboratories can compete for some types of DHS funding. In such cases, DHS planning and prioritization are at the program level, and the selection of a proposal from a DOE Laboratory comes at the end of the process when awards are made. Program-level planning and prioritization have been examined frequently by this committee and others, as well as by independent organizations such as the Government Accountability Office, the National Academy of Public Administration, and the National Academy of Sciences. Among the issues these examinations have raised are the adequacy of the S&T Directorate's strategic planning; the effectiveness of its portfolio review process; the sufficiency of the Department's risk analysis efforts and the extent to which those efforts inform R&D priorities; and the mechanisms for ensuring alignment between the S&T Directorate's R&D priorities and the needs of its customers, including other DHS components as well as State and local first responders.

The planning and prioritization of work at the DHS-owned laboratories and work funded through non-competitive awards to the DOE Laboratories raise a number of additional questions for the committee to consider:

- Has DHS developed a strategic plan for the DHS Laboratories?[12]
- Has it developed a strategic plan for its use of the DOE Laboratories?
- What is the appropriate content for such plans?
- What mechanisms are in place to ensure that they are implemented?

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[12] There are strategic plans for at least some of the individual laboratories. For example, see Department of Homeland Security, Science and Technology Directorate, National Urban Security Technology Laboratory, *National Urban Security Technology Laboratory Strategic Plan FY2009-FY2013;* and Battelle National Biodefense Institute, *National Biodefense Analysis and Countermeasures Center (NBACC) Strategic Plan,* June 2009.

- How does DHS determine whether to assign work to a DHS Laboratory, a DOE Laboratory, or another organization, such as a private-sector company or a university?
- What policies, procedures, and criteria are in place to guide these decisions?[13]
- How does the Office of National Laboratories ensure DHS-wide coordination of planning and prioritization?
- How do DOE and DHS planning efforts fulfill the Homeland Security Act's mandate (in Section 309(h)) to ensure that all homeland security research, development, test, and evaluation activities conducted by DOE, whether funded by DOE, DHS, or any other organization, are fully coordinated between DOE and DHS to minimize duplication of effort and maximize the effective application of Federal resources?

EFFICIENCY AND COST-EFFECTIVENESS

Finally, the committee asked CRS to address the efficiency and cost-effectiveness of DHS's use of the DHS and DOE Laboratories.

At the DOE Laboratories, work is generally done on a cost-reimbursement basis, with overhead rates and other conditions determined by the laboratory's management and operating contract with DOE. Management efficiency, cost, and related issues have been discussed from time to time throughout the history of the DOE Laboratories.[14] Congress and the administration have addressed these through a variety of mechanisms, including the recompetition of management and operating contracts and the establishment of performance-based fees. Many questions remain unanswered, however. A recent report by the DOE Inspector General raised the following concerns:[15]

- Can DOE sustain all its current facilities?
- Are there opportunities for consolidation and realignment?
- Are laboratory efforts aligned with agency priorities?
- Are laboratory missions clear and well-coordinated?
- Is the laboratory complex appropriately-sized?
- Could alternatives to the usual management and operating contracts enhance efficiency and economy?
- To reduce overhead costs, should DOE make more use of non-DOE facilities, such as universities and non-profit research centers?

Under current circumstances, DOE is probably more able to address issues of cost and efficiency at the DOE Laboratories than is DHS. Although the Homeland Security Act gives DHS special status with respect to work at the DOE Laboratories, it does not give DHS a direct role in their management.

While many studies of the DOE Laboratories have addressed efficiency and cost-effectiveness, there has not been comparably detailed scrutiny of the management of the DHS-owned laboratories. However, an extensive body of related work exists that could provide relevant insights:

- There is an academic literature on mechanisms for measuring R&D productivity and effectiveness.[16] Some of this work could assist DHS in developing metrics for the efficiency and cost-effectiveness of its laboratories.

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[13] In 2004, the S&T Directorate reported on four criteria for choosing to execute work at DHS and DOE Laboratories: Inherent Federal responsibility, maintenance of enduring capabilities, limited private-sector interest, and leveraging of other Government investments. A number of other policies described in the 2004 report have since changed. It is unclear whether the four criteria are still in effect. See Department of Homeland Security, Science and Technology Directorate, *Utilization of the National Laboratories: Report to Congress in Response to House Report 108–541 to the Fiscal Year 2005 Department of Homeland Security Appropriations Bill,* October 2004.

[14] See, for example, General Accounting Office, *DOE's National Laboratories: Adopting New Missions and Managing Effectively Pose Significant Challenges,* GAO/RCED–94–113, February 1994; Secretary of Energy Advisory Board, Task Force on Alternative Futures for the DOE National Laboratories, *Alternative Futures for the DOE National Laboratories,* February 1995; Department of Energy, *Report of the Department of Energy for the Interagency Federal Laboratory Review in Response to Presidential Review Directive NSTC–1,* March 1995; General Accounting Office, *Department of Energy: Uncertain Progress in Implementing National Laboratory Reforms,* GAO/RCED–98–197, September 1998; National Research Council, *Preliminary Assessment of DOE Facility Management and Infrastructure Renewal,* 2004; and National Research Council, *Maintaining High Scientific Quality at Los Alamos and Lawrence Livermore National Laboratories,* 2004.

[15] Department of Energy, Office of Inspector General, *Management Challenges at the Department of Energy,* DOE/IG–0858, November 2011.

[16] See, for example, Mark G. Brown and Raynold A. Svenson, "Measuring R&D Productivity," *Research Technology Management,* November–December 1998, pp. 30–35; Martin Karlsson, Lars

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- Federal organizations such as the Government Accountability Office and the agency Inspectors General have often assessed the laboratories of other agencies.[17] These assessments may contain lessons learned that could be applied to the DHS Laboratories.
- Outside organizations have also conducted assessments of the laboratories of other agencies. The National Academy of Sciences, for example, issues periodic evaluations of the National Institute of Standards and Technology (NIST) and the Army Research Laboratory (ARL), and from time to time undertakes similar assessments for DOE, the Environmental Protection Agency, and other agencies.[18]

There are some general considerations for Congressional policymakers in comparing the potential for efficiency and cost-effectiveness between the DHS Laboratories and the DOE Laboratories. First, the DOE Laboratories are generally operated by contractors rather than directly by the Government. This may provide some opportunities for management and personnel flexibility that are not available to most DHS Laboratories. On the other hand, to the extent that the operating contractors of the DOE Laboratories earn fees over and above the costs they incur, that may increase their cost relative to the Government-operated DHS Laboratories. Second, the DOE Laboratories have an extensive and long-established infrastructure of facilities, equipment, and personnel. This may allow them to perform some types of work without the cost of acquiring additional infrastructure, but it may increase the on-going costs of maintaining the DOE Laboratory infrastructure. Third, because the DOE Laboratory system is much larger than that of DHS, it may enjoy economies of scale, and it may have more capacity to adjust to fluctuations in utilization if the resources available to DHS increase or decrease. If DHS expenditures at the DOE Laboratories decrease, however, any additional infrastructure that the laboratories have invested in to meet DHS needs may not be applicable to DOE's own needs. It seems likely that these general considerations will be outweighed by the specific circumstances of individual laboratories and projects.

CONCLUDING REMARKS

Thank you again for the invitation to testify today. I look forward to answering any questions you may have.

Mr. LUNGREN. Thank you very much.

Would you like to make your opening statement now or when we come back?

Ms. CLARKE. [Off mike]

Mr. LUNGREN. Okay, I am going to recognize Ms. Clarke for her opening statement so we can get all of this in before we go vote. Then, we will come back and start with our questions.

Ms. CLARKE. I thank you, Mr. Chairman. Thank you for your indulgence and I thank our panelists for coming to testify today. Mr. Chairman, I too want to welcome our witnesses. Some have traveled from the great State of California and we appreciate their participation.

I also want to welcome Deputy Under Secretary Gerstein to the subcommittee. He is relatively new to his position, obviously well-qualified and, since arriving, has provided enthusiastic and knowledgeable leadership efforts to S&T. During his short time on the

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Trygg, and Bengt-Olof Elfström, "Measuring R&D Productivity: Complementing the Picture by Focusing on Research Activities," *Technovation,* 2004, pp. 179–186; and Albert Sciarretta, et al., "A Methodology for Assessing the Military Benefits of Science and Technology Investments," Center for Technology and National Security Policy, National Defense University, September 2008.

[17] See, for example, Government Accountability Office, *Department of Energy: Additional Opportunities Exist for Reducing Laboratory Contractors' Support Costs,* GAO–05–897, September 2005; Department of Defense, Office of the Inspector General, "Evaluation of the Department of Defense Forensic Laboratories," September 16, 1998; and Lawrence Berkeley National Laboratory, *DOE Best Practices Pilot Study,* LBNL/PUB–865, February 2002.

[18] See, for example, the assessments of NIST and ARL listed on the website of the Academy's Laboratory Assessments Board, *http://sites.nationalacademies.org/DEPS/LAB/DEPS_047831;* and National Research Council, *Evaluating Research Efficiency in the U.S. Environmental Protection Agency,* 2008.

job, he has proven to be a valuable asset to the Under Secretary O'Toole. I am looking forward to his testimony today.

The Department and S&T, in particular, supports a broad range of scientific and engineering research and development. Its purposes are wide-ranging address specific concerns such as chemical security, biodefense, transportation security, and nuclear detection. An important segment of the Department's laboratory—the Department's laboratories' effort is it fosters the development of our country's scientific, engineering, and technical workforce, which influences students at universities and even high schools.

When teachers and students can see that there is interesting and substantial work to be done in the sciences at our laboratories, they show an incredible amount of interest in striving to work there. Important things go on in our laboratories and they are seen as good and significant places to work. Our scientists, researchers, engineers, and technicians work hard to discover, excuse me—to deliver solutions grounded in science and supported by innovative engineering. This strengthens U.S. innovation and competitiveness in the global economy.

This committee has a long-standing interest in the strength of the Department's research and development enterprise and in providing support for its R&D activities. We must anticipate the needs of our laboratories and the DOE Labs and provide the best support and oversight that can help provide solutions to our toughest scientific, technological, and problematic challenges.

However, recent and projected budget cuts passed by the Majority are driving difficult decisions, such as prioritization and, sometimes, the elimination of R&D projects. This is causing stress among competing priorities within the Department's S&T Directorate and its R&D portfolio. Congress will play a central role in defining the Nation's R&D priorities as it makes decisions with respect to the size and distribution of Homeland Security R&D funding.

We have expressed our serious concerns about the drastic decreases voted by this Congress and passed by the Majority in the level of Federal funding for Homeland Security R&D funding. As the fiscal year 2013 appropriations process moves forward, it faces two overarching issues; the extent to which the Federal R&D investment can grow and what little R&D funding available will be prioritized and allocated.

The Department and, in particular, the S&T Directorate will need to justify and make transparent its R&D investments. President Obama's Science Advisor, John Holdren, and others, have raised concerns about the potential harm of a boom-bust approach to Federal R&D funding as seen in the past. Like rapid growth followed by much slower growth, flat funding, and even decline.

Critics assert that there has been a variety of damages from this bust-boom cycle, including interruptions and cancellations of much-needed research projects, decreased student interest in pursuing graduate studies, and reduced employment prospects for the large number of researchers with advanced degrees. More broadly, in a 2009 speech before members of the National Academy of Sciences, President Obama put forth a goal of increasing the National invest-

ment in R&D to more than 3 percent of the U.S. gross domestic product.

But, as they say, the devil is in the details and the details are what we are here to talk about today. This subcommittee and full committee have been real supporters of the Department's R&D and National Labs but we need a better, clear understanding of how things have gotten better, how management oversight of R&D projects has increased and what is the path forward as we look forward—as we look forward and the drastic funding cuts coming out of this Congress.

Mr. Chairman, I yield back.

Mr. LUNGREN. Thank you.

We will take a recess and be reconvened as soon as we get back from our vote.

[Recess.]

Mr. LUNGREN. Alright, we will resume and thank you for your indulgence in the time that was taken for our votes. We are going to try and move along here so that before the next votes we are here. So I will recognize myself for 5 minutes.

Dr. Gerstein, I know this is a general question but do you view the job that you have, with respect to the kinds of research that we are talking about, to be one of basic research or applied science or a mixture of two or is that a inappropriate distinction in this environment in which you work?

Mr. GERSTEIN. Well, thank you. No, that is a great question, actually, and it fits very well into our value-added proposition and the way we have been thinking about science and technology or research and development. So if you looked at our organization a couple of years ago, you would have seen much more focus on basic research and, then, some applied research. But, today, what we are focusing in on is instead of big "R", big "D", we are looking at little "R", big "D".

So we are doing less basic and applied research and we are looking for more development. The point here is what we are trying to do is be very operationally focused. That is to get products to the Homeland Security enterprise. To do that at the numbers that we are at, you absolutely have to find work that is on-going in the community; you have to partner with other entities, whether that is the DOE Labs, whether that is other interagency partners, international partners.

So it is absolutely essential that we continue to focus on this later-stage development and move things forward where it can be commercialized and brought forward.

Mr. LUNGREN. Same question for you, Dr. Gowadia.

Ms. GOWADIA. Gowadia.

Mr. LUNGREN. Gowadia.

Ms. GOWADIA. It is a strange name, I will give you——

Mr. LUNGREN. No, no, people mess my name up too. I don't know how they do that but they do. But go ahead.

Ms. GOWADIA. Yes, we, actually, have been fortunate in that we have the entire scope of effort for the nuclear threat in DNDO. So we are able to take a holistic, integrated approach to the countering nuclear threats mission. As such, we make sure that our sustainment of the early R&D in our transformational research

portfolio stays consistent. Also, our forensics mission. Of course, it is all driven from an analysis of the architecture.

So we have vulnerabilities that come up from analyzing the gaps in the architecture and our close coordination with our partners, so we know what is needed operationally to deliver. So we have tried, actually, to have a fair balance between the early research and the applied end.

Mr. LUNGREN. Look, we can all talk about budgets and so forth. The fact of the matter is we are in a budget crisis; we are all looking at tougher decisions than we have ever had to make, I believe, if we are going to be serious about this. So you are not going to have all the money you want to have. My question is, therefore, Dr. Gerstein, in the area of Plum Island and, then, its successor, now, as I understand it, you are asking the National Academy of Sciences to assess the very need for the successor and development of an analysis of alternatives, delineating all options to meet the threat.

It is easy to do Monday-morning quarterbacking but have we made a mistake in saying that we had to go to an alternative to Plum Island? Did we make a mistake in deciding that we were going to site in Kansas and not do the proper development that we needed? Or is this the result of budget reality staring us in the face that causes us to reassess?

Because, you know, we were bragging about this just a couple years ago and now we are saying we have got to reassess the whole thing. That might be an intelligent decision; it might be a statement that we wasted a pile of money that we can't afford to waste. Where are we on that?

Mr. GERSTEIN. So, a fair question, and what I would like to do is start off with the strategic context and say that Plum Island is 58 years old. It has been a magnificent facility; we have done great work there. We are continuing to do great work there, as evidenced by the Foot-and-Mouth disease vaccine work and the eventual licensure that we are going to get.

On the other hand, there are some limitations with Plum Island; they are significant limitations and we are continuing to modernize the facility even as we look to move to a new facility with the NBAF. By "modernize", I mean we are looking at putting in a new wastewater treatment handler so that we can ensure that the products that come out of the experimentation is all safely put through and there are no pathogens contaminates in that. That is just one example of the modernization.

So what are some of the limitations? Well, Plum Island doesn't have the highest containment level, or BSL–4 capability; that is a major drawback, giving the infectious emerging diseases, such as NIPA and Hendra, and even some of the old-world diseases, such as Rift Valley and West Nile Virus.

In fact, we are so concerned about this lack of capability, that I have recently been to Canada and talked to them in Winnipeg about their one health facility that deals with agricultural contaminates by biological pathogens. They can handle a BSL–4. On the other hand, they can handle one cow at a time; in our studies, we are handling 100 cows at a time, multiple rooms, and doing herd analysis. So very different level of scale.

I am also going to Australia to talk to them about their BSL–4 Ag. They are working on diseases that we simply do not have the capacity for. Our facility right now, at Plum, we are only looking at three diseases; the Foot-and-Mouth Disease and we are doing the vaccine trials, we are looking at classic Swine Fever and African Swine Fever, where we are doing—development.

So here is the NAS study that we have asked for. It is not to say, "Do we need this facility?" it is to say, "In view of the current fiscal environment, is it going to be affordable?" So we have asked NAS to look at three basic options: One is to build NBAF as it is originally intended and as it is currently designed; to build a smaller version of NBAF; or to keep—and to try to leverage the foreign MOUs and, therefore, not build NBAF.

But, in terms of protection of our $1 trillion agricultural industry, we know that there is a valid requirement to have a capacity for a BSL–4, high-containment facility, dedicated to agriculture.

Mr. LUNGREN. I thank you and my time is expired but I would like, at some point in time to get around to the question of when is that study going to be done and when do you think you can act on it?

Mr. GERSTEIN. May I just follow up on that because that is a short answer. The study should be done by the 30th of June.

Mr. LUNGREN. Of this year?

Mr. GERSTEIN. Of this year. We intend to have that to the Secretary and then a decision will be made on affordability.

Mr. LUNGREN. Okay, we will be very interested in looking at this as soon as that comes up.

The Ranking Member is recognized for 5 minutes.

Ms. CLARKE. Thank you, Mr. Chairman.

Dr. Gerstein, I wanted to just ask a couple of questions relative to ONL. In addition to the oversight at S&T Directorate Laboratory Operations, ONL is to coordinate homeland security-related activities and Laboratory Directorate research, conducted within the DOE's National Laboratories. So I was wondering if there is a—if ONL has a current list or breakdown of the DHS research and development projects conducted at the S&T-owned National Laboratories and at the DOE-owned Laboratories. If so, how much does DHS spend annually on R&D at the National Labs?

Mr. GERSTEIN. Okay, so let me begin by talking about the total spending and some of the trends. So for fiscal year 2010, at the DOE Labs, we spent $152 million. In 2011, it was $103.6 million and, this year, year-to-date, we have spent $10.1 million. That is a reflection of the down-sizing of the number of projects. We have gone from, approximately, 250 projects in fiscal year 2010 to 63 projects today.

So that is why you see the numbers change. Now, that is the S&T spending in the DOE Labs. If you were to back out, or if you were to add, all the spending to the DOE Labs from the Department of Homeland Security that number would be $312.7 million and it cuts across seven different components from within the Department of Homeland Security. So your first part of the question, though, was on this idea of ONL and authorities and whether or not they have the appropriate authorities.

Here, I would say that I think we are actually well-endowed with our authorities, in that we, under the Homeland Security Act of 2002, were given authorization under section 309, to have direct funding into the Department of Energy Laboratories. That has been very powerful and that has been augmented with a management directive, 143, from within the Department of Homeland Security, that gives us the ability in ONL and S&T to look at the appropriateness of the work that is being conducted in the DOE Laboratories.

So let me make clear, though, this is not a go, no-go, but if we are presented with a project and we look at it and we say, "You know, this is not really in the laboratory sweet spot," we do not feel any degree of bashfulness about saying this is not the right performer. Now, we will not be able to stop that if the component were dead-set.

Now, most recently, our Secretary has said she wants to have greater visibility into the work that is being done at the Federally-funded research centers, or FFRDCs. To that end, to gain that greater visibility, she has put in place that S&T will assist the components in developing a portfolio review process, which is very similar to the process that we have. She is not going to have it directed so that everyone will look identically but the requirement to have a portfolio review process and to gain visibility of the work that is being done in research and development across the components will, indeed, become part of our culture.

Ms. CLARKE. Let me just follow up with a couple of other questions here. The development of the Homeland Security workforce, including the next generation of scientists and researchers engaged in homeland security activities, has one goal of DHS. How are DNDO and the S&T Directorate engaging scientists at the DHS Laboratories and the DOE National Laboratories to foster homeland security scientific workforce? What programs or activities does DHS have that leverage the scientific capabilities of these facilities to strengthen outreach to other scientists, for example, in academia?

Ms. GOWADIA. I will take this question——

Ms. CLARKE. Thank you.

Ms. GOWADIA [continuing]. First. At DNDO, we actually have a legislative mandate and two strong programs that are focused specifically at the intellectual infrastructure of developing sciences for our nuclear detection and forensics mission. The first is a legislatively-mandated program—is the National Nuclear Forensics and Expertise Development program—every aspect of the program is close-coupled with the National Laboratories, we are looking for maintenance of our Nation's capabilities for geochemical sciences, nuclear sciences, to make sure that our forensics expertise pipelines is consistent.

We have students—170, actually, have come through our process so far and we have five universities, major universities, involved in the program and additional 10 summer interns, all the way from undergraduate through graduate school, post-Docs and faculty, are encouraged and, actually, stipulated that they have to work with the National Laboratories on their research. We continue to assess the needs of the program based on the mission, as well as the sup-

ply and demand of the human capital chain. So that is the legislative part.

In addition to the forensics mission, of course, we have this large nuclear detection responsibility. For that, we have our academic research initiative. This is a joint partnership we have with the National Science Foundation and we select programs or projects from the universities. It is specifically with the universities; we are looking for our next generation of researchers in the nuclear detection realm.

Not only do we weigh the proposals on their technical merits but, also, we look to see what support the university will give the student and, thereby, develop a career path, ensuring that the innovative solutions that can come from this next generation will be made available to us.

Ms. CLARKE. Thank you, Dr. Gowadia.

Thank you, Dr. Gerstein.

I yield back, Mr. Chairman.

Mr. LUNGREN. Thank you, the gentlelady's time has expired.

The gentleman from Missouri, Mr. Long, is recognized for 5 minutes.

Mr. LONG. Thank you, Mr. Chairman.

Dr. Gowadia, on the National Laboratories—everybody knows that they have been around for 60 years, or whatever, and, kind of, the centerpiece of R&D capabilities. What steps are the Department of Energy that has those National Labs now or their—has the jurisdiction over them, what steps are they taking to partner with you all, with DHS?

Ms. GOWADIA. Thank you, Representative Long. My colleague, Dr. Gerstein, mentioned the Mission Executive Council. So that is just one of the many interagency—we have, where we look at not just the relevant capabilities that are relevant to our projects immediately, but what needs to be sustained for the long-term, the maintenance, development, and sustainment of the facilities, the people, the resources, the knowledge base.

We work very closely with the National Laboratories to make sure that those interagency—are well-supplied with information to make the right strategic decisions at the U.S. Government level. Of course, we involve the laboratories in everything we do at DNDO, based on their unique and special expertise in the nuclear realm. So all the way from planning through assessment through operation support, of course, the research and development. So we have a very good partnership there, not just with our Federal partners but, also, with our laboratory partners.

Mr. LONG. So, as far as defining the mission that you are confident, or you are pleased that they are working together with DHS?

Ms. GOWADIA. Yes, sir. Yes, they are very dedicated to the nuclear mission.

Mr. LONG. Okay, thank you. Pronouncing Dr. Gowadia is one thing but I am still caught up on the fact people mispronounce "Dan." I don't understand how that happens but—I yield back.

Mr. LUNGREN. Well, all I can say is the former Governor of Mississippi used three syllables to say "Dan," if you ever heard him talk—"Da-a-an". So that is how it is.

All right, gentlelady from California is recognized for 5 minutes.

Ms. RICHARDSON. Well, my first question I would like to ask of the Chairman. That is, for those of us who participated today, do we get extra brownie points for showing up 2 days in a row and——

Mr. LUNGREN. Absolutely, and, particularly——

Ms. RICHARDSON. [Off mike]

Mr. LUNGREN [continuing]. If the quality of the questions are good.

[Laughter.]

Ms. RICHARDSON. Oh, okay, that is why you are the Chairman.

Representatives of the DOE National Laboratories serve within DHS in advisory roles, often temporary IPA employees. The National Academy of Public Administration and DHS Office of Inspector General and the GAO office, all have highlighted the need for DHS to maintain strong managerial controls, in order to maintain transparency and funding activities and to avoid conflicts of interest.

My question is: Please describe how DNDO and the S&T Directorate ensure that these representatives avoid conflicts of interest.

How is that, Mr. Chairman?

Mr. LUNGREN. Well, we will see what the answer is.

Ms. RICHARDSON. All right.

Mr. GERSTEIN. Could I ask you to clarify which representatives are you referring to?

Ms. RICHARDSON. Specifically, I was referring to the IPA employees that are often temporary.

Mr. GERSTEIN. Well, so, when we look at this, obviously, and we decide who is going to be a performer and what projects are going to be worked on, there is an analysis that gets done. Through our portfolio review, what we have done is to look and pare down those projects. Based on that, we make a corporate decision on who the performers are going to be.

We are not placing people in a position where a conflict of interest is likely to occur. So we wouldn't want, for example, an IPA to be directly working on something that they had worked on in their previous incarnation at the laboratory where they serve. So——

Ms. RICHARDSON. Do you keep records, though, to verify that, in fact, is not occurring?

Mr. GERSTEIN. Well, because of the number of projects we are dealing with, we actually have very few IPAs that come from the DOE Labs. So this does not serve to be a major problem.

Ms. RICHARDSON. But do you have records to determine if that could occur?

Mr. GERSTEIN. We certainly do know where people work. Yes, we do keep those records.

Ms. RICHARDSON. You keep it into consideration?

Mr. GERSTEIN. We absolutely do. We look to see who the best performer is and, based on that, we make the assessment of whether or not we go with the DOE Lab, whether we go with a—typical contractor, whether or not we go to an interagency partner or an international partner.

Ms. RICHARDSON. Okay, could you specifically reference the NAPA study, though, and the concerns that they provided in our—

let us see, I am having National Academy of Public Administration, the Department of Homeland Security, your department—June 2009—the Office of Inspector General had a report and it said, "DHS needs to improve ethics-related management controls for the Science and Technology Directorate." Also, referenced December 22, 2005.

Mr. GERSTEIN. Yes, so, let me say, I would like to take this for the record but I do believe that our management controls have greatly improved with the entire process of conducting a systems analysis, doing the portfolio reviews, ensuring that we are working towards projects that will, indeed, transition long-term. But I would like to provide a more detailed answer to you.

Ms. RICHARDSON. Sure, well, if the Chairman does not object, I would suggest that you review those two reports, June 2009 and December 2005, and come back to the committee based upon those recommendations and see if they have, in fact, been addressed.

My next question is—the DHS budget, especially that for research and development within DHS, is experiencing great fiscal pressure. I heard you saying "greatly endowed." I thought that that was interesting. But, for all of us, there is extreme pressures of what gets funded. What procedure does DHS have in place to guide program managers regarding performing research and development?

Mr. GERSTEIN. So we have instituted a number of what we are calling "knowledge management activities" and, really, the centerpiece is the portfolio review process and the way we select those programs that we are going to put into as a portfolio.

As we mentioned earlier, we have come down from $1 billion, of which about $600 million was dedicated to R&D, and we had 250 projects down to, current year, 63 projects and $265 million. Through that portfolio process, we have pared back considerably. So we also have, in addition to the portfolio review process, a program manager handbook, which is designed to tell program managers what their duties and responsibilities are as part of the enterprise that we are running.

Ms. RICHARDSON. Mr. Chairman, could I have an additional 10 seconds?

Mr. LUNGREN. Yes.

Ms. RICHARDSON. Thank you, sir.

What criteria, though, building upon that, does the DNDO and S&T Directorate use to determine whether industry, academia, or DOE National Laboratory or the DHS Laboratory should perform the research and development?

Mr. GERSTEIN. So that is a great question. Let me start by saying that there are certain activities that are ideally suited for the Department of Energy Laboratories and our consortium of laboratories' internal labs. So, what we do is we think about what project and what is the problem we are trying to solve through our systems analysis approach.

But what it comes down to is this—that if you are looking for something that is multi-dimensional, highly complex, it is going to be a long-term effort—that is something that is ideally suited to the DOE Labs and our internal labs. On the other hand, if you are looking for just simple program management, there are many con-

tractors who can perform that role and probably do it at a more cost-effective basis.

Ms. GOWADIA. We have a very disciplined approach, ma'am, at DNDO, for going through our entire portfolio on an annual basis. Our requirements are based entirely on the analysis of the global nuclear detection architecture for which we are responsible. We seek to address the vulnerabilities, both in the long-term research portfolio and in our shorter-term fixes, not just by way of research and development but, also, by way of operational changes and non-material solutions.

We have found that we are able to actually tap nicely into the laboratory structure, academia, and industry as appropriate. As Dr. Gerstein mentioned, some of the shorter-term engineering development is done in industry but the long-term challenges that require the lab's expertise, access to special nuclear material, assessments, et cetera. We certainly work with the labs on those things.

Ms. RICHARDSON. Sure, my time is expired.

Thank you, Mr. Chairman.

Mr. LUNGREN. Thank you very, very much. I apologize for the shortness of time because of the votes. We are going to have votes later and I want to make sure we get the second panel. Dr. Morgan, I apologize for us not asking you any questions here. I believe there will be questions submitted by the panel in writing and we would ask you to respond to them.

Dr. Gerstein, I am going to ask a question in writing with respect to our inability to get spreadsheets from you in terms of exactly how much is being spent by DHS to the labs over the past number of years; there was some question about different analyses from DOE versus DHS. But it is disappointing for us so we are going to submit a specific series of questions to you on that. We would appreciate a response in a timely fashion. Other Members may also ask questions as well.

Again, I thank you for appearing before us. I thank you for the work that you are doing. These are difficult budget times. This is very important work for us, spanning all the way from nuclear threat to the threat to agriculture and everything in between.

Dr. Morgan, thank you for the work that you are doing to help us get a—sort of, a third voice and third set of eyes there. Thank you very much.

We would dismiss the first panel now and call forward the second panel, Ms. Jill Hruby, Vice President, International, Homeland and Nuclear Security Management Unit at Sandia National Laboratories and Dr. Michael Carter, Senior Leadership Staff, National Ignition Facility, Lawrence Livermore National Laboratory.

Once again, thank you for being here and thank you for the work that you are doing. We are trying to make sure we get between two sets of votes on what is known as a "getaway day" for Congress. So I know I have four of us here now. After the votes, I am not sure we would have too many folks here. So we are going to try and proceed very quickly.

Ms. Jill Hruby is the Vice President of International, Homeland and Nuclear Security at Sandia National Laboratories. Ms. Hruby focuses on nuclear security, including non-proliferation, technology support to arms control activity, global nuclear security and threat

reduction, nuclear asset protection, detention and response to weapons of mass destruction.

In addition, she is also Vice President for Energy Security and Defense Technologies, has been with Sandia more than 25 years, and previously serving as director of homeland security and defense systems and director of materials in engineering sciences. Over the course of her career, she has been actively engaged in nanoscience research, hydrogen storage, solar energy research, mechanical component design, Thermal Analysis, and microfluidics.

Dr. Michael Carter is the Senior Scientist for the National Ignition Facility and Photon Science Directorate at Lawrence Livermore National Laboratory. Prior to this appointment, he served as a deputy principal associate director for program, within the laboratory's Global Security Principal Directory. He came to Lawrence Livermore National Laboratory after working for more than 3 years at Department of Homeland Security, was the deputy director of the Domestic Nuclear Detection Office and Nuclear—and director of the DHS Science and Technology Directorate's Nuclear and Radiological Countermeasures Program.

He has also served as technical advisor, for 8 months, at the White House's Transition Planning Office for the Establishment of the Department. Again, as I mentioned, your written statements are made a part of the record in their totality and we would ask you to summarize in 5 minutes.

Thank you, Ms. Hruby, and we would now recognize you.

STATEMENT OF JILL M. HRUBY, VICE PRESIDENT, INTERNATIONAL, HOMELAND AND NUCLEAR SECURITY, SANDIA NATIONAL LABORATORIES

Ms. HRUBY. Chairman Lungren, Ranking Member Clarke, and distinguished Members of the committee, thank you for the opportunity to testify. I am Jill Hruby, the Vice President of Sandia National Laboratory's International, Homeland and Nuclear Security Strategic Management Unit. Sandia is a multi-program National security laboratory owned by the United States Government and operated by Sandia Corporation for the National Nuclear Security Administration.

Sandia supports multiple Government agencies, providing science and end-to-end, engineering solutions for complex and high-risk systems to protect the Nation from the worst, often existential, threats. I appreciate the opportunity to speak to you today concerning the best use of the DOE National Security Labs, that help address the mission challenges at DHS.

The labs, acting in their role as R&D, Federally-funded, research and development centers, help DHS more effectively get ahead and stay ahead of threats to our homeland by filling the need for a science, technology, and engineering enterprise, dedicated to their mission. An example of why enduring S&T enterprise is so important was highlighted in the aftermath of the 2001 Anthrax attacks.

Because our scientists anticipated the threat of deliberate use of pathogens against civilian populations, we had to develop foam that was used to safely and effectively decontaminate many of the contaminated buildings in the District of Columbia. There was no commercial market for the foam, nor was there yet any perceived

urgency about the biological threat. But, because of the special nature of the DOE National Security Laboratories and their enduring focus on National security challenges, the Nation had, in its hip pocket, a novel technology to immediately mitigate the consequences of the attack.

The National Academies wrote, in their post-9/11 report, that it is critical to establish a flexible supporting science and technology enterprise. The unique nature and capabilities of the DOE National Security Labs make us natural partners in this enterprise. Congress also recognized the capabilities the DOE Labs had applied to DHS, recognizing that the mission space could not be covered simply by adapting solutions developed for other reasons, but required solution providers to develop and maintain considerate domain knowledge and expertise.

An ability to see the art of the possible. They understood the benefits of leveraging knowledge and solutions across the homeland security place, including DOE, DOD, and the IC. That is why Congress explicitly created pathways that would facilitate DHS access to, and use of, these labs through legislation. Clearly, the labs do not fulfill all homeland security technology needs; the private sector and academia supply important element of the continuum of technology needs from near- to long-term.

What we do fill is a crucial niche by acting as an objective brain trust, with extensive domain knowledge and broad and deep technical expertise, to help buy down risk and understand the role science and technology can play in real-world solutions. We are available 24/7. While DHS and the Nation have benefitted from many technical solutions, resulting from long-term research and development performed by the labs before and after 2002, I fear the pipeline may be drying up.

The role that the labs play for DHS today is not one of R&D, Federally-funded research and development centers. Now, we are mainly contractors on competitively-bid research projects, which is not optimum. The very best use of the special character of the labs, which will simultaneously sustain the scientists and engineers, is to focus the labs on understanding the mission needs by working with operators and assessing threats and using the knowledge of the mission and threat realities to suggest and, in some cases, pursue long-term innovation to fill major gaps.

Finding the right balance between harvesting available technologies and driving innovation for the long term is fundamental to success in securing the homeland. There are some on-going efforts between DHS and the labs that begin to model what partnership could look like. For example, development of an integrated bio security strategy for the S&T Directorate—excuse me, helping TSA develop risk-based systems and working with FEMA to establish a longer-term modeling and simulation agenda, are good applications of the labs.

Secretary O'Toole has expressed an interest in engaging with the labs to articulate major emerging homeland security challenges, along with the R&D required to address those challenges. We are committed to the homeland security mission. We can make a difference. It is what we strive to do; provide exceptional service in the National interest.

Thank you, again, for the opportunity I am privileged you have afforded me today. I welcome your questions.

[The prepared statement of Ms. Hruby follows:]

PREPARED STATEMENT OF JILL M. HRUBY

APRIL 19, 2012

INTRODUCTION

Chairman Lungren, Ranking Member Clarke, and distinguished Members of the House Committee on Homeland Security Subcommittee on Cybersecurity, Infrastructure Protection, and Security Technologies, thank you for the opportunity to testify. I am Jill Hruby, Vice President of Sandia National Laboratories' International, Homeland and Nuclear Security organization. Sandia is a multi-program National security laboratory owned by the United States Government and operated by Sandia Corporation for the National Nuclear Security Administration (NNSA).

I appreciate the opportunity to comment on a topic that is so important to the long-term security of our Nation. I hope my statement today, along with those of my colleagues in the Department of Homeland Security (DHS) and from the National security science and technology provider community, will result in concrete actions to ensure that DHS can provide science and technology (S&T) solutions that allow our Nation to get, and stay, ahead of threats to our homeland. In order to do this, I believe DHS needs to create and foster an enduring environment where dedicated, outstanding scientists and engineers can, as providers of solutions that will deter acts of terrorism, enable resilience to natural disasters and other incidents, and facilitate trade and travel while enhancing security.

One example of how dedicated scientists made a difference in urgent circumstances was the decontamination foam that was used to clean up nearly all the contaminated buildings in Washington, DC after the anthrax attacks. Our scientists had been watching the biological threat for years—concerned that pathogens would someday be used against our population—and that we would need to rapidly respond. When the attack came, we had already developed a novel, effective technology to quickly mitigate the consequences. That kind of threat awareness, and the ability to do something concrete about it, comes from a special type of person in a special type of institution. The DOE National Security Laboratories cultivate those committed people and establish and maintain those capabilities. My hope is that, with a shift in the way DHS and these labs engage with each other, we will realize a robust and enduring approach to ensure our Nation is always prepared.

MAJOR POINTS OF THIS TESTIMONY

- The only way DHS can get ahead of the threat is with a dedicated and flexible science and engineering enterprise focused on solutions for the long term and the unique nature and capabilities of the DOE National Security Laboratories makes us natural partners in this dedicated enterprise.
- DHS has benefitted from many technical solutions that the DOE National Security Laboratories contributed as a result of long-term research and development performed for other agencies long before its creation, but that pipeline is not being sustained.
- DHS as a whole is not taking advantage of the systems analysis and long-term innovation that the DOE National Security Laboratories are best-suited to provide; however, there are some on-going efforts that begin to model what the partnership could look like—and lead to enduring solutions to hard homeland security mission challenges.

NEED FOR DEDICATED HOMELAND SECURITY RESEARCH AND DEVELOPMENT

In the aftermath of 9/11 and the Amerithrax attacks, the National Academy of Sciences completed a rigorous assessment of major Homeland Security challenges. "Making the Nation Safer"[1] described in detail how important technical approaches were to effectively managing the risks in the homeland security mission space—especially since many of the most consequential threats are posed by technology. The report pointed out what we now accept as a basic truth—that our society and infrastructures are very complex and completely interconnected. Understanding threats

[1] *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism,* Committee on Science and Technology for Countering Terrorism, National Research Council, *http://www.nap.edu/openbook.php?record id=10415,* 2002, The National Academies Press, 440p.

and potential consequences to these systems, as well as understanding how to optimally balance the components of the systems—technologies, people, and concepts of operations—is the fundamental first step in changing the risk equation in our favor. And although the National Academies proposed a suite of near-term, high-priority research and development activities, they also stated it was critical to establish a flexible supporting science and technology enterprise that could change and adapt as circumstances change. Getting in front of the threat—and staying there—is what the DOE National Security Labs were created to do—and what we have been doing well for over 60 years.

Congress recognized the capabilities the DOE Labs could apply and explicitly created pathways that would facilitate the new Department's access to and use of these labs in the 2002 enabling legislation—Pub. L. 107–296, Sec 309. This legislation was remarkably forward-looking, and explicitly gave DHS direct access to the DOE Labs' unique expertise, knowledge base, and experimental and computational facilities—developed over years of taxpayer investments—to help with needed science and technology for homeland security on an equal basis with other missions. As a result, it provided a direct path to establishing a cadre of experts with an enduring focus on the hard problems in homeland security within the DOE National Laboratories.

Today, the DHS and laboratory community recognize the unique nature of homeland security work relative to other National security challenges. When supplying technical solutions for homeland security, consideration must be given to the operator and his or her environment and training, to individual freedoms and U.S. public acceptance, to interagency coordination, and to other practical and policy considerations. In addition, the homeland security missions are broad including everything from natural disaster preparation to protection from, response to, and recovery from the use of a weapon of mass destruction against the U.S. civilian population. This is not a mission space that will be covered simply by adapting solutions being developed for other reasons—it is a unique mission space requiring solution providers with considerable domain knowledge and expertise.

DOE NATIONAL LABORATORIES CONSTRUCT

Let me start with a brief summary of the DOE Laboratories for those of you who are unfamiliar with us. DOE manages 17 National Laboratories, 3 being managed under the National Nuclear Security Administration (NNSA). Sandia and our two sister NNSA Labs—Lawrence Livermore and Los Alamos—are large, multidisciplinary research and development (R&D) institutions wholly dedicated to the National security. Most of the DOE Laboratories have missions devoted to science and energy, although two of those—Pacific Northwest National Laboratory and Oak Ridge National Laboratory—have significant footprints in National security. All of the National Laboratories have operated as Federally Funded Research and Development Centers (FFRDCs) since our creation about 65 years ago during the Manhattan project. Today, Sandia's prime sponsor is the NNSA and we work with support from multiple Government agencies to provide science and engineering solutions for complex and high-risk systems, endangered by often existential threats.

The FFRDC construct has served the Nation exceptionally well for 70 years. The core tenets of FFRDCs (from FAR Title 48CRF35.017) govern the practices and culture of the National Laboratories:

- An FFRDC meets a special long-term research or development need,
- An FFRDC is required to conduct its business in a manner befitting its special relationship with the Government, to operate in the public interest with objectivity and independence, and
- A long-term relationship between the Government and FFRDCs should provide the continuity that helps the FFRDC both attract and retain high-quality personnel. This relationship should also be of a type to encourage the FFRDC to maintain currency in its field(s) of expertise, retain its objectivity and independence, preserve its familiarity with the needs of its sponsor(s), and provide a quick response capability.

The fact that we are FFRDCs, coupled with the nature of our work over decades, has created a truly valuable and unique resource for the U.S. Government to meet its special long-term needs for science, technology, and engineering. Efforts at the DOE National Security Labs span the complete technology life-cycle from basic research and development to testing and evaluation, modeling and simulation, technology system deployment, operator and decision-maker support and training, and policy advice. Our special relationship with the Government provides for independence and objectivity—and our bottom-line commitment is to the mission rather than the shareholder. This creates a different mindset among our staff, one of total commitment to sponsors' needs and to the security of the Nation. The labs do not com-

pete with industry; rather we partner with them to pave the way for commercialization of technology once it is sufficiently mature to become operationally viable. We do not fulfill all of the needs for homeland security technology solutions—but we fill a crucial niche as a brain trust of homeland security domain expertise and deep and broad science and engineering in addressing both urgent and long-term needs for science, technology, and systems advice.

Each of the DOE National Security Laboratories has unique strengths and capabilities. At Sandia, our culture of both scientific excellence and large-scale systems engineering drives us to think about the totality of a problem and to understand what will really make a difference; not to simply reach for "low-hanging fruit" but to really explore how to change the game. Nothing is more likely to inspire lab staff to innovation than stating an important problem is too complex to solve. All of the DOE National Security Labs have the ability to bring together interdisciplinary teams to tackle problems that are beyond the scope of academic institutions—although we frequently partner with academia to feed the innovation pipeline, to keep our skills sharp, and to develop future generations of laboratory staff. Sandia creates and maintains large facilities for the U.S. Government such as environmental test ranges, including those for testing novel explosives; nano- and micro-fabrication facilities capable of producing both research prototypes and unique, radiation-hardened microelectronics; and high-performance computing. These facilities can be used for high-risk, classified experiments and push the envelope beyond the scale of those existing at purely academic or commercial entities.

A BRIEF SUMMARY OF SANDIA'S HOMELAND SECURITY CONTRIBUTIONS

All of the DOE National Security Laboratories have applied their unique expertise individually and in collaborative partnerships over the years to create solutions to high-impact homeland security problems. The examples below are a subset of the areas in which Sandia has contributed. Each of the labs could share a similar list of contributions.

Looking Over the Horizon—Biological Risk

The long-term relationship codified by the FFRDC construct provides for an enduring focus on significant National security issues that creates the deep and broad knowledge base that not only enables the labs to understand the immediate threats, but also to look over the horizon and anticipate future risks. Before the creation of DHS, the labs anticipated the potential for a biological threat to be used on civilian populations in the United States, and invested in solutions to use if needed—such as the specialized foam (mentioned earlier) used to decontaminate 53 of the 56 Washington, DC-area buildings that were contaminated by the 2001 anthrax attacks. Our microanalytical methods that allowed characterization of the Amerithrax material were incorporated into specialized equipment and transferred to DHS' National Bioforensics and Analysis Center (NBAAC) for routine use in the investigation of biocrime and bioterror events. We were engaged in developing the first generation of the BioWatch program, which placed detectors in locations around numerous U.S. cities to rapidly detect the release of pathogens into the air. As DHS is now enhancing the system, the labs are performing trade-off studies to inform the requirements for the next-generation system to ensure performance metrics for response time and detection sensitivity are understood and incorporated. Today, rapid advances in biology have opened the door to the possibility that terrorists might engineer existing or develop novel organisms to enhance their efficacy and evade current detectors and countermeasures. Sandia is investing in methods to rapidly identify new threat organisms to allow response to these new potential threats.

Leveraging and Coordinating Efforts—Nuclear and Cyber Risk

Another key strength of our National security laboratories is the ability to leverage across the breadth of related National security missions—helping to create a more consistent and robust system across multiple U.S. Government agencies and international partners. As expected, the labs have contributed to the current goals of nuclear and radiological risk reduction beginning with aggressively accelerating research to modify radiological detection technologies originally developed for DOD and NNSA for use in homeland security applications. DHS operations required that equipment originally capable only of identifying specific radionuclides in controlled lab conditions rapidly evolve for effective deployment in the noisy, environmentally variable real world and for use by non-technical operators. The DOE National Security Labs were key to this technology transition.

The labs continue to work with the Domestic Nuclear Detection Office (DNDO) to build the Global Nuclear Detection Architecture (GNDA) and develop international guidelines documents on core concepts related to nuclear detection.

DNDO's "Model Guidelines Document" is currently being adapted by the International Atomic Energy Agency (IAEA) to be part of its Nuclear Security Series. DHS has been able to leverage capabilities and past experiences at Sandia including those gained from supporting the NNSA's nuclear non-proliferation efforts such as Second Line of Defense (SLD), the Department of State's Export Control and Related Border Security Assistance (EXBS), the Department of Defense CENTCOM workshops on weapons of mass destruction (WMD) interdiction and border security, IAEA initiatives, and others. The benefit to DHS includes not only specific technologies but also technical bench strength that have been built by the DOE National Security Laboratories for other agencies to apply to the unique problems in homeland environments. Those agencies, in turn, benefit from the contributions sponsored by DHS—resulting in an overall uplift of the Nation's nuclear security capabilities.

Because of our long history in cybersecurity for a variety of sponsors and beginning with our responsibility for the security of the command and control of the U.S. nuclear weapons, DHS' National Protection and Programs and Science and Technology Directorates are now leveraging Sandia's knowledge of the most sophisticated cyberthreats to perform adversarial analyses on potential new cybersecurity approaches before they are deployed for use by Government and industry. We also use our deep knowledge base and ties to other Government entities to develop and extend tools for analysis of risk factors, to perform threat assessments, and conduct vulnerability assessments on systems of interest to the DHS.

The Nation's Technical First Responders—Urgent Response to Natural and Man-Made Incidents

Our enduring focus provides an ability to quickly respond to urgent needs—and this is particularly true for WMD and other high-consequence threats. The labs are the Nation's technical first responders. In the aftermath of Hurricane Katrina, the Christmas day bombing attempt, and the Deepwater Horizon and Fukushima disasters, our deep technical expertise was used as an immediate and integral part of the overall response to guide executive leadership in characterizing the situation, predicting the evolution of the incident, and advising on appropriate response and consequence management approaches.

Applying System Solutions and Developing Requirements Informed by Domain Knowledge—Border and Aviation Security

No homeland security solution exists in a vacuum. These solutions are all part of complex, interdependent systems that include technology, human operators and decision makers, environmental and operational constraints, policy drivers, and many other competing and reinforcing requirements. Sandia systems analysts work with both DHS S&T and DHS operational components to refine the understanding and definition of problem space, create and apply an analytic framework that utilizes "measures of effectiveness" germane to stakeholders' objectives, analyze options within that framework, and then explain options, insights, and trade-offs to enable action.

The highly complex and enduring challenge of enhanced border security requires developing a detailed and accurate understanding of the global systems architecture and all of its important components: Ports of entry and unattended borders at the ground level and below, in the air and on the water, across all modes of transportation and conveyances, moving legitimate and illegitimate people and goods. The border is a complex interdependent system that can only be addressed through a multidisciplinary, sustained, and long-term effort. For over 60 years, Sandia has been providing trusted National service in the form of end-to-end analysis and full life-cycle support solutions for safeguarding critical National assets.

In the early 1990s, Sandia performed a mile-by-mile analysis of the Southwestern U.S. Border for the Immigration and Naturalization Service. The study assessed the impact of potential technological and operational changes, and made specific recommendations such as the very successful multi-layer San Diego fence. The 1993 report continues to be frequently requested and referenced by DHS and others interested in understanding the border system.

More recently, Sandia led a team to contribute to aviation security by performing system modeling and analysis of the TSA airport checkpoint system in order to understand the effect of deployment of new systems on the checkpoint operations. As a result, a decision framework and prototype tool was provided to TSA to apply a structured approach for evaluating system impacts and tradeoffs among key aviation security objectives. And when TSA starts its next system acquisition, it will know in advance how effective it will be for the dollars expended and how best to

deploy the systems so the technologies and its human operators work smoothly together.

DHS RELATIONSHIP WITH THE DOE NATIONAL SECURITY LABORATORIES

As discussed above, Sandia worked on many homeland security challenges long before the September 11 attacks and we have been committed to DHS since its inception. Our lab, along with other DOE National Security Labs, provided scientists who established the framework for the S&T Directorate (and later DNDO) and who also filled key roles in the initial senior leadership team. The labs played a foundational role in creating the systems configuration and enabling the technical basis for major homeland security capabilities in use today, including the BioWatch System, radiation detection technologies used at major points of entry, and the technical basis for assessing aircraft vulnerability. Sandia remains firmly committed to the homeland security mission, even though DHS work is a very small and decreasing percentage of our work.

While the 2002 legislation creating DHS authorized utilization of the DOE National Laboratories as R&D FFRDCs for DHS that is not the role that we have today. Now our laboratories are used predominantly as contractors on competitively bid research projects. We perform discrete research and technology development in response to specific technical requirements. While the labs have been relatively successful in competing for projects on a transactional basis, this model fails to utilize the unbiased technical advice and analysis for systems-based solutions based on a thorough understanding of the mission and the operational needs of the sponsor, deep scientific understanding, and multidisciplinary National security expertise unique to these laboratories. In fact, working on projects rather than mission is precisely the wrong use of these labs.

Part of the issue with appropriate use of the DOE National Security Labs is it requires coordination between S&T and the operational components in a way that doesn't exist today. The S&T Directorate is responsible for R&D efforts and priorities in support of DHS' mission, and performing associated demonstration, testing, and evaluation and assessing threats and vulnerabilities. But the responsibility for understanding the systems-level mission challenges lays with the operational components—e.g., CBP, TSA, and FEMA.

Mission-relevant R&D must have an integral connection to the needs of the operational components and the environments in which they work. Solving major homeland security challenges requires systems-level solutions enabled by a combination of thorough understanding of operational missions, subject matter expertise, and R&D focused on core challenges. The most fruitful collaborations begin with scientists and engineers working directly with the operators. The depth of insight gained during these collaborations is invaluable in characterizing the entire system, determining the most crucial needs, and creating a vision of what is possible. If the operational components directly access the DOE National Security Labs as FFRDCs to support them in developing their systems requirements—the result could be avoiding the monetary and security costs incurred with suboptimal systems.

Another issue has occurred because of the shift in the S&T Directorate, an almost exclusive focus on foraging for existing technologies that can be rapidly adapted and integrated into existing systems. It is not surprising that in today's operationally dominated homeland security environment, the operational components and the S&T Directorate are driven by immediate needs and have neither the time nor an ingrained cultural inclination, to focus on systems-level solutions for the rapidly evolving global environment. While this approach can be a useful part of overall solutions, it is equally also important to find the right balance between harvesting available technologies and driving innovation for the long term.

Many of the most impactful technical solutions to the homeland security problem arose from investments made by the Government before DHS stood up. That pipeline that benefitted from long-term R&D has dwindled or, in some cases, perhaps even been lost. If technology foraging is the sole focus of DHS, then it will fall farther and farther from achieving the levels of risk reduction required to protect the Nation now and in the future. The lack of interest in the type of creativity the labs bring to bear on the homeland security problem coupled with the lack of DHS commitment reflected in intermittent and unpredictable funding has resulted in lab staff, who had previously dedicated themselves to this mission, walking away to work on other important National security problems. The longer this absence of enduring mission partnership continues, the less likely will we be able to recapture the most talented scientists and engineers to attack problems unique to the homeland security mission and operational environments—and drive the innovation re-

quired to stay ahead of the rapidly adapting adversaries and effects that propagate through our highly interdependent systems.

For all of these reasons, if DHS can institutionalize the FFRDC partnership relationship with the DOE National Security Laboratories that was envisioned and authorized in the 2002 Homeland Security Act, we can provide a very important capability for meeting homeland security challenges and fill the keystone niche that bridges the gap between what we have and what we need in terms of effective security technology systems.

Presently there are some activities that show promise to result in mission-level work that takes advantage of the character of a FFRDC relationship and that would provide substantial benefit to the homeland security mission.

- In biosecurity, DHS S&T has recently engaged a few DOE National Security Laboratories in the on-going development of an integrated biosecurity strategy.
- A group of DOE Labs together with the Homeland Security Systems Engineering and Development Institute and the Homeland Security Studies and Analysis Institute has been working with TSA to develop systems analysis resources for the development and implementation of risk-based screening.
- S&T and FEMA have engaged Sandia, not just as a technology provider for technologies used by emergency preparedness professionals to enhance their training, but also as a long-term strategic partner to help create a roadmap for development and utilization of technology to enhance the Nation's emergency preparedness. This partnership has also allowed S&T and FEMA to demonstrate several near-term wins, while continuing to pursue a longer-term R&D agenda to address tomorrow's technology needs.
- Recently, Under Secretary Tara O'Toole has asked a group of DOE National Security Laboratories to articulate major emerging homeland security challenges, along with the capabilities and R&D that will be required to address those challenges.

A FUTURE WITH DEDICATED HOMELAND SECURITY RESEARCH AND DEVELOPMENT

The pace of technology change and the increasing complexity and interdependence of the systems homeland security manages and employs demands that DHS moves to the forefront of innovation to keep in front of the threat—and even more importantly, to shape the environment which the threat operates and affects. As stated by the National Academy of Sciences back in 2002, it is critical to establish a supporting science and technology enterprise that could change and adapt as circumstances change.

The only way to move from a reactive to an anticipatory posture in the homeland security mission space is to establish and sustain a dedicated R&D enterprise that is a full partner in creating the future. This partnership can help ensure that not only the urgent—but also the most important and enduring problems are addressed. This partnership can ensure that dedicated scientists and engineers develop and preserve familiarity with the needs of its DHS sponsors, establish a long-term enduring relationship that keeps high-quality personnel engaged in addressing mission challenges, maintain currency in fields of expertise important to the mission, can provide a quick yet deeply knowledgeable response capability, and can provide the advice and systems understanding needed to implement solutions that truly address the most important risks.

With a full partnership with the DOE National Security Labs, we can imagine a future where:

- We no longer simply reacted to novel explosive threats in the months and years after they have been used—but rather developed in advance synthesized information from intelligence assessments, detection R&D, explosive performance R&D, and advanced detection concepts. This information could drive development and prioritization of mitigation methods for various adversary threat pathways, concealments and threat materials. The labs already created the structure to accomplish this task and have many of the component parts, which could be resourced and sustained as an integrated capability.
- We could enhance security without disrupting the flow of people or commerce. We have already begun working with TSA and industry to develop risk-based, threat-informed screening architectures and enabling technologies that enable graded passenger screening, with maximum screening of only the highest-risk passengers. A systems approach would consider the entire system and not just the checkpoints. Protective measures throughout the airport and aircraft could eventually lead to the point that you won't have to take off your belt and shoes—and perhaps you can even carry a bottle of shampoo on board the plane

with little or no risk that a terrorist could smuggle in enough liquid explosives to bring down an airplane.

- The labs have applied their expertise to push the envelope on data to decisions—enabling the analysis of enormous and diverse data sets and quickly providing the most important elements of the information to decision makers in order to react to events in near-real time. For instance, it were possible to pull together the vast array of data on nuclear materials that is currently collected and stored in hundreds of different locations in different formats; synthesize and analyze it and then push actionable information out to front-line operators in near-real time.
- A biosurveillance system and key enabling technologies provide a cost-effective risk-based mix of environmental monitoring and medical diagnostics and surveillance to give early warning of attacks to major population centers—saving countless lives by allowing timely medical intervention for those people who have actually been exposed and require medication.
- A National-level analysis capability for understanding the impacts of cyber attacks across interdependent U.S. infrastructure elements allows us to defend our civilian infrastructure against asymmetric and ubiquitous cyber threats.
- Analysis tools and subject matter experts decipher the complex interdependencies of our critical infrastructure, assess vulnerabilities and potential cascading effects, thus enabling the Government, private sector, and citizens to dramatically increase resilience saving lives, property, and services.

We are committed to the homeland security mission; we can make a difference. It is what we strive to do—provide exceptional service in the National interest.

Mr. LUNGREN. Thank you very much.

Now, Dr. Carter.

STATEMENT OF MICHAEL R. CARTER, SENIOR SCIENTIST, NATIONAL IGNITION FACILITY AND PHOTON SCIENCE DIRECTORATE, LAWRENCE LIVERMORE NATIONAL LABORATORY

Mr. CARTER. Hi, good morning, Chairman Lungren, Ranking Member Clarke, and distinguished Members of the committee. I also thank you for the opportunity to testify before you today on this important relationship between the Department of Homeland Security and Department of Energy's National Laboratories.

I bring a unique perspective to today's hearing, having served as a scientist at Livermore for more than 40 years, and in a Government role, as the first Director for their Radiological Nuclear Countermeasures, in the Department of Homeland Security's Science and Technology Directorate and, subsequently, as the first Deputy Director of DNDO. Having served in these roles, I have an appreciation for both the requirement and challenges at DHS and the roles and scientific capabilities that the National Labs have, that are best suited to help fulfill the DHS mission.

My recommendations today are based on my experience from both of these phases in my career. This is especially true for the protections against the determined and adaptive adversaries intent on the use of weapons of mass destruction. Over the last 10 years, the Department of Energy Labs have developed many technical solutions in support of DHS. These contributions include innovation in biodefense, nuclear detection and forensics, aviation security and explosive countermeasures, infrastructure protection and support to on-going DHS operations.

I will briefly mention just a few of these and then I will speak a little bit more about today's challenges. Prior to the Anthrax attacks in the Fall of 2011, the National Laboratories were funded by internal laboratory—director of research and development funds and Department of Energy, and were already pioneering the field

of rapid, DNA-based, detection of biological pathogens. These detection methods became the basis for the Nation's Biowatch program.

In the last decade, more than a million samples, from over 30 U.S. cities, have been analyzed for the signatures of a biological tag, without a single false alarm. In the subsequent decade, the Department of Homeland Security has supported the laboratories in the development of autonomous, biological detection systems and, also, invested in bioinformatics and DNA microarrays. These microarrays provide the potential for the detection and, also, identification of both engineered or previously unknown pathogens, by searching for DNA similarities with thousands of known viruses and bacteria.

In 2004, the Department of Homeland Security established a Bio Defense Knowledge Center at Livermore. The BKC has produced more than 100 studies for the biodefense community, served as a technical reach-back center for DHS, and has recently partnered with CVP's initial targeting center to develop methodology for the interdiction of bioterrorism-related materials at our U.S. borders.

Similarly, the DHS entity has established a tri-lab program focused on aviation security countermeasures. Leveraging the extensive experience and infrastructure for explosives research for our nuclear weapons program, the lab scientists have turned their attention to the home-made explosive threats. Scientists are working to understand the formulation, the energetic properties and the detection methods, for hundreds of potential home-made explosives, with the goal of—you know, again, keeping TSA ahead of an ever-attacking adversary.

Similarly, the nuclear security R&D programs, which began over a decade ago, are beginning to bear fruit. The development of new detection materials for both gamma ray and neutron detection systems are setting the foundation for improved systems deployed at our borders and with our State local law enforcement community. But major gaps in our capability remain. In particular, stand-off detection and detection of shielded nuclear materials remain grand challenges, with very little support in the R&D community.

Because of cuts, by nature, in nuclear weapons, the National Laboratories are the Nation's repository of expertise and are the natural partners in development of next generation, radiological, nuclear countermeasures. I urge the Congress, the Department of Homeland Security and the DOE Labs to not lose focus on the difficult challenges that pertain to the homeland, especially against the threat of weapons of mass destruction.

The DOE Labs bring unique, specialized, S&T capability and expertise to the DHS mission, yet with reduced budgets and increasingly near-term priorities, the resources available for these partnerships with the laboratories are in significant decline. I believe the Department of Homeland Security should utilize the National Labs for enduring, difficult problems where multi-disciplinary teams are required to anticipate, to innovate, and deliver solutions.

I also encourage the DHS to partner with the National Laboratories as that party sees, and bring together the operational elements of the Department and its stakeholders with the S&T workforce from the labs, to ensure the technology that is developed is focused on the Department's unique requirement. We should all

work to make homeland security mission a career path choice for scientists and engineers at the laboratories. I encourage this committee's continued support and I thank you, again, for the opportunity to testify today.

[The prepared statement of Mr. Carter follows:]

PREPARED STATEMENT OF MICHAEL R. CARTER

APRIL 19, 2012

INTRODUCTION AND SUMMARY

Good morning Chairman Lungren, Ranking Member Clarke, and the distinguished Members of the committee. Thank you for the opportunity to testify before you today on the critically important relationship between the Department of Homeland Security (DHS) and the Department of Energy (DOE) National Laboratories.

I am Dr. Michael Carter, currently a Senior Scientist at Lawrence Livermore National Laboratory (LLNL). In 2002 I had the privilege to serve as a technical advisor to the DHS Transition Planning Office and served as the first director of radiological and nuclear countermeasures in DHS S&T Directorate (DHS S&T) and subsequently as the deputy director of the Domestic Nuclear Detection Office (DNDO). I returned to Livermore in 2006 and have since served in multiple capacities including the program director for counterterrorism programs at LLNL. The recommendations I provide are based on my experience and knowledge gained from these activities.

DHS has been tasked with a very broad mission including the responsibility for homeland defense against determined and adaptive adversaries and preparation for and response assistance to natural disasters. "Making the Nation Safer," a National Academy of Sciences report prepared soon after the events in 2001, stated "strengthening the National effort in long-term research that can create new solutions should be a cornerstone of the strategy for countering terrorism." This need for long-term research prompted the establishment of an S&T Directorate within DHS.

The DOE National Laboratories—principally the National Nuclear Security Administration (NNSA) Laboratories (Livermore, Los Alamos, and Sandia) and two Office of Science laboratories (Oak Ridge and Pacific Northwest)—have provided critical support to the DHS S&T over the past decade. Their focus has been on S&T development to tackle some of our Nation's most difficult challenges, which are typically longer-range than the immediate day-to-day operational issues facing DHS. I will highlight in my testimony examples involving efforts at LLNL.

As the tenth anniversary of the founding of DHS approaches, I look ahead with concern. Determined and adaptive adversaries—now and in the future—pose some truly drastic threats to our Nation which we currently have no way to stop, inadequate means to mitigate the effects, and insufficient concerted investment in S&T to devise systems and technologies to improve our defensive and responsive capabilities. The Nation would greatly benefit from increased DHS attention to sustained, focused investments in S&T to address threats such as an engineered or emergent biological pathogen and a smuggled improvised nuclear device. These are examples of specific areas where the DOE National Laboratories are prepared to deliver unique S&T support to our National security. However, in response to changing priorities and reduced resources, the funding from DHS to LLNL has decreased from its peak in fiscal year 2006 of $131 million to an estimated funding level of $40 million in fiscal year 2012.

I believe that the DOE National Laboratories are well-suited to shoulder responsibility for providing research and development (R&D) to counter serious homeland security threats. DHS reliance on the capabilities of the DOE Laboratories is a workable, effective answer to a pressing National need. I base this recommendation on four points:

- *Solving hard, enduring S&T problems*.—The DOE National Laboratories were established to serve the National interest by solving challenging S&T problems best tackled by multi-disciplinary teams using state-of-the-art research capabilities. Many of the challenging S&T issues facing DHS fall into this category. Overcoming these challenges will require sustained investment in R&D suitable for the DOE National Laboratories and aligned with their National security mission.
- *Leveraging existing S&T investments*.—The DOE National Laboratories perform considerable work for Federal sponsors in mission areas closely aligned with those of DHS, develop technologies that can be adapted to DHS missions, and/

or have special research capabilities that can be applied to unique DHS mission needs. It is advantageous and cost-effective for the Nation and DHS to leverage these previous investments.

- *Providing an S&T expertise base focused on homeland security issues*.—Working with diverse set of law enforcement and emergency response agencies, DHS has unique needs for S&T solutions that fit within their operational requirements. This calls for the S&T professionals supporting DHS to understand its operational needs, help shape requirements, and execute R&D programs to meet DHS mission challenges. These S&T professionals would also be available to provide technical assistance to support on-going operations and prepared to assist the Department's response to a terrorist event or natural disaster.
- *Developing trusted partnerships*.—DHS would benefit from an enduring relationship with FFRDCs that understand their unique operational requirements and can serve as "honest brokers" and trusted partners. The DOE Laboratories are also natural partners in establishing and sustaining a pipeline of young scientists and engineers emerging from our Universities interested in careers in S&T dedicated to National security missions. The laboratories have served these roles for the DOE since their creation.

These benefits were implicitly recognized by the Homeland Security Act of 2002, which established the Department and set the foundations for DHS S&T through the transfer of funding, responsibility, and key technical capabilities to counter nuclear and biological terrorism from DOE to DHS. The Homeland Security Act also authorized DHS to establish contracts with one or more Federally-funded research and development centers (FFRDCs) to carry out its responsibilities. Congress specifically authorized multiple methods, including a joint sponsorship agreement, for DHS to utilize the DOE National Laboratories. The examples I provide demonstrate that the partnership between DHS and the DOE National Labs has proven vital in leveraging the Nation's S&T capabilities to protect the homeland. This partnership needs to be rejuvenated and continued.

BIO SECURITY

In the immediate aftermath of 9/11 and the anthrax attacks, the DOE National Laboratories were called upon to provide the technology for the Nation's biosecurity program. They were ready to do so because the underlying technical foundation for the Biowatch program was in place. The technology development for Biowatch started through Laboratory Directed Research and Development (LDRD), an internal investment program at the DOE Laboratories targeting exploratory S&T to meet current and emerging mission needs. Scientists at the laboratories recognized Biosecurity as a critical National security need and pioneering work began on the technology for rapid agent detection via polymerase chain reaction methods (PCR) in the 1990s. The LDRD work led to program support from NNSA's Office of Non-Proliferation Research and Development's Chem/Bio program.

Thanks to exploratory investments and the existence before 9/11 of a DOE program focused on a critical National security need, these DNA-based PCR detection methods quickly became available and have demonstrated the capability to detect, identify, and characterize a threat organism in less than an hour. Detection systems have now operated for almost a decade, analyzing more than a million samples without a false alarm. Biowatch samplers are now located in more than 30 U.S. cities monitoring for the early signs of bioterrorism enabling early treatment and intervention.

The DOE Laboratories continue to lead the way in the development of advanced assays and DNA-based detection methods by leveraging their expertise in microfluidics and bioinformatic analysis of DNA sequences utilizing high-performance computing. Researchers have developed massively parallel, high-density DNA microarrays able to detect thousands of potential viruses and bacteria. This capability provides the potential for the detection and identification of previously unknown pathogens by searching for similarities in genetic sequences of known pathogens. Advances in detection technology funded by DHS S&T also provide benefit to the public health community. These DNA microarray-based detection methods have been used to identify a contaminating pig virus in a human vaccine for rotavirus.

In 2004, DHS S&T established the Biodefense Knowledge Center (BKC) at LLNL to develop and deliver knowledge products critical for anticipating, preventing, characterizing, and responding to an attack using biological warfare agents. BKC personnel have authored dozens of rapid-turnaround analyses and in-depth threat and capability-based technical assessments on biodefense topics; published awareness bulletins focused on technical analysis of the potential for nefarious uses of biotechnologies; and developed information management tools that provide unique knowl-

edge discovery capabilities for biodefense analysts Nation-wide. They have also authored 12 Material Threat Assessments, 26 Awareness Bulletins, 55 agent-specific factsheets; published a biothreats agent factbook; and responded to more than 100 technical reachback requests from DHS and other operational entities. In addition, the BKC maintains an information system at three security levels with more than 34 million documents from a wide variety of Government sources.

More recently, under sponsorship from DHS S&T, the BKC has partnered with the U.S. Customs and Border Protection (CBP) Agricultural and Biological Terrorism Countermeasures (ATBC) Program to develop improved methodology to intercept suspicious enabling biological material and equipment that could support bioterrorism. This new capability has been integrated into the Automated Targeting System for routine use at the National Targeting Center and will be accessible to all 22,000 CBP Officers at our Nation's ports of entry. This successful partnership between CBP and the BKC was acknowledged in a commendation letter from then Assistant Commissioner Thomas Winkowski to DHS S&T. Mr. Winkowski specifically called out the need to "further build this partnership, one that bridges science and law enforcement, to undertake the daunting tasks and vital work that remain in preventing ag/bio-terrorism."

NUCLEAR SECURITY

In the aftermath of 9/11, nuclear terrorism emerged as a top threat to our National security. Early assessments identified key weaknesses in the technology base for detecting and interdicting a smuggled nuclear device, including the ability to robustly detect shielded nuclear material at our borders. DHS S&T developed an R&D roadmap to improve the radiation detection technology base with particular focus on the operational needs of the DHS components. This roadmap identified the need to develop better gamma and neutron detection methods to dramatically improve detection sensitivity and reduce false alarms from other radioactive but non-threatening materials. Because of the classified nature of nuclear weapons, the fundamental understanding of the signatures of special nuclear material and nuclear weapons resides primarily at the DOE/NNSA Laboratories (Los Alamos, Livermore, and Sandia). These laboratories therefore played a key role in developing the R&D roadmap and investigating potential solutions to improve detection systems performance.

The Nuclear Security R&D programs that began almost a decade ago are beginning to bear fruit with the development of new detector materials and detection methods. These new materials provide dramatic improvements in affordability, operational utility, and effectiveness in detecting and discriminating materials that could be part of a weapon from other radiation sources. In particular these more effective radiation detection materials enable the next generation of hand-held detection systems for secondary inspections at our ports of entry. New detection methods and advances in signal processing enable significant improvements in detection and identification of threat materials and significant reductions in false alarms rates. DHS DNDO has also supported R&D on alternative neutron detection methods in response to the worldwide shortage of Helium–3 used for conventional neutron detection systems.

The R&D has resulted in dramatic improvement in detection and identification capabilities, but major challenges remain. However, resources for the DNDO's Transformational and Applied R&D program have been significantly reduced in the last 2 years and a focus on near-term solutions has replaced attention to the enduring challenges of stand-off detection and detection of shielded materials. Agencies such as the DOE and DoD continue to pursue R&D in radiation detection but this research is often directed toward a set of requirements that do not necessarily fit DHS operational needs. DHS, DOE, DoD, and the Director of National Intelligence (DNI) work closely together to leverage scarce R&D resources to meet urgent needs in domestic nuclear security but in order to ensure effective technology development and deployment, DHS must sustain an R&D program focused on the unique operational requirements of the Department and its stakeholders.

The National Laboratories have also played a key role in training and supporting DHS operational elements in their front-line role of detection and interdiction of nuclear material. Working closely with CBP, DNDO established a technical reachback network at the laboratories with trained scientists available for technical assistance to front-line law enforcement officers 24 hours a day. This reachback support network has fielded hundreds of support requests and continues to work with DNDO, CBP and other DHS entities to support and improve the alarm adjudication processes. DOE Laboratory scientists bring a unique understanding of the signatures of nuclear materials and weapons as well as experience with the detection technologies

deployed in the DHS operational environment. The training and technical support network will be critical if and when we are faced with our first domestic nuclear smuggling event.

Scientists and engineers at the National Laboratories have also worked with DNDO in creating and assessing the Global Nuclear Detection Architecture (GNDA). This global view of the radiation detection systems deployed both domestically and internationally enables considered assessments of the capabilities and vulnerabilities in our collective abilities to detect and interdict a nuclear terrorist attempt. Working with partners across the interagency the laboratories have supported the integration of this network of systems and, through detailed technical assessments and operational analysis, have developed options to expand the deployed detection architecture to further reduce the risk of nuclear terrorism. Understanding the signatures of nuclear materials and the operational effectiveness of deployed systems and inspection processes is key to an "honest broker," independent assessment of the capabilities and gaps of the GNDA. LLNL is now developing a searchable database and visualization system to help DNDO visualize and interrogate the GNDA and provide enhanced insight into detection assets world-wide.

The National Laboratories are uniquely positioned to perform such systems analysis in support of DNDO and its interagency partners. LLNL, in particular, has played a critical and unique role in support of DNDO's red team efforts. LLNL has partnered with DNDO in understanding the nuclear threat space, designing and developing surrogates for the key nuclear signatures, planning and executing red-team operations, and developing lessons learned. This program has successfully worked within DHS and across the interagency bringing credible, independent assessment of technology and field operations dedicated to detection and interdiction of nuclear smuggling.

Another example of a successful partnership model is the National Technical Nuclear Forensics Center (NTNFC) within DNDO. The NTNFC has two major roles: Acting as the lead for interagency coordination in the nuclear forensics arena and supporting a wide variety of expertise-based programs including exercise development and planning. These programs include the Nuclear Forensics Science Panel, the Federal Expertise Development Program, and pipeline development activities (e.g., university fellowship programs). NTNFC leadership is clearly committed to their mission and has worked to create strong partnerships across the interagency as well as with the DOE Laboratories that provide the enduring technical capabilities that support the mission.

This success, however, is limited. While the NTNFC plays a key coordination role, the center is not a majority stakeholder in the forensics community, either in budget or scope. This limits their ability to affect the priorities of their interagency partners including the FBI, DOE, DoD, and the DNI. Efforts have been made to create a coherent set of requirements for both pre- and post-detonation nuclear forensics, but local priorities at each agency still have a strong influence on how they expend their resources. The DOE Laboratories act as integrator, working across this space, but often without the integrated programs to invest in the required laboratory infrastructure, drive innovation, and solve grand challenge problems.

AVIATION SECURITY AND EXPLOSIVES COUNTERMEASURES

In response to the liquid explosives threat in London in 2006 and the prospect of a broad suite of home-made explosives threats, DHS turned to the DOE Laboratories within NNSA, which have a deep scientific understanding of explosives stemming from 60 years of work in the nuclear weapons program and other DoD missions. These laboratories are home to an extensive experimental infrastructure and a multi-disciplinary scientific and engineering staff with expertise in development and characterization of explosive compounds, explosive detection, modeling and simulation of explosive properties using high-performance computing, and assessment of explosive effects.

Livermore's High Explosive Applications Facility (HEAF) is one example of a $100 million facility, constructed for and operated by the LLNL's nuclear weapons program, that supported activities focused on the improvised explosive device threat to aviation security. Researchers in HEAF and other similar facilities at Los Alamos National Laboratory and Sandia National Laboratories teamed together to provide technical support to DHS. The Department sought to establish guidelines for allowed liquid quantities through passenger checkpoint screening and enhancement of technology and screening protocols for both checked baggage and passenger screening.

Scientists at HEAF have formulated hundreds of home-made explosive compounds (HMEs), characterized their explosive properties, and evaluated their potential risk

to aviation security. LLNL has also tested explosive screening technologies to understand and improve their detection performance against a broad array of military-grade and home-made explosive materials. In DHS S&T-sponsored Project Newton, the laboratories are developing structural models of aircraft and the evaluating the effect of explosive blasts on the structure to determine the mass of conventional high explosives required for catastrophic damage. Laboratory characterization of HME properties are then used to establish the equivalent mass of different HMEs that would result in the same level of catastrophic damage. This work at the DOE/NNSA Laboratories complements live-fire aircraft testing, detection development, and certification testing done at the DHS Transportation Security Laboratory. This R&D supporting DHS S&T and the Transportation Security Administration (TSA) has had significant impact protecting the Nation's aviation infrastructure and passengers from ever-evolving terrorist tactics.

The DOE/NNSA Laboratories have also worked with DHS S&T, TSA, and several mass transit agencies across the Nation to secure mass transit systems from asymmetric attacks using high explosives. The laboratories have assembled multi-disciplinary teams of structural engineers, computational scientists, physicists, mathematicians, and statisticians to assess vulnerabilities and mitigation methods. This work includes system-wide vulnerability assessments, non-destructive and destructive analysis of construction materials and methods, simulation of explosive properties and potential failure modes, and development and deployment of solutions that significantly reduce system vulnerabilities. These DHS-sponsored programs have resulted in improved measures to ensure public safety and protect billions of dollars of infrastructure at a cost of a few tens of millions of dollars in security and safety enhancements.

NEED FOR ENDURING PARTNERSHIPS

In each of the programs above, a key enabler to success is partnership between the Federal program managers and the scientists and engineers at the National Laboratories. In the decade since 9/11, these partnerships have made critical contributions to the Nation's homeland security efforts. The DOE National Laboratories have deep technical capabilities, particularly in the area of countering weapons of mass destruction, which are key to the DHS efforts to develop effective, sustainable countermeasures against the threats of WMD. The laboratories have established extensive capabilities in high-performance computing, precision measurement science, nuclear and radiological materials, high explosives, and modeling and simulation expertise, which would not be affordable otherwise. These technical capabilities are a direct result of investments made by multiple Government agencies, as well as investments from the laboratories themselves in directed R&D programs to address key National security priorities. Because of these and other investments, DHS's programs are highly leveraged.

In our most successful programs, our scientists and engineers work with DHS to understand the threat space, develop an understanding of the operational requirements, evaluate alternatives, research and develop technology, test potential solutions in an operational environment, provide training and operational support to front-line operations, and develop lessons learned. These end-to-end programmatic partnerships have near-term impact and provide a basis for sustainable mission roles for the laboratories. The National Laboratories can bring unique, core capabilities to bear, partner with DHS, develop technical solutions to difficult National security challenges and develop a dedicated, knowledgeable workforce focused on mission success.

The Nation would be best served if the relationship between DHS and the DOE National Laboratories were more than just a contractual relationship. A partnership with joint, enduring commitment between DHS and the DOE Laboratories would ensure focusing the laboratories' expertise and unique capabilities on S&T needs for homeland security with requisite sustained support from DHS. Reducing the risk of WMD requires a sustained effort to develop effective solutions, which in turn, require the mission-focused research, development, testing, and evaluation that the DOE National Laboratories offer. The combination of the right technologies, in the hands of a trained, equipped, and supported front-line workforce will be a key component of interdicting or responding to the WMD threat.

WHAT'S FACING US NOW?

Concurrently, the Nation is facing serious Federal budget issues and a dangerous, evolving WMD threat. As Congress and the Executive Branch work to tighten Federal discretionary expenditures, we as a Nation must not lose sight of the requirements to protect the homeland against the threats of catastrophic terrorism. The na-

ture of the WMD threat, especially biological terrorism, continues to evolve and our ability to counter it lags further and further behind.

At the same time, the threat grows more formidable and more sophisticated. Recent trends in explosive threats to commercial aviation have demonstrated that our adversaries adapt to our deployed countermeasures. Recent work on genetic modifications to pathogens such as the H5N1 virus highlight the increasing risk of an engineered pathogen deliberately or accidently introduced into the environment. DHS efforts to develop technologies for early detection and characterization of emergent pathogens are critical to our ability to stay ahead of the threat. An attack using an engineered biological agent or a smuggled nuclear device would result in human and economic consequences that are orders of magnitude more severe than anything we have experienced to date.

To be successful in protecting the homeland, DHS must be ahead of the evolving threats and adaptations of our adversaries. Effective and enduring solutions are science-based, intelligence-informed, and developed with the DHS end-user community requirements in mind. Enduring solutions to difficult problems take time to mature. The typical technology maturation times from the beginning of an R&D program to the transition to the operational community can often be more than a decade.

CONCLUDING REMARKS

The threat of the use of WMD, rather than fading with time, is growing more serious; yet, the focus on the S&T required to effectively counter the WMD threat has eroded. Since the stand-up of DHS, DOE no longer provides R&D funding to the National Laboratories in chemical, biological, and explosives countermeasures. There is increasing downward pressure on S&T resources within DHS as focus turns to near-term technology gaps in the day-to-day operational missions of the Department and its stakeholders.

DHS and Congress should not lose focus on the difficult challenges in protecting the homeland from the threat of WMD. I believe DHS should partner with the DOE National Laboratories as FFRDCs to meet critical National needs in homeland security. The laboratories have demonstrated that they bring unique, specialized S&T capability and expertise to the mission. In particular, DHS should:

- Utilize the DOE National Laboratories for enduring, difficult problems where multi-disciplinary teams are required to anticipate, innovate, and deliver solutions to meet the most demanding DHS mission needs.
- Work with the DOE National Laboratories as FFRDCs and enable program partnerships which bring together the operational elements of DHS with the S&T workforce from the National Laboratories to better ensure technology development focused on the Department's unique requirements.
- Leverage investments in the DOE National Laboratories made by other sponsors (DOE, DoD) and adapt technology to Homeland's unique mission requirements.
- Develop a sustainable, mission-focused set of homeland security S&T professionals with deep understanding of the DHS operational environment and solutions that can be incorporated into the homeland security operations and culture.

By strengthening the partnerships between DHS and the DOE Laboratories, we will be able to better serve the mission of DHS to defend the homeland. I encourage this committee's continuing support of S&T activities supporting the DHS mission, and I thank you for the opportunity to testify before the committee.

Mr. LUNGREN. Thank you very much for your testimony.

I will now recognize myself for the first 5 minutes of this round of questioning. Back in the 1980s, when I happened to serve here the first time around, I remember holding some hearings on the nature of our National Labs and whether we appreciated them and whether there was an ability to transfer knowledge out of them into the commercial sector. You know, creatives and all sorts of things, that we developed at that time or extended development of that time.

We are in a different world now at the National Labs. We had a re-organization—I call it a "re-organization"—of National Labs a few years ago. In a sense—and, again, this is just a generalization but it is almost as if the National Labs were required to stand on

their own in a new way. I will put it this way, with DHS being a partner or a client or a client partner, in some ways I can see relying more on that as a funding source and, therefore, being very responsive to the immediate needs, as we have asked DHS to be involved in immediate needs application, as we have dealt with the post-9/11 world.

So the question of how you maintain your capacity for self-initiative in terms of the areas of research versus responding to the immediate requirement that you get from a client partner, is a difficult one, I would think. So let us go back to that Anthrax question. As I understand it, it was not because the Federal Government had directed you to do Anthrax research; it was as a result of larger-scale, general analysis of potential threats, as unknown as they could be, that you had continued with research—that when we had the Anthrax attack, you were able to respond with this foam as you said, is that correct?

Ms. HRUBY. The Anthrax foam was, indeed, an idea that was created through the Laboratory Directorate research and development efforts. But it was also supported at that—before the stand-up of DHS by the Department of Energy, who had a very small chem bio program, which helped get the technology to the stage where it could be deployed.

Mr. LUNGREN. So, I guess, my question would be—was that was a success? We don't want to not have those successes in the future. You seem to caution, or give us some alarm, that, perhaps, the balance is not quite the one that you would foresee in terms of us responding more to the immediacy of a particular problem as opposed to, I would call, a basic research and development.

But you also said, in your written testimony, that the enabling legislation that established DHS' relationship with the labs was remarkably forward-looking. So, I guess, with a benefit of 10 years of hindsight, do you have any recommendations for any legislative changes that would make that balance more possible or is this just going to be a continuing problem we are going to have as we deal with the reality of budgets and the idea of deal with the immediate versus the potential, long-range, unknown?

Ms. HRUBY. Let me say that I do think that the legislative framework exists for this to—the work between—you know, the work for DHS to be appropriate. There are practices that are difficult for the labs. So, you know, we have a portfolio of projects and the total amount of funding—you know, it has gone down but, okay—you know, it is a tough economic time.

But, if you look at the size of the average project contract, if you will, that the labs contracted to for DHS, it is small. A half—I mean, even if I just use the numbers that Dr. Gerstein just reported—a couple hundred thousand dollars—a $500,000, sort of, on-average, size of project, that is small for our workforce. It makes it hard to sustain scientists and engineers doing this, you know, as multi-disciplinary teams. It is not the right way to use the labs for such small projects.

So it is not about the overall, total amount of money; it is about the kind of work. Part of this is a better relationship between DHS, S&T, and DNDO. This is more S&T because of the nature of their business, the labs and the operating units, so that the labs can un-

derstand deeply the needs of the operating units, can see what is possible in the long-term, can figure out the gaps and fill those gaps, as opposed to responding to detailed needs through proposals to fill shorter term gaps.

Mr. LUNGREN. Okay, I don't want to put any words in your mouth but my sense, from what I take out from this, is we still need more effort of an integration of the mission of DHS in a science and technology arena and your operation, or the operation of the National Labs, that is not a—I wouldn't view that as a criticism; it is a suggestion of a larger, collaborative environment in which you might work. How you get there, of course, is the question that we would love to be a part of the participancy in coming to that. I don't view that as a criticism, I view that as a maturation of our responsibilities in a fiscally challenging time.

Ms. Clarke is recognized for 5 minutes.

Ms. CLARKE. Thank you. Thank you, Mr. Chairman.

This is very interesting because its really an evolutionary question that we are dealing with here. Many of the products of research and development that is taking place and has been taking place for quite some time in our labs, now it is where the rubber meets the road because a lot of what we could only envision has become reality in our lives as Americans.

So it's about, you know, how we now come into the 21st Century understanding that reality and then integrating it in a way in which its productive. So I want to thank you for your testimony here this morning because you have brought a lot of clarity to what, you know, has been, I guess, sort of—you have an agency that is relatively young and you have National Laboratories that have been on this mission for quite some time now trying to be of mutual support to one another in fiscally austere times.

So I want to get your viewpoint, both of you, on a couple of things. The DOE National Labs have very broad capabilities that may overlap with the needs of multiple DHS components and offices within the DHS components. So multiple laboratories may be well-positioned to provide services to DHS, the previous administration aligned the DOE National Laboratory capabilities with specific S&T Directorate technology divisions.

This served to clarify which laboratories might be appropriate recipients of funding for certain topics. But it may have failed to recognize the unique contributions available at specific laboratories. Again, just an outgrowth of where we are in the 21st Century. Can you give me your viewpoints on that?

Mr. CARTER. Yes, I think it is also important to realize that, you know, in a lot of fields, in response to an urgent need or a long-term use in the Department of Homeland Security, what the laboratories are often able to do is partner with each other. So we know our relative strengths and weaknesses and gaps and vulnerabilities, you know, as well as anybody, if not better. What we find is when we partner with the laboratories—Livermore, for example, has a long track record of partnering very closely with Sandia National Labs. What you would end up with is the best technologies and the best cultures and behaviors from each laboratory integrated into one collective partnership to execute an important mission.

When the Federal Government tries to stovepipe one particular laboratory to be, you know—for example, the sole provider or the prime provider of a particular approach, those partnerships can break down. I think that is to the disservice for our Government sponsors and also to the laboratories, which would then build up multiple, duplicative—areas of expertise instead of taking the efficiencies that often come with partnering. So I think it is important to keep these partnering options and opportunities in the right perspective too.

Ms. HRUBY. Let me just add, that is a great question because that was an effort that held some promise to focus but it wasn't really successful and, therefore, was dropped. The alignment to specific areas—one of the things that happened is there are some large, dedicated National security laboratories, certainly the three NNSA Labs—PacificNorthwest Labs, Oak Ridge National Labs—that are really dedicated, wholly, to the National security; that is what we do.

There are other great DOE Laboratories that have missions in energy and science, that have great capabilities to apply to some specific homeland security problems. But when they did this by—this alignment by divisions, there was no distinction between any of these labs in terms of their, you know, sort of, mission space and commitment to the area. There just, frankly, isn't enough money to have a wide—to have everybody play equal roles.

So this is a very difficult situation because, of course, I have high regard, we all have high regard for each other's expertise, but we have to say that missions for National security and the labs that do that are distinct from the labs—some other labs that have other primary missions in Energy Science and other things. So, I think, it is a matter of recognizing that in addition to things like focus and alignment.

Ms. CLARKE. It really becomes a matter of flexibility as well.

Ms. HRUBY. Absolutely.

Ms. CLARKE. You are tied into a commitment and you know that the expertise is resident in a smaller lab that has been working on a project, but you don't have the flexibility to incorporate that. It doesn't serve us any well and it may be even more costly to try to wield out the capacity that already is resident in another lab.

Ms. HRUBY. Yes.

Ms. CLARKE. Okay, so—I have more—okay, sure.

What process has the S&T Directorate established to align the DOE National Labs with the S&T Directorate's requirement? What is your understanding of that? When conducting reviews of statements of work, how does the Office of National Laboratories align the DOE National Laboratory capabilities with the needs of DHS components outside of the S&T Directorate? If you have any knowledge of either of those, please.

Ms. HRUBY. To the best of my knowledge, in the competitive processes, DHS looks for what they consider to be the best proposal. It is this issue of alignment to a certain area, I do not believe, exists from my perspective. With respect to components, the labs, of course, do work with components that S&T is not very involved in.

But S&T has a responsibility to review and make sure that mission is aligned. I commend the Office of National Laboratories for doing that effectively and efficiently and allowing the work to continue but, to the best of my knowledge with transparency perspective, it is about the best idea and not about an institution.

Mr. LUNGREN. Okay.

Mr. Long is recognized.

Mr. LONG. Thank you, Mr. Chairman.

My question is similar to the one that I asked the first panel, from the other side of the coin, and that is: Are the Department of Homeland Security and Department of Energy working together to define your mission in your opinion?

Doc Carter, I will start with you.

Mr. CARTER. So there are certainly activities between the two Federal agencies that help bring awareness to the Department of Homeland Security other than, for example, the Department of Energy's Laboratories' capabilities. Of course, in the end, the Department of Homeland Security contracts to the National Labs, you know, through the Department of Energy and Department of Energy site offices.

But, as far as developing a joint strategy with respect to homeland security technologies joined between the Department of Energy and the Department of Homeland Security, I don't know of any process outside the Mission Executive Council process, which is relatively new, that begins to pull that strategic alignment of the laboratories together to meet the mission needs of, for example, the Department of Homeland Security.

I believe the Mission Executive Council is one opportunity for the Deputy Secretary to level within multiple departments to at least begin to communicate and develop, you know, a joint understanding of what the relative, important, unique priorities for the departments are. But, as yet, we haven't seen that process actually come to much—that actually impacts the laboratory's work with the respect to the departments to date.

Mr. LONG. Okay.

Ms. Hruby.

Ms. HRUBY. I agree with Dr. Carter. The best hope here is the Mission Executive Council to have all the National security agencies compare notes, think about the health and the capabilities at the National Laboratories to make sure they are properly utilized and funded. That has been a slow start and, in part, there hasn't been much engagement of the labs directly in that. So the assessment of the health of our capabilities have not yet entered into that discussion.

I would say that——

Mr. LONG. Precipitate that, how can we get that to moving?

Ms. HRUBY. Well, your interest in it, I am sure, will be important. I would say that I do think that the collaboration between DNDO and NNSA has been significant over the years and is quite good.

Mr. LONG. Okay, thanks, you all, and thanks for being here and your testimony.

Mr. LUNGREN. The gentlelady from California is recognized.

Ms. RICHARDSON. Thank you very much, Mr. Chairman.

I would like to clarify—as you can tell, some of the questions are following some of the same areas and I would like to talk about, in your view, some of the competitiveness that DOE, in fact, has to go through in order to receive some of the DHS funding for contracts.

Specifically, I am referring to, like, the DHS might rely upon the expertise of DOE National Laboratories in specific topic areas because of their long history of work in a particular area and we heard that from the first panel—their special relationship with Federal agencies and/or their ability to perform classified National and homeland security work.

In other cases, the DOE National Laboratories may be one of many possible performers that could have performed that same job. In your opinion, how much of DHS funding to the DOE National Laboratories is awarded on a competitive basis and how much is it not?

Ms. HRUBY. I don't have any numbers, although I can certainly get back with you on those specifics. But it is the case that most, well over 50 percent, of the work that we do for DHS is based on a competitive process, which, by the way, we don't mind. I mean, we do—we don't mind competing, you know, we like competing. The issue, really, is, you know, we want to make sure we are competing for the best ideas while balancing that with maintaining a dedicated science and technology enterprise.

What we have found is because of the small size and very specific nature of some of the competition, that our scientists and engineers are not always that interested. They don't feel that is the best use of their talent. That is why I make statements that I fear that the pipeline could be drying up, is because we are finding our scientists and engineers turning away from those mission, small, specific projects to work at other areas where they have more flexibility and long-term commitment.

Ms. RICHARDSON. So would you be able to provide to this committee, without the objection of the Chairman, a percentage of how many of these you think you receive and how many go outside?

Ms. HRUBY. I would be happy to.

Ms. RICHARDSON. Okay. Then, building upon that same idea, it is my understanding that the Office of National Laboratories does not have an official gatekeeper role, is how I would describe it, in determining whether a contract may be provided to a DOE National Laboratory. Do you agree with that? Also, what oversight mechanisms does the laboratory then have in place to track or assess DHS' investment in the DOE National Laboratories?

Mr. CARTER. I would say, yes, since the formation of the Office of National Laboratories, they have played a coordination role to be primarily not in oversight and governance role of the works that we do for DHS S&T. They do provide a valuable conduit, now, into Department of Homeland Security science and technology but, also, to the other operational components of the Department. They are often there in place to help us understand what the operational needs of an operational agency might be and assess, or at least help us assess, whether or not the micro trace capabilities are appropriate to offer up to the component of the Department as a potential solution.

Ms. RICHARDSON. So are you suggesting that, in fact, they have given you other options to consider?

Mr. CARTER. They have, actually, connected us in many cases with operational gaps across the Department and that helps us develop our strategies. Our technology base could, ultimately, be applied to those challenges.

Ms. RICHARDSON. How much of a percentage of time would you say that is actually implemented? One, that you receive the feedback and two, that you follow it.

Mr. CARTER. So I am not sure I completely understand the question. But they probably help us with about half of the work that we do outside the S&T Directorate and outside DNDO. So they help us with that alignment in that strategy.

Ms. RICHARDSON. Okay, and can you tell me—do you know of whether the percentage of where you are being suggested something else or have you been?

Mr. CARTER. No, I don't know that number directly. You know, typically, the Office of National Laboratories won't make those kinds of detailed suggestions but they will connect us with the operational elements that would have feedback and we would, of course, listen to that.

Ms. RICHARDSON. The operational elements within where?

Mr. CARTER. Within the departments so that that might be FEMA or CVP or GSA or whatever it might be.

Ms. RICHARDSON. So, then——

Mr. CARTER. [Off mike]

Ms. RICHARDSON [continuing]. Based upon my questions, and my time is running out, it sounds like to me that, in fact—the initial of how I lined up this question, it doesn't appear that there is a real true gatekeeper.

Mr. CARTER. So they don't play an official gate-keeping role, i.e. we are not required to check in with them before you talk to an operational agency outside S&T, but they play an advisory and assistance role, a coordination and collaboration role.

Ms. RICHARDSON. Okay, thank you.

I yield back.

Mr. LONG [presiding]. I thank the gentlelady and I thank the witnesses for their valuable testimony and the Members for their questions.

The Members of the committee may have additional questions for the witnesses and we will ask you all to respond to those in writing. The hearing record will be open for 10 days. This subcommittee stands adjourned.

[Whereupon, at 12:04 p.m., the subcommittee was adjourned.]

APPENDIX

QUESTIONS FROM CHAIRMAN DANIEL E. LUNGREN FOR DANIEL M. GERSTEIN

Question 1. This committee has been unable to obtain detailed budget numbers from the Science and Technology (S&T) Directorate on how much money goes from the Department of Homeland Security (DHS) to the labs each year for the past few years. The numbers that were provided were insufficiently detailed, and took a week for S&T to pull together. This is concerning is because your office has the statutory role as coordinator of all Departmental research to the labs.

Please explain why the office in S&T (Office of National Laboratories) that is legally charged with coordinating Departmental research to the labs cannot easily delineate annual expenditures to the labs. (Please do not address the discrepancies between DHS and Department of Energy (DOE) expenditure records until the next question.)

Answer. In accordance with Section 309(g) of the Homeland Security Act of 2002 (Pub. L. No. 107–296) the Science and Technology Directorate's (S&T) Office of National Laboratories (ONL) was established within S&T, and is responsible for the coordination and use of the Department of Energy (DOE) National Laboratories to create a "networked laboratory system for the purpose of supporting the missions of the Department." S&T's performs appropriateness reviews of the tasks components send to the laboratories. S&T has not tracked DHS expenditures at the laboratories. Components requesting the work track the funds spent at the laboratories. Therefore, providing total DHS expenditures at the labs requires time to compile expenditure data from all components with work at the labs.

ONL's role, working with DOE and its laboratories and sites, has resulted in the establishment of processes and procedures that have enabled the Department of Homeland Security (DHS) Components to engage with and use the DOE National Labs to meet their respective R&D and technology needs.

To this end, ONL reviews all statements of work issued from DHS and directed to DOE National Labs prior to the preparation and submission of the final requisition package. The purpose of this review is to ensure the proposed work is within scope of and complies with the terms and conditions of the prime contract between DOE and the respective laboratory operator (Federally Funded Research and Development Center).

Question 1b. In addition, can you please explain the nature of the discrepancies between DHS and DOE expenditure records? What is the delta, in dollars, for each of the last 3 fiscal years between the records of the two agencies? Are these differences of concern to you?

Answer. *Nature of discrepancies*.—The difference between DOE and DHS funding records is that DOE reports Homeland Security Activities as DOE "direct-funded," non-DOE "direct-funded," and DOE "indirect-funded" activities which includes Work for Others (WFO), Laboratory Directed Research and Development, Cooperative Research and Development Agreements, and Interagency Personnel Agreements. The expenditures reported by DHS have been DHS sponsored WFO categorized as DHS "direct-funded" expenditures. Also, DHS does not fund all work categorized by DOE as "Homeland Security". It is also possible that other agencies fund work that fall into this category. In addition the DOE report has been developed for the current year and during execution of that year these numbers will have been estimates. These are the likely sources of discrepancies between reported numbers.

Question 1c. Please provide a detailed breakdown of all Departmental expenditures from fiscal year 2010 through fiscal year 2013 (expected) for both the DHS Labs and the DOE Labs. Please include the components by name, the laboratories they fund by name, and the amount funded. Please also include the type of project or the name of the project that was funded.

Answer. Below is a list of DHS expenditures at DHS and DOE Laboratories. A detailed breakout of expenditures is attached.

DOE Laboratory	Fiscal Year 2010 Amount Obligated	Fiscal Year 2011 Amount Obligated	Fiscal Year 2012 Amount Funded YTD	Fiscal Year 2013 Amount Funded/ Projected
Ames Laboratory	$70,899	$179,101	$0	$186,279
Argonne National Laboratory	30,522,882	33,680,703	22,470,776	17,226,679
Brookhaven National Laboratory	784,592	369,581	988,000	322,000
Idaho National Laboratory	25,027,463	27,393,413	27,848,993	25,100,843
Lawrence Berkeley National Laboratory	5,332,220	5,935,540	2,759,418	5,404,328
Lawrence Livermore National Laboratory	67,045,723	59,319,013	25,207,559	51,227,295
Los Alamos National Laboratory	38,616,545	32,531,836	21,791,440	22,046,279
National Energy Technology Laboratory	515,000	500,000	495,000	520,039
National Renewable Energy Laboratory	0	1,095,000	0	1,138,886
Nevada National Security Site	3,960,000	3,161,660	5,173,470	0
New Brunswick Laboratory	2,407,000	0	1,045,000	1,218,000
Oak Ridge National Laboratory	70,045,542	37,653,430	30,788,549	26,307,490
Pacific Northwest National Laboratory	50,213,479	53,690,126	28,223,479	28,572,888
Remote Sensing Lab	5,282,000	1,047,000	0	1,088,962
Sandia National Laboratories	74,481,969	63,421,006	45,810,564	41,727,829
Savannah River National Laboratory	11,220,486	12,053,424	4,090,000	4,700,000
Y–12 National Security Complex	684,375	708,000	470,000	420,000
TBD	0	0	0	8,823,000
Total	386,210,175	332,738,833	217,162,248	236,030,797

DHS Laboratory Operation and Maintenance Funding	Fiscal Year 2010 Amount Obligated	Fiscal Year 2011 Amount Obligated	Fiscal Year 2012 Amount Funded YTD	Fiscal Year 2013 Amount Funded/ Projected
Chemical Security Analysis Center	$5,370,000	$4,236,277	$5,005,409	$5,005,409
National Biodefense Analysis and Countermeasures Center	45,360,842	41,035,903	36,500,000	41,035,903
National Urban Security Technology Laboratory	3,778,560	6,054,795	5,183,036	6,054,795
Plum Island Animal Disease Center	38,612,282	41,756,527	42,016,557	42,016,557
Transportation Security Laboratory	24,316.530	16,122,783	22,579,361	22,579,361

Below is the programmatic funding provided to the S&T Laboratories outside of operation and maintenance:

S&T DOLLARS OBLIGATED TO S&T LABS BY DIVISIONS OTHER THAN S&T'S OFFICE OF NATIONAL LABORATORIES TO DATE 5/15/2012

Fiscal Year 2010			
Division	Project	DHS Lab	
Explosives	Air Cargo Systems Integrated Approach	TSL	$1,862,177
	Automated Carry-on Detect	TSL	402,764
	Explosives Trace Detect	TSL	585,000
	Next Generation Passenger Checkpoint	TSL	137,500
Borders and Maritime	Container Security Test Bed (CSTB)	TSL	35,000
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term)	PIADC	7,032,237
	Agrodefense Basic Research	PIADC	642,325
	CSAC	CSAC	5,760,000
	Model Large Scale Toxic Chemical Transport Release	CSAC	1,335,000
	Chemical Infrastructure Risk Assessment	CSAC	3,503,450
	Bio Threat Characterization	NBACC	21,931,350
	National BioForensics Operations	NBACC	14,105,150
	NBFAC	NBACC	1,918,800
TOTAL			59,250,753

Fiscal Year 2011			
Division	Project	DHS Lab	
Explosives	Check Point/Detection	TSL	$2,684,890
	Next Generation Passenger Checkpoint	TSL	258,922
	Mass Transit	TSL	921,899
	Air Cargo Systems Integrated Approach	TSL	811,597
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term)	PIADC	9,366,434
	Ag Screening Tools	PIADC	641,333
	CSAC	CSAC	3,936,263
	Model Large Scale Toxic Chemical Transport Release	CSAC	860,000
	Increase Safety of Hazardous Materials	CSAC	1,100,000
	Chemical Infrastructure Risk Assessment	CSAC	1,577,200
	IT Security Services	CSAC	300,000
	National BioForensics Operations	NBACC	12,933,936
	Bio Threat Characterization	NBACC	9,541,486
	BioForensics Research and Development	NBACC	306,000
TOTAL			45,239,960

Fiscal Year 2012				
Division	Project	DHS Lab	To Date	Planned
First Responder Group	Rad/Nuc Recovery Plan	NUSTL	$0	$150,000
Explosives	Next Generation Passenger Checkpoint	TSL	631,558	0
	Checked Baggage/Next Generation Passenger Checkpoint/ PBIED.	TSL	423,228	0
	Checked Baggage	TSL	492,370	0
	Air Cargo/Algorithm and Analysis of Raw Images/Next Generation Passenger Checkpoint.	TSL	294,139	0
	Air Cargo/Checked Baggage	TSL	594,705	0
	Air Cargo/TSL Operations	TSL	321,349	0
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term).	PIADC	3,412,744	211,000
	Ag Screening Tools	PIADC	188,003	0
	Chemical Security Analysis Center	CSAC	3,545,360	0
	Bio Threat Characterization	NBACC	6,180,042	0
	Bio-Defense Knowledge Center Analyses and Assessments	NBACC	800,000	0
	National BioForensics Operations	NBACC	7,303,572	0
	BioForensics Research and Development	NBACC	351,157	0
TOTAL			24,538,227	361,000

FUNDING FROM OTHER THAN S&T TO S&T LABORATORIES

	Amount
Fiscal Year 2012—From USDA to PIADC:	
FADD School Operations/animal care	$44,082
Fiscal Year 2011—From USDA to PIADC:	
FADD school operations, overtime hours, contractor costs, materials, and supplies	22,688
Animal per diem, copier charges, employee physicals, and DNA analyzer maintenance	36,300
Animal per diem, copier charges, and employee physicals	91,130
USDA APHIS International Services	22,163
Fiscal Year 2011—From DNDO to NUSTL:	
Securing the Cities program	120,000
Fiscal Year 2011—From NPPD to NUSTL:	
Shielded Nuclear Alarm Resolution Technology Demonstration and Characterization	83,922
Fiscal Year 2010—From USDA to PIADC:	
Animal care	78,403
Costs associated with animal care, employee physicals, and DNA analyzer	27,179
Foreign Animal Disease Diagnostics	28,144
North American Foot-and-Mouth Bank	23,051
Fiscal Year 2010—From TSA to TSL:	
Determine the security applications of a CAT/BPSS device	2,076,073
Develop an initial baseline standard image format	325,000
TSA requires continued support for the additional functionality of the development of the Fedtrak system	1,000,000
Supplemental tests for the Chlorine Rail Tank Car Vulnerability Assessment	100,000
Fiscal Year 2010—From DNDO to TSL:	
Computed Tomography	544,701

Question 2. In your analysis, where can cost savings be found with respect to the Department's work with the DHS and DOE Laboratories?

Answer.

DOE Labs

Cost savings occur when DHS leverages existing technologies, capabilities, and infrastructure at the DOE National Laboratories. If DHS did not leverage the DOE National Labs, DHS would have to create the needed capability at great cost. In addition, DHS leverages basic research that is performed at the DOE Labs that other components and Government agencies fund.

In addition, cost savings are being realized when the Department of Homeland Security (DHS) applies a systems approach to Department of Energy (DOE) Labs working in multiple laboratory teams. This approach allows DHS to take advantage of the core competencies of each lab, while accessing the body of work performed by respective team members, and taking advantage of identified synergies.

The Science and Technology Directorate's (S&T) sponsored program to develop Rapid Diagnostic Tools is an example of realizing costs savings through the systems approach and teaming with the right lab partners. Working with Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratory (SNL), S&T is accessing the wealth of genetic sequencing work performed by LLNL and coupling it with the photolithography and micro-fabrication capabilities of SNL to develop peptide microarrays for rapid diagnostic tools. Additional savings are being realized through S&T's leveraging of SNL's existing photolithography and micro-fabrication capacity for the research and development, prototyping, and ultimate manufacture of the microarrays.

DHS Labs

To maximize the facility use/scientific deliverables and minimize risk, S&T's Office of National Laboratories (ONL) has:

- Initiated performance-based operations and maintenance contract at Plum Island Animal Disease Center.
- Looked at consolidating and minimizing the number of support contracts at all DHS Laboratories.

- Developed a work for others operational requirement, primarily at the National Biodefense Analysis and Countermeasure Center (NBACC) (Located at Ft. Detrick, Maryland and contains the National Bioforensics Analysis Center [NBFAC] and the National Biological Threat Characterization Center [NBTCC]) to use the capacity of labs and increase mission support with small increases in fixed operational costs.
  - The Federal Bureau of Investigations (FBI) provides funding for their casework done by NBFAC.
  - Because of the unique capabilities of the NBACC facility, other Federal agencies have expressed an interest in having NBACC staff perform mission work in biocontainment space (under the caveat that this work is consistent with the facility mission and/or special expertise, the work must not affect the achievement of DHS work requirements, the sponsor's proprietary data will be protected, etc.).
  - Memorandum of Understanding between S&T and another Federal Agency was signed in February 2012 for collaboration on biological defense countermeasures test and evaluation (e.g., leverage existing facility space, programs and trained staff at NBACC with respect to Biosafety Level 4 Good Laboratory Practice procedures).
- Decreased rented space for the National Urban Security Technology Laboratory (NUSTL) (Located in New York City), resulting in reduced rent and security payments to the General Services Administration.
- Formed an IT Working Group to leverage certification and accreditation work and lessons learned at one DHS Laboratories.

Question 3. What rigorous process is S&T using to ensure that mission and research requirements are driving capacity (in terms of what labs get built and how large they are) for any new labs?

Answer. All construction programs (new laboratories and additions to laboratories) within the Science and Technology Directorate's (S&T) Office of National Laboratories are managed using the Acquisition Life-cycle Framework (ALF) as defined in the Department of Homeland Security, Acquisition Management Directive 102–01.

The ALF is a template for planning and executing acquisitions, which ensures mission requirements are defined, validated, and then translated into what is built.

Question 4a. S&T recently released its new strategic plan, which lays out its vision for meeting its mission to provide knowledge and technology solutions for the homeland security enterprise. Goal 4.6 is explicitly to "improve S&T's knowledge and use of . . . research facilities with a focus on DOE National Labs and DOE efforts."

In what ways does S&T believe it stands to improve its knowledge and use of the DOE Labs?

Question 4b. How can S&T take advantage of the labs more as a partner, and less as a contractor, if there would be value in such a thing?

Answer. The Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) continues to evolve its relationship with the Department of Energy (DOE) Laboratories, moving away from being a "performer" and towards the role of "partner." S&T values the strategic perspective resident in the DOE Labs and recently, in the case of S&T's Technology Foraging effort, has sought their advice.

S&T's Office of National Laboratories is extending and deepening our strategic partnership with the DOE Labs, we are also undertaking to increase awareness of the DOE Labs' capabilities in the Homeland Security space with our own DHS Components. In fiscal year 2012, S&T is embarking on an educational and awareness drive through briefings and "road shows" to inform S&T's Homeland Security Advanced Research Projects Agency Division and DHS Components about the research opportunities at the labs. In addition, S&T has put in place an agency-to-agency master agreement that streamlines the business processes around contracting to simplify collaboration and use of DOE Labs. Information, forms, templates, guides, and relevant resource documents are all available on-line.

In the last 6 months, S&T has called on the DOE Labs to share their "best guess" on emerging over-the-horizon technologies that can be put to use for the Homeland Security Enterprise. The applications of the technologies are in the areas of border security (air-based technologies, ground-based technologies, maritime-border security); bio-agent detection; chemical detection; explosives detection; biometrics; cyber security; disaster relief, first responder equipment and capabilities; and information sharing, analysis, and interoperability.

As noted earlier, in order to increase the value-added received from the labs, S&T encourages the labs to work in teams or consortia. This approach allows S&T to re-

ceive the benefit of a broader knowledge and skill base that may be resident in several labs as opposed to sourcing a project to just one lab or having to select a single lab capability.

For example, the exceptional capabilities at one lab in high-performance computing can be paired with another's excellence in modeling and simulation to create disaster training scenarios for first responders. Currently, S&T is working with a consortium, the National Explosives Engineering Sciences Security Center (NEXESS) made up of Sandia, Los Alamos, and Lawrence Livermore Laboratories. NEXESS's work is focused on characterizing specific home-made explosive threats, and providing technical, test, and evaluation services to DHS's Transportation Security Administration.

Question 5a. Dr. Gerstein's written testimony stated that "in the current budget environment, there will be a temptation to fund near-term priorities while sacrificing the future. In my judgment, this would be a mistake." And yet, the DHS S&T technology foraging strategy and the proposed budget emphasis away from transformational projects does just that.

Can you explain this discrepancy? Is S&T's approach a long-term or a short-term one?

Question 5b. Can you please describe the rigorous process you have in place to ensure that all of these funds would go to projects that the end-users ultimately need, and that they will reliably work in the field? How are the labs partners in this process?

Answer. In general, funding for future efforts such as research and development are sacrificed in austere budget environments in favor of operational funding. While operational funding is imperative, we must make every effort to look into the future, anticipate threats, and fund longer-term efforts. In recent years the Science and Technology Directorate (S&T) discretionary research and development budget saw a decrease of nearly 56 percent; from $598 million in fiscal year 2010 to $265 million in fiscal year 2012. To minimize the impact of the budget decrease on near-term R&D, S&T reduced the basic research funding.

With this budget environment, we have established a process of on-going reviews of our entire research and development portfolio to ensure that we are: (1) Investing in technologies that will significantly improve DHS's efforts to help secure the country, and (2) meeting the goals established by our partners in the operating components and the broader homeland security enterprise. We have committed to an annual review of our portfolio of basic and applied research and development and all proposed new projects. During this annual review we study written materials, hear a presentation by the project manager, and carefully analyze the project's likely impact and feasibility (or "riskiness"), judging these attributes against specific metrics determined by the Science and Technology Directorate (S&T) with input from the operating Components. S&T also reviews other basic research portfolios in other agencies. For example, ONL participates in reviews at the DOE Laboratories to identify opportunities to leverage on-going research or identify partnership opportunities for future investments.

These metrics establish a framework to address elements essential to programmatic success in the context of the DHS missions spelled out in the Quadrennial Homeland Security Review. The framework assesses the project's overall impact on customer mission; transition of products to the field; investment in technology to position S&T for the future; coordination with customers to align projects with their requirements; and application of an innovative strategy. Each project is evaluated by a review panel composed of S&T leaders, DHS component representatives, and independent experts. By measuring all of S&T's projects against the framework, we establish a transparent view of all research and development within S&T to enable more strategic, longer-term budget decisions; ensure efficient delivery to the component or individual user; and cultivate effective communication. These are the same review model and framework used by both Federal and private research and development organizations, including the award-winning Army Engineer Research and Development Center.

Having an adequate infrastructure for a viable R&D capability requires long-term investment. Currently, S&T puts priority on R&D investments with an 18–24 month transition time to maximize impact in a difficult economic time, but the on-going investment in DHS Labs, DOE Labs, and University Centers of Excellence show a commitment to maintain long-term effectiveness.

Question 6a. The work that DHS does with the labs can statutorily be performed under three mechanisms: No. 1, joint sponsorship with DOE; No. 2, direct contract with the lab; or No. 3, "work for others."

How often are these three options utilized? If work for others is used the most often, what is the basis for that?

Question 6b. Would there be benefit to taking advantage of the other types of contracting mechanisms?

Answer. The Homeland Security Act of 2002, (Pub. L. No. 107–296) authorizes four mechanisms for utilizing the Department of Energy (DOE) Labs, the three listed above and any other method provided by law, which includes Cooperative Research and Development Agreements (CRADA). Work for Others is the easiest and most straightforward mechanism for conducting work at the DOE Labs.

The bulk of the Department of Homeland Security (DHS) sponsored work is performed on a "work for others" basis with the remainder being performed under CRADAs. Using a modified work for others basis was included in implementation of the February 2003 DOE/DHS Memorandum of Agreement that established a framework to ensure that the capabilities of the DOE Labs and sites were made available to DHS. The processes and procedures associated with the work for others basis is routinely reviewed by DHS and DOE to ensure their efficiency. For example, in an effort to enhance the work for others process, DHS and DOE implemented a master Interagency Agreement that provides standard contract terms and conditions for all DHS-sponsored work.

While the Homeland Security Act of 2002 authorizes direct contracting, the Act further specifies that direct contracting only applies to programs or activities transferred from DOE to DHS that were being carried out through direct contracts. As a result this method is not applicable for "new" DHS-sponsored programs or activities.

Joint Sponsorship Agreements have a significant disadvantage in that DHS would be responsible for associated infrastructure costs. However, in order to assure alliance between DHS's and DOE's National Laboratory's future research agendas, along with those of other Federal agencies with similar research concerns, DHS is a member of the four-agency governance charter that led to the Mission Executive Council that includes DOE, DOD, and DNI. Through this mechanism, DHS and DOE coordinate critical science and technology issues that currently meet this need. DHS will continue to evaluate opportunities and situations where these mechanisms could be used.

Question 7a. Three entities within DHS are understood to formally perform or fund research and development: S&T, the Domestic Nuclear Detection Office, and the Coast Guard. But the list is actually much longer, and includes the Office of Health Affairs, Customs and Border Protection, the Secret Service, and a number of others. S&T has the statutory role of coordinator of all research and development at the Department.

How does ONL ensure DHS-wide coordination of planning and prioritization?

Answer. The statutory authority to coordinate all research and development in the Department of Homeland Security (DHS) lies within DHS's Science and Technology Directorate (S&T), not S&T's Office of National Laboratories (ONL) specifically, and the Directorate has been taking a larger role in this responsibility.

The past Integrated Product Teams (IPT) and current S&T Resource Allocation Strategy STRAS processes help S&T maintain awareness of not only the needs and requirements of Component partners, but also their own research and development activities.

In addition, as noted earlier, ONL is meeting with other DHS components to make them aware of the capabilities that reside in DOE's National Laboratories and of processes that ONL has lead to systematize and simplify the administrative processes for getting work underway at DOE's laboratories.

Question 7b. Is there a compliance check in place on ONL's part? What procedures allow S&T to manage the role of DHS in using the labs, particularly in the context of "One DHS"?

Answer. S&T is the primary DHS focal point for work to be performed by the Department of Energy (DOE) National Laboratories pursuant to a "work for others" arrangement formalized by the Memorandum of Agreement Between Department of Energy and Department of Homeland Security dated February 23, 2003, and in accordance with 6 U.S.C. § 189(a)(1)(c).

ONL is the primary point of contact to conduct reviews and recommend approval of work by DOE National Laboratories. As noted earlier, ONL reviews all statements of work issued from DHS and directed to DOE National Laboratories to ensure the work complies with the terms and conditions of the prime contracts between DOE and each of the National Laboratory operators.

As noted above, ONL is meeting with DHS's components to advance their knowledge of the National Laboratories's capabilities and processes that would simplify the placement of work.

Question 7c. Can you provide any example of capabilities that have slipped through the cracks or projects that have not been done well because components did not coordinate with S&T?

Answer. We do not have detailed insight into what might be viewed as other DHS components' lost opportunities for improved products had work otherwise contracted for been performed at a DOE National Laboratory.

In addition, in fulfillment of the Science and Technology Directorate's role under section 302 of the Homeland Security Act of 2002, it has engaged in the operational testing and evaluation aspects of acquisitions of a certain size through S&T's Test and Evaluation and Standards Office. Moreover, the Directorate has become increasingly engaged in the design and implementation of the Department's acquisition process. As this process evolves, we will play an on-going role.

The Department recognizes the need to improve the acquisition process; accordingly, it is implementing improvements to reduce cost and schedule overruns. DHS recently published an Integrated Strategy for High-Risk Management. That report provides a comprehensive vision and strategy to manage all Department-wide investments. We will be a prominent member at the beginning of the acquisition cycle and remain involved throughout the acquisition cycle, working closely with four groups: The Department Strategy Council, Capabilities and Requirements Council, Program Review Board, and Investment Review Board.

Question 8. Please describe S&T's process for determining how to allocate projects to the different research entities at its disposal. What are the guiding principles for project prioritization, and how do these map to your new strategic plan?

Answer. The Department of Homeland Security's (DHS) Science and Technology Directorate (S&T) has a mission to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions for the Homeland Security Enterprise (HSE). To achieve this mission, S&T has outlined three critical areas of strategic focus. First, S&T will pursue technology options and process enhancements that are operationally-focused. Second, S&T will seek innovative, systems-based solutions to complex problems. Third, S&T will foster robust partnerships across the Federal Government, State, local, and Tribal governments, universities, private sector, and internationally in order to leverage expertise and solutions and share resources. S&T priorities for areas of research, development, and analysis are derived from an understanding of near- and long-term threats, National needs, and DHS mission needs and operational vulnerabilities, as articulated in the administration's National Security Strategy, the Quadrennial Homeland Security Review (QHSR), and the capability gaps and operational requirements of DHS Components and first responder communities. S&T has established a rigorous portfolio review process. Each proposed "new start," as well as each on-going project in our research and development portfolio, undergoes an on-going review to ensure that it remains relevant, feasible, and effective.

In reviewing the portfolio, we study written materials, listen to the project manager's oral presentation, and carefully analyze the project's likely impact and feasibility (or "riskiness"), measuring these attributes against specific metrics determined by S&T with input from the operating Components. These metrics establish a framework to address elements essential to ensuring that the program will help DHS meet one or more of its missions, as defined in the QHSR. These elements include:

Systems Analysis.—How well does the project's product(s) align with a customer's existing operational context/concept of use or an alternative that is agreeable to the customer?

Customer Buy-in.—Have the project objectives been developed through close consultation with appropriate decision authorities?

Efficiency.—What level of savings can be achieved by this project with respect to the customer's operations?

Capability.—To what extent does this project provide risk or threat reduction and/or improved fidelity, performance, etc.?

Technical/Research Feasibility.—How likely is it that the team will overcome the technical and/or research challenges facing this technology and/or knowledge product?

Transition Likelihood.—Is there a clear path/mechanism to enable transition/commercialization? Customer readiness? Are there any secondary issues related to the concept of use, prepotency, budgeting, affordability, regulatory or statutory realities, or business value?

Timeline.—When will the project achieve either an efficiency or capability improvement, as defined on the Impact page, as part of normal operations? Or, when will the first demonstration of the capability/efficiency be observed in an operational context?

Innovation.—Does the project attempt to realize its objectives in a way that others have not previously considered or exploited?

Resource Leverage.—What level of interaction exists between the project team and the target component or customer?

Foraging.—Does the project exploit existing technology or research, and/or new or existing partnerships to minimize time and expense?

Cost Realism.—Is the cost projection credible?

Project Clarity.—How well is the project described, laid-out—is it clear what the team will do? Is the problem well-defined and the approach clear? Has a letter of intent or TTA been obtained?

Each project is evaluated and rated by a review panel composed of S&T leaders, DHS component representatives, and independent technical experts. By measuring all of S&T projects against the framework, we establish a shareable view of all research and development within S&T. In so doing, we enable more strategic, longer-term budget decisions; ensure efficient delivery to the component or individual user; and cultivate effective communication throughout the process.

Question 9. How much money per year do the DOE Labs typically spend on LDRD projects that are applicable to the homeland security mission? What has been the return on investment, if any, from this independent R&D?

Answer. Laboratory Directed Research and Development (LDRD) is a critical component of keeping the laboratories at the forefront of basic research relevant to the Homeland Security Enterprise. LDRD has provided the laboratories with the opportunity to recruit and retain staff and acquire and build foundational tools necessary to ensure their long-term vitality at the leading edge of technical fields relevant to the Homeland Security mission area. In a typical year assuming $360 million in total program funds at the laboratories from the Department of Homeland Security, LDRD would be about $18 million at the laboratories. The laboratories had $192 million of LDRD projects applicable to DHS science, technology, and engineering missions. Technical contributions have included:

- Enabling research in Rapid Bio-Diagnostics;
- Enabling research in Home-made Explosives characterization;
- Basic materials research that has led to enhanced personnel protection equipment for first responders;
- Advanced computing, modeling, simulation, and virtual training;
- Data analytics resulting in visualization and situational awareness tools;
- Battery and renewable power solutions for remote sensors.

Question 10a. S&T operates about ten test beds around the Nation.

What is the rationale for establishing test beds, rather than contracting with DOE Labs, DHS Centers of Excellence, or other existing entities for the work?

Question 10b. Does the funding for these test beds come from ONL?

Answer. Test beds provide controlled environments in which scientific testing, evaluation, and demonstration can take place. To ensure the highest return on the time and resources invested in a project, the Science and Technology Directorate (S&T) uses the most appropriate facility for each project, including using existing capabilities whenever possible. However, in some cases, projects require test beds that do not exist for certain operational environments to assess continuity of operations, live demos, human response, etc., and in many cases a lab or Center of Excellence cannot meet these needs.

In fiscal year 2010, the Resilient Tunnel Project constructed a full-scale test tunnel at West Virginia University in Morgantown, West Virginia, and configured it with an internal geometry that closely matches tunnels of a mass transit partner. In this case, the West Virginia University test bed has the capability to allow testing with water pressures equivalent to those expected in a breached underwater transit tunnel. Such simulation could not be accomplished without severe disruption to services and risk of significant damage in an actual transit tunnel. The test tunnel also provides ready access and observation of both sides of the inflatable tunnel plug during its deployment.

The DETER test bed is a shared cybersecurity facility globally accessed through the internet by the research community for the research, development, testing, and education of cybersecurity technologies. DETER is a unique facility that provides researchers with secure environments that can replicate different portions of the internet, allowing safe exploration of new defenses against emerging cyber threats. DETER's computing infrastructure and software is developed and maintained by the University of Southern California's Information Sciences Institute and the University of California, Berkeley. Research at both institutions provides constant improvements and allows the test bed to keep pace with the technology developments, support increasingly larger experiments, and efficiently develop and execute experi-

ments. DETER is the largest, unclassified public test bed and this on-going research ensures that it is also one of the most advanced.

The inherently distributed design and virtual nature of the test bed has allowed for additional computing resources, from National Labs and educational institutions, to be seamlessly integrated over the internet and made accessible through DETER.

Funding for the individual test beds can come from a variety of sources including Department of Homeland Security (DHS) and non-DHS sources. Generally, S&T's Office of National Labs does not fund test beds.

Question 11a. The National Biodefense Analysis and Countermeasures Center (NBACC) has endured considerable delays due to infrastructure problems. It also has a lot of unused space.

How much square footage is vacant at the NBACC? Please provide a break-down by biosafety level, and indicate how this figure will change when the lab space is fully accredited. Was the excess space unintended? What is DHS' plan for leasing the space to other entities?

Answer. Currently 10,500 square feet of BSL–4 space and 11,000 sq. ft. of BSL–2 space are being utilized at NBACC for BSL–2, 3, and 4 operations. Approximately 20 percent of the total National Biodefense Analysis and Countermeasures Center (NBACC) Laboratory capacity of 55,000 sq. ft. (including 34,000 sq. ft. of BSL–3 space being activated in calendar year 2012) may be available for additional research and development to support the Department of Homeland Security (DHS) and non-DHS entities.

The strategy is for NBACC staff to perform work for other entities in the NBACC Laboratories rather than leasing space. DHS and NBACC have developed Memoranda of Understanding with multiple Federal agencies to fund externally-sponsored program activities in the near term (i.e., fiscal year 2013) as well as part of potential strategic collaborations.

DHS envisions that this approach will address additional National biodefense priorities, enhance the competencies and capabilities available at NBACC, and increase the overall use of the facility. NBACC was always intended to be a National resource available to support other entities. Due to DHS's Science and Technology Directorate (S&T) funding reductions and delays in registering some of the laboratories, the current annual investment is below the intended DHS level when fully activated.

Question 11b. Please provide the total cost of remediation of the laboratory due to piping problems. Please also indicate how far back, in terms of time until full operational capability, these problems have set the lab.

Answer. Remediation of the stainless steel pipes cost $563,000. The corrosion was identified in August 2010, and remediation was completed in March 2011 resulting in a 7-month delay in laboratory activation. NBACC submitted the Centers for Disease Control and Prevention (CDC)/U.S. Department of Agriculture (USDA) registration for the BSL–4 in April 2011 and received registration in September 2011. The delay due to corrosion remediation was partially mitigated by using the time to conduct additional planning, documentation, training, reviews, and use of the laboratories at BSL–2 (already activated) to ensure readiness for the CDC/USDA registration process.

Remediation of the glass piping system cost $913,000. The piping installation issues were identified in August 2010, and remediation was completed in April 2012 resulting in a 20-month delay in laboratory activation.

NBACC is scheduled for submittal of the CDC/USDA registration for the BSL–3 in June 2012 with projected registration in December 2012. The delay due to glass piping remediation was partially mitigated by conducting BSL–3 activities inside the BSL–4 laboratories allowing critical work to proceed.

Question 12. What office has final oversight of NBACC activities? What is the difference between the roles of the Chemical and Biological Division and ONL with regard to NBACC oversight and management?

Answer. The Science and Technology Directorate's (S&T) Office of National Laboratories (ONL) has responsibility for the overall execution of the NBACC mission. ONL oversees and manages the NBACC Laboratory including planning, staffing, funding, and utilization. In addition, ONL has responsibility for the facility operations, including safety and security regulations are met.

S&T's Chemical and Biological Defense Division (CBD) is a customer of the NBACC. CBD oversees the technical management of specialized research and development projects in the bio-threat characterization at NBACC as well as requests work to be completed on CBD division-level goals and objectives.

Question 13. Many foreign animal diseases are emerging that could impact livestock and human health. Given that the terrorist threat should be a primary focus of DHS' involvement in agricultural security, how do the Plum Island Animal Dis-

ease Center and the presumptive National Bio- and Agro-Defense Facility contribute to this security mission in a way that is unique from the Department of Agriculture's approach to agricultural security?

Answer. Plum Island Animal Disease Center (PIADC) represents an on-going partnership between the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T), the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) and USDA's Agriculture Research Service (ARS).

PIADC is responsible for conducting research, diagnostics, and countermeasure development (e.g., vaccine development) for high-consequence foreign animal diseases (FAD) with a priority on Foot-and-Mouth Disease (FMD). S&T is responsible for the operation and maintenance of the laboratory, and ensuring a safe and secure environment for conducting the mission.

Due to the threat of agro-terrorism, DHS has supported the development of new forensic capabilities at PIADC. In the event of a FAD outbreak, the Federal Bureau of Investigations can now work at PIADC to conduct forensic testing to investigate whether the incident was intentional or naturally-occurring. PIADC programs would transition to the National Bio- and Agro-defense Facility.

S&T's basic role concerning foreign animal disease outbreaks is unique and distinct from the USDA mission:

USDA	S&T
Basic research and discovery for vaccines and diagnostics for foreign animal diseases.	Administer and provide a facility for foreign animal disease laboratory work.
Manage operational response during a foreign animal disease outbreak.	Later development including proof of concept through commercialization.
	Develop modeling, diagnostic, and screening tools to minimize the number of animals affected and limit economic impact of an outbreak.
	Provide scientific and technical support to operational response during an incident.

The agricultural sector and food supply are designated critical infrastructures by DHS.

For this reason, PIADC and the presumptive NBAF have a critical role in preventing and protecting against devastating animal diseases in the United States as well as responding to or mitigating the effects of such diseases. Regardless of whether the cause is terrorism or naturally-emerging disease, the outbreak of a foreign animal disease has the potential to be devastating to critical infrastructure and the U.S. economy. In either case, DHS would be responsible for coordinating the National response if the event were of sufficient scale and impact.

Questions From Ranking Member Bennie G. Thompson for Daniel M. Gerstein

Question 1. The Office of National Laboratories has at least two major roles: Its statutory responsibility to coordinate and use DOE National Laboratories and its DHS-assigned responsibility of constructing, operating, and maintaining S&T Directorate Laboratories.

How are the resources of the Office of National Laboratories divided between these functions, in terms of staff, full-time equivalents, or budget authority?

Answer. The Science and Technology Directorate's (S&T) Office of National Laboratories (ONL) has two main roles as defined by current funding: Construction (including lab upgrades) and Operations. These programs are appropriated through the Laboratory Facilities budget authority that is part of the S&T appropriations. In fiscal year 2012, the total Laboratory Facilities budget was $176.5 million ($50 million for construction, $18.2 million for upgrades, and $108.3 million in operations).

The coordination and utilization of the Department of Energy (DOE) National Laboratories and the Department of Homeland Security Technology Transfer program do not have assigned budgetary responsibilities.

ONL has a director that oversees the branches and programs to execute its mission. The resources of ONL are divided into the following areas:

- ONL Director: 3 full-time employees; overall budget of $176.5 million.

- Operations Branch: 9 full-time employees (budget of $108.3 million operations for five S&T Labs).
- Constructions/Lab Upgrades: 9 full-time employees (budget of $50 million for the National Bio- and Agro-Defense Facility, $18.2 million for Transportation Security Lab upgrades).
- DOE Lab Utilization: 3 full-time employees.
- Technology Transfer Program: 2 full-time employees.

Question 2a. The S&T Directorate realigned itself in late 2010. Some S&T Laboratories are associated with the programs they support (for example, the National Urban Security Technology Laboratory (NUSTL) is aligned with the Homeland Security Enterprise and First Responders Group), while others are aligned with the Office of National Laboratories (for example, the Chemical Security Analysis Center).

Why are different approaches taken to the organization of the S&T Directorate Laboratories?

Question 2b. How does the direct connection or lack of a direct connection to the programs the laboratories support affect the work done by the laboratories?

Answer. The Department of Homeland Security's Science and Technology Directorate (S&T) operates five laboratories: Plum Island Animal Disease Center; the Transportation Security Laboratory (TSL); the National Urban Security Technology Laboratory (NUSTL); the Chemical Security Analysis Center; and the National Biodefense Analysis and Countermeasures Center.

S&T's Office of National Laboratories (ONL) oversees and funds operation and maintenance for all five S&T Laboratories through the Laboratory Facilities budget.

Laboratories whose key function is scientific research are administered under ONL. Laboratories that have a major non-scientific research mission are aligned to the appropriate functional group. For example, TSL has a major test and evaluation mission and is aligned to S&T's Acquisition Support and Operation Analysis Group that includes the Test and Evaluation Standards Office.

Similarly, NUSTL's major mission is to support First Responder activities and is aligned to the Homeland Security Enterprise and S&T's First Responders Group. This alignment ensures that these laboratories provide the focused support to the specialized non-scientific activities needed to ensure success.

Question 3a. The DHS Congressional budget justifications from fiscal year 2009 through fiscal year 2011 provided a break-down of operations and maintenance funding for each S&T Directorate Laboratory. DHS discontinued this practice in the fiscal year 2012 Congressional budget justification, and now doesn't report the amount of programmatic funding sent to the S&T Directorate Laboratories. Also, DHS does not detail the amount of funding provided by DNDO to its laboratory-like facilities.

Why has DHS changed the amount of information provided to Congress regarding the operations and maintenance of the S&T Directorate Laboratories?

Question 3b. How much programmatic funding has been provided to the S&T Directorate Laboratories and by what entities both inside and outside the directorate?

Question 3c. Why does DHS not report the total amount of funds budgeted annually for each S&T Directorate Laboratory in the same manner that DOE reports regarding its laboratories?

Answer. For fiscal years 2008–2011, the Science and Technology Directorate (S&T) included program level funding below the Program/Project Activity (PPA) level in the President's budget request. Beginning in fiscal year 2012, S&T included PPA-level funding information in the budget request and separately provided Congressional staff a much greater level of detail down to the project level. This information provided greater insight into S&T funding requests than was previously available in the S&T budget request for fiscal year 2009 through fiscal year 2011. Attached is the information provided with the budget submission. The more detailed information provided includes funding information on operation and maintenance of each S&T Laboratory.

Below is the programmatic funding provided to the S&T Laboratories outside of operation and maintenance:

S&T DOLLARS OBLIGATED TO S&T LABS BY DIVISIONS OTHER THAN S&T'S OFFICE OF NATIONAL LABORATORIES
TO DATE 5/15/2012

Fiscal Year 2010			
Division	Project	DHS Lab	
Explosives	Air Cargo Systems Integrated Approach	TSL	$1,862,177
	Automated Carry-on Detect	TSL	402,764
	Explosives Trace Detect	TSL	585,000
	Next Generation Passenger Checkpoint	TSL	137,500
Borders and Maritime	Container Security Test Bed (CSTB)	TSL	35,000
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term)	PIADC	7,032,237
	Agrodefense Basic Research	PIADC	642,325
	CSAC	CSAC	5,760,000
	Model Large Scale Toxic Chemical Transport Release	CSAC	1,335,000
	Chemical Infrastructure Risk Assessment	CSAC	3,503,450
	Bio Threat Characterization	NBACC	21,931,350
	National BioForensics Operations	NBACC	14,105,150
	NBFAC	NBACC	1,918,800
TOTAL			59,250,753

Fiscal Year 2011			
Division	Project	DHS Lab	
Explosives	Check Point/Detection	TSL	$2,684,890
	Next Generation Passenger Checkpoint	TSL	258,922
	Mass Transit	TSL	921,899
	Air Cargo Systems Integrated Approach	TSL	811,597
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term)	PIADC	9,366,434
	Ag Screening Tools	PIADC	641,333
	CSAC	CSAC	3,936,263
	Model Large Scale Toxic Chemical Transport Release	CSAC	860,000
	Increase Safety of Hazardous Materials	CSAC	1,100,000
	Chemical Infrastructure Risk Assessment	CSAC	1,577,200
	IT Security Services	CSAC	300,000
	National BioForensics Operations	NBACC	12,933,936
	Bio Threat Characterization	NBACC	9,541,486
	BioForensics Research and Development	NBACC	306,000
TOTAL			45,239,960

Fiscal Year 2012				
Division	Project	DHS Lab	To Date	Planned
First Responder Group	Rad/Nuc Recovery Plan	NUSTL	$0	$150,000
Explosives	Next Generation Passenger Checkpoint	TSL	631,558	0
	Checked Baggage/Next Generation Passenger Checkpoint/ PBIED.	TSL	423,228	0
	Checked Baggage	TSL	492,370	0
	Air Cargo/Algorithm and Analysis of Raw Images/Next Generation Passenger Checkpoint.	TSL	294,139	0
	Air Cargo/Checked Baggage	TSL	594,705	0
	Air Cargo/TSL Operations	TSL	321,349	0
Chem/Bio	Foreign Animal Disease Vaccines and Diagnostics (Near/Long Term).	PIADC	3,412,744	211,000
	Ag Screening Tools	PIADC	188,003	0
	Chemical Security Analysis Center	CSAC	3,545,360	0
	Bio Threat Characterization	NBACC	6,180,042	0
	Bio-Defense Knowledge Center Analyses and Assessments	NBACC	800,000	0
	National BioForensics Operations	NBACC	7,303,572	0
	BioForensics Research and Development	NBACC	351,157	0
TOTAL			24,538,227	361,000

FUNDING FROM OTHER THAN DHS TO S&T LABORATORIES

	Amount
Fiscal Year 2012—From USDA to PIADC:	
FADD School Operations/animal care	$44,082
Fiscal Year 2011—From USDA to PIADC:	
11–9100–0900–IA FADD school operations, overtime hours, contractor costs, materials, and supplies	22,688
11–9100–1080 Animal per diem, copier charges, employee physicals, and DNA analyzer maintenance	36,300
60–1940–1–043 Animal per diem, copier charges, and employee physicals	91,130
11–5000–2074–1A USDA APHIS International Services	22,163
Fiscal Year 2011—From DNDO to NUSTL:	
HSHQDC–11–X–00188 Securing the Cities program	120,000
Fiscal Year 2011—From NPPD to NUSTL:	
HSHQDC–11–X–00254 Shielded Nuclear Alarm Resolution Technology Demonstration and Characterization	83,922
Fiscal Year 2010—From USDA to PIADC:	
60–1940–0–019 Animal care	78,403
10–9100–1080 Costs associated with animal care, employee physicals, and DNA analyzer	27,179
10–9100–0900–1A Foreign Animal Disease Diagnostics	28,144
10–9100–1194–1A North American Foot and Mouth Bank	23,051
Fiscal Year 2010—From TSA to TSL:	
HSTS04–09–X–CT4033 Determine the security applications of a CAT/BPSS device	2,076,073
HSTS04–09–X–CT1331 Develop an initial baseline standard image format	325,000
HSTS02–10–X–MLS112 TSA requires continued support for the additional functionality of the development of the Fedtrak system	1,000,000
HSTS02–09–X–MLS360 Supplemental tests for the Chlorine Rail Tank Car Vulnerability Assessment	100,000
Fiscal Year 2010—From DNDO to TSL:	
HSHQDC–10–X–568 Computed Tomography	544,701

Question 4a. The DHS budget, and especially that for research and development within DHS, is experiencing fiscal pressure. Maximizing the value of research and development expenditures is essential.

What procedures does DHS have in place to guide program managers regarding performing research and development?

Question 4b. What criteria do DNDO and the S&T Directorate use to determine whether industry, academia, a DOE National Laboratory, or a DHS Laboratory should perform the research and development?

Question 4c. How have the results from these investments been assessed on a cost and performance basis?

Answer. The Science and Technology Directorate's (S&T) Value-Added Proposition guides our efforts to maximize the impact of research and development of technologies that will serve DHS's components. The Value-Added Proposition is operationally focused, seeking innovative solutions, and expanding critical partnerships.

To support the Value-Added Proposition, we have established a process of ongoing reviews of our entire research and development portfolio to ensure that we are: (1) Investing in technologies that will significantly improve the Department of Homeland Security's (DHS) efforts to help secure the country and (2) meeting the goals established by our partners in the operating components and the broader Homeland Security Enterprise.

We have committed to an annual review of our portfolio of basic and applied research and development and all proposed new projects. During this annual review we study written materials, hear a presentation by the project manager and carefully analyze the project's likely impact and feasibility (or "riskiness"), judging these attributes against specific metrics determined by DHS's S&T with input from the operating components.

These metrics establish a framework to address elements essential to programmatic success in the context of the DHS missions spelled out in the Quadrennial Homeland Security Review. The framework assesses the project's overall impact on customer mission; transition of products to the field; investment in technology

to position S&T for the future; coordination with customers to align projects with their requirements; and application of an innovative strategy.

Each project is evaluated by a review panel composed of S&T leaders, DHS component representatives, and independent experts. By measuring all of S&T's projects against the framework, we establish a transparent view of all research and development within S&T to enable more strategic, longer-term budget decisions; ensure efficient delivery to the component or individual user; and cultivate effective communication.

Feedback from these reviews highlight areas of strength within each program but also highlight areas for improvement. This provides valuable input to program managers to help improve program management. S&T has seen a substantial improvement in quality over the 2 years the portfolio review has been conducted.

The program managers are also guided by the work of S&T's Knowledge Movement and Process Improvement Office (KMO). KMO developed a comprehensive program management guide; templates for program documents; and a framework for information sharing including a new Sharepoint site that houses all of the program names, descriptions, and key documentation.

Question 5a. Representatives of the DOE National Laboratories serve within DHS in advisory roles, often as temporary "IPA" employees. The National Academy of Public Administration, the DHS Office of Inspector General, and the Government Accountability Office all have highlighted the need for DHS to maintain strong managerial controls in order to maintain transparency in funding activities and to avoid conflicts of interest.

Please describe how DNDO and the S&T Directorate ensure that these representatives avoid conflicts of interest.

Question 5b. How does the S&T Directorate, in performing appropriateness reviews of work sent to DOE National Laboratories, assess and address such potential conflicts?

Answer. The Science and Technology Directorate (S&T) currently has one individual detailed under the Intergovernmental Personnel Act Program (IPA) whose employer is a Department of Energy (DOE) National Laboratory. In accordance with the Intergovernmental Personnel Act, all IPAs are legally required to adhere to all of the ethics statutes and regulations applicable to Federal employees, including the Standards of Ethical Conduct for Employees of the Executive Branch in the Code of Federal Regulations and the criminal conflict of interest statutes as outlined in Title 18 of the United States Code. For example, IPAs must comply with 18 U.S.C. 208 (prohibiting personal and substantial participation in a particular matter in which he or she has a financial interest).

All IPAs, before they are assigned to the Department, including the sole IPA within S&T from a DOE National Laboratory, are required to file an Office of Government Ethics Form 450, Confidential Financial Disclosure Report and to discuss the disclosure report with an ethics attorney prior to appointment. IPAs are also are required to receive an ethics briefing from the Department of Homeland Security's Office of the General Counsel (OGC) Ethics Division upon appointment and annually thereafter.

If the Ethics Official identifies a potential conflict of interest between the candidate's personal financial interests and his/her IPA duties, the Ethics Official notifies the S&T supervisor of the potential conflict, reviews possible options to resolve the potential conflict, and, in consultation with S&T management, determines the appropriate option to resolve the potential conflict.

The Ethics Official works directly with the IPA candidate to resolve the potential conflict.

Any potential conflicts and necessary remedial measures taken to avoid or resolve a conflict are documented by the ethics attorney on the IPA's financial disclosure report. New employee and annual ethics briefings emphasize that employees are prohibited from participating personally and substantially in an official capacity in a particular matter that he/she knows will have a direct and predictable effect on his/her financial interests to include those of a current employer. In addition, the impartiality ethics regulations prohibit an IPA or Federal employee from participating in a Government matter if their current employer is a party to the matter or is representing a party to the matter if a reasonable person would question the IPA's impartiality. Both of these restrictions require the IPA to disqualify from participating without prior authorization from an agency ethics official.

With respect to the IPA from the DOE National Laboratory, as with all IPA appointees, the IPA is bound by the restrictions set forth in the Office of Government Standards of Ethical Conduct for Employees of the Executive Branch in 5 Code of Federal Regulations Part 2635, and the financial conflict of interest statute at 18 United States Code Section 208 with regard to any particular matters pertaining

to his or her employing institution and other conflict of interest laws in Title 18. IPAs are responsible for adhering to the laws and the standards by recusing themselves, if appropriate, if a matter comes to their attention that may have a direct and predictable effect on the financial interests of their employing institution or if their employing institution is a party to a matter to which they are assigned, or representing a party to a matter to which they are assigned. The IPA should alert his/her supervisor of any potential conflicts before participating in a matter. Finally, when the IPA leaves the position with DHS, the Ethics Division is available to provide post-employment counseling to the departing IPA.

The appropriateness reviews that S&T performs for work sent to the DOE National Laboratories do not specifically address potential conflicts of interest. Any conflict of interest would be handled through the ethics process described above by the IPA and his/her supervisor.

QUESTIONS FROM CHAIRMAN DANIEL E. LUNGREN FOR HUBAN GOWADIA

Question 1. In looking at the Domestic Nuclear Detection Office's (DNDO) utilization of the labs over the past few years, it looks like there has been a substantial decline in funding. In fiscal year 2010, your funding to the five Department of Energy (DOE) Labs you use the most was $134 million, and that dipped to $91 million in fiscal year 2011. I understand that fiscal year 2012 will decline further, to almost half of fiscal year 2011. Yet, DNDO's total budget has not been reduced by half.

Can you explain the reason for this change? Does it demonstrate a shift in DNDO's research budgets to other entities or other priorities?

Answer. The reduction of funding going to the DOE Labs in fiscal year 2012 is projected to be $65 million less than the amount obligated during fiscal year 2011. Rather than a shift away from research, this lower amount is a direct reflection of the lower amount of funding appropriated for research and development in fiscal year 2012.

The Transformational Research and Development Accounts alone were reduced by 58 percent, or ($56 million) from the fiscal year 2011 funding levels. DNDO historically has sent approximately 30 percent of the Transformational and Applied Research (TAR) funding to the National Laboratories. In addition, DNDO will spend significantly less than the fiscal year 2011 obligations as a result of lower funding levels in our Systems Development and Systems Acquisition Accounts.

Question 2a. Funding put toward DNDO's Transformational and Applied (TAR) R&D program has been on the decline.

How can DHS sustain an R&D program that meets the unique operational requirements of the Department and its stakeholders? What role do you foresee the labs playing here?

Question 2b. What is the relationship between the transformational research program and DNDO priorities?

Answer. DNDO's Transformational and Applied Research (TAR) budget was relatively level between fiscal year 2007 to fiscal year 2011, but was drastically reduced by 58 percent ($56 million) in the fiscal year 2012 appropriations act. In order to account for this budget decrease, many initiatives were terminated and more were delayed with the anticipation of higher funding in fiscal year 2013. The fiscal year 2013 President's funding request restored the TAR budget to $84 million, which is 87 percent of the fiscal year 2011 level. This increased level of funding will meet the unique Research and Development (R&D) mission to address gaps in the Global Nuclear Detection Architecture (GNDA) and to dramatically improve the performance and reduce the operational burden of nuclear and radiological detection and technical forensics technologies. DNDO's Solution Development Process ensures there is a direct link between TAR's program and DNDO priorities by defining and prioritizing research needs and by performing reviews of on-going and purposed research projects.

The relationship between TAR and the rest of DNDO is unique within the Government, in that TAR work is very closely connected to the strategic development, implementation, and enhancement of the global nuclear detection architecture and National technical nuclear forensics efforts. DNDO brings a holistic approach to the problem of nuclear terrorism, combining multiple functions which are necessary to build a complete nuclear detection capability. In particular, DNDO brings:

- An understanding of the threat with gaps in the architecture to inform current deployment of technology as well as near-term and long-term research, and
- Operational support to end-users to help develop CONOPs, training, exercises, and conduct alarm adjudication.

The National Laboratories play a critical role in support of the TAR research and development mission by providing innovative ideas, establishing technical feasi-

bility, developing prototype systems, and supporting characterization and analysis for transformational and near-term research and development projects:

- DNDO annually releases a competitive Call for Proposals (CFP) for Exploratory Research to the National Laboratories and other Federal centers. The competitive CFP solicits proposals that may lead to dramatic improvements in National capabilities for nuclear/radiological detection and forensics. Topics areas for this research are defined from prioritized gaps in the GNDA, technology needs defined by DNDO and Department of Homeland Security (DHS) operational components, and remaining technology hurdles discovered in prior research.
- National Laboratories are encouraged to compete for project funding exploratory research at the early stages of research and development. National Laboratories have contributed to advances in many technical areas including detector materials development, passive detection techniques, neutron detection and helium–3 replacements, shielded special nuclear material detection, modeling and algorithms, and nuclear forensics.
- In fiscal year 2012, DNDO is supporting 11 Exploratory Research projects at the National Laboratories, focusing on early-stage and basic research that can be developed into new technologies for improving radiation detection capabilities or operations.
- The National Laboratories also provide technical expertise, technology characterization planning, and data analysis support to DNDO's Advanced Technology Demonstration (ATD) Program. This program strives to take innovative technology that has been proven in a laboratory environment from a laboratory bench-top prototype into a full-scale performance test unit, and characterize its performance in a simulated operational environment. Because they have the proper mix of technical expertise and scientific rigor to assist in the development and characterization of advanced technologies, the National Laboratories have played a major role in each of the eight ATD projects initiated to date.

Question 3a. I understand that DNDO may at times find itself in possession of expensive equipment or prototypes that for one reason or another do not get deployed. Some of this equipment, or its components, can be quite expensive. A good example of this is the radiation detection crystals inside portal monitor equipment.

Does DNDO have a mechanism in place to transfer this equipment or its components to the labs, so that even if it is non-deployable, it can at least provide some research value?

Question 3b. If no such mechanism exists, what do you need to make that happen?

Answer. Yes, DNDO has a mechanism to transfer non-deployable equipment or system components to the National Laboratories for research. Section 302 of the Homeland Security Act of 2002 (Pub. L. 107–296) granted the Secretary authority for "establishing a system for transferring homeland security developments or technologies to Federal, State, local government, and private-sector entities." This authority is in addition to the property disposal authorities of the General Services Administration (GSA). The following generally outlines DNDO's process for handling excess equipment, which complies with DHS and GSA property policy:

1. Declare assets "Excess".
2. Determine if the asset should be dismantled for parts/components.
3. Keep desired assets or components in storage.
4. Determine if other entities can use the assets (in the following order):
    - Within DNDO;
    - DHS components;
    - Federal agencies;
    - State & local agencies (as applicable);
    - National Laboratories (emphasis added);
    - Universities.
5. Transfer assets.

As an example, DNDO has transferred excess equipment such as Advanced Spectroscopic Portal (ASP) Low Rate Initial Production units to the Department of Energy's Second Line of Defense Program and the State of Georgia. DNDO has also transferred ASP components (including crystals) to labs and universities to support research and development.

DNDO does not have authority to sell property and retain the proceeds to be applied toward other acquisitions or research and development projects. DNDO has made use of surplus materials as the Government contribution to Cooperative Research and Development Agreements, or as outright transfers.

Question 4. DNDO is fundamentally responsible for helping to safeguard the homeland against a nuclear or radiological attack, primarily by supporting detection

capabilities. Many efforts to detect illicit nuclear activities, supported by other U.S. agencies, are on-going in the international arena.

Does DNDO take advantage of existing assets fielded by other agencies for illicit nuclear activities internationally, and leverage them for homeland security purposes? Does it work with the National Laboratories to do so?

Answer. DNDO cooperates extensively with both U.S. and non-U.S. efforts in the international arena to detect radiological and nuclear material out of regulatory control. Under the framework of the Global Initiative to Combat Nuclear Terrorism (GICNT), which currently numbers 85 partner nations and four international observers including the International Atomic Energy Agency (IAEA), DNDO has led the development of international guidelines and best practices for nuclear detection efforts in the GICNT's Nuclear Detection Working Group chaired by the Netherlands. Developed in concert with the GICNT community, these guidelines leverage best practices from domestic U.S. efforts to enhance our National-level radiological and nuclear detection capability as well as the best practices established at the international level. The National Laboratories are a critical part of the U.S. Government (USG) programmatic assistance to build nuclear detection capacity in the international arena, and thus offer insight into the USG's myriad nuclear detection assistance efforts and are uniquely positioned to inform DNDO's attempts to characterize the GNDA through regional architectural analyses and other studies of transnational issues related to the GNDA.

DNDO has also leveraged the experience of the National Laboratories in testing and characterizing nuclear detection equipment, gathering intelligence information related to radiological and nuclear threats, and developing and implementing nuclear detection architectures.

An example of international and domestic cooperation for radiological and nuclear detection capabilities is the Illicit Trafficking Radiation Assessment Program+10 (ITRAP+10) program. The ITRAP+10 is a partnership between the European Union (EU), the United States, and the IAEA to evaluate the performance of available commercial radiation detection equipment against accepted standards. The EU initiated the program to test EU manufactured equipment to the radiological portion of the IEC standards at the Joint Research Center (JRC) in Ispra, Italy. Since countering nuclear terrorism is a concern to the entire world community, DNDO proposed in 2010 to expand the scope of the test to include all instruments regardless of National origin, and to conduct testing against all sections of the standards (radiological, mechanical, environmental, and electro-magnetic). DNDO has committed funding, subject matter experts, and test facilities to support the expanded scope.

Today, ITRAP+10 is a dynamic partnership between the JRC-Ispra, DHS/DNDO, Department of Energy's Second Line of Defense program (DOE/SLD) and the IAEA, that has embarked on the ambitious project to test nearly 100 commercially-available systems in nine categories of instruments against ANSI and the IEC standards. Presently, testing is being conducted at the JRC, Oak Ridge National Laboratory (ORNL), Pacific Northwest National Laboratory (PNNL) and the Savannah River National Laboratory (SRNL). To harmonize test processes between the European Union and all of the U.S. test facilities, the participating agencies have agreed to share resources and personnel.

Question 5. In a budget environment in which funding is on a general decline, how does DNDO plan to address serious nuclear and radiological threats that academia and the private sector simply do not have the infrastructure to study? What efficiencies can you find to do more with less?

Answer. DNDO uses use all sources of assistance to develop solutions to address nuclear and radiological threats: Private companies, Federal partners, National Laboratories, academia, and our own in-house expertise.

Transformational research and development funding is focused on addressing high-risk or longer-term solutions. DNDO engages with the private sector, National Laboratories, and the academic community to advance fundamental knowledge for nuclear and radiological threat detection and related sciences with emphasis on fundamental research to solve long-term, high-risk challenges or dramatically improve the performance of domestic radiological and nuclear detection systems and enabling technologies

In light of the decreased appropriation for transformational research and development, DNDO's strategy is to allocate funds to the near-term Advanced Technology Demonstration projects to more readily demonstrate the benefits of investment, but at the expense of the much longer-term Exploratory Research and Academic Research Initiative projects in DNDO's portfolio. DNDO will continue to seek to find the appropriate balance between long- and short-term research in this current fiscal environment.

In order to use resources more effectively and capitalize on the advances being made by industry, DNDO's acquisition and commercial engagement strategy will focus on the "Commercial First" initiative to leverage industry development of systems and solutions. This capitalizes on the great strides made by industry in developing new detection technologies and provides insight into operator needs. DNDO will work with industry closely, and share technical requirements and advances in research and development projects that could potentially be integrated into next-generation systems.

QUESTION FROM CHAIRMAN DANIEL E. LUNGREN FOR DANIEL MORGAN

Question. DHS components may have short-term, urgent needs for which they request the help of the labs. It seems that one of the roles of S&T, then, should be to infuse longer-term guidance on how to meet those needs in the context of longer-term R&D needs and evolving threats.

Do you think that S&T has figured out how to play a role in this space?

Has S&T struck a balance of taking requirements from components, integrating them with next-generation threats that components wouldn't necessarily know about, and using the labs or other entities to facilitate the whole spectrum of needed research in a given area?

Answer. When the DHS operational components request assistance from the DOE National Laboratories, they often seek near-term solutions to specific, identified operational needs. This approach may help to ensure that the resulting work is relevant and useful. On the other hand, some laboratory representatives argue that it fails to capitalize on the full range of their scientific and technical expertise. They advocate the use of science and technology to identify long-term needs and opportunities, not just to supply short-term solutions to needs that have already been identified. A longer-term approach could include roles for the S&T Directorate as well as the laboratories themselves.

If the S&T Directorate were to place more emphasis on identifying long-term needs and opportunities, it could benefit from a detailed understanding of the missions of the operational components, as well as from strong relationships with the components to facilitate its infusion of scientific and technical guidance. The directorate's on-going work in systems analysis, which seeks to develop structured models of the activities of DHS operational components, will likely help it to develop a better understanding of their missions. Stronger relationships are explicitly called for by Objective 1.2 of the directorate's 2011 strategic plan: "Strengthen relationships with DHS components and the first responder community to better understand and address their requirements."

The directorate's efforts to meet Objective 1.2 include Apex projects, which are agreed to at the leadership level between the S&T Directorate and an operational component, and the forging of stronger relationships at lower levels between S&T technical experts and front-line operators. In addition, the Integrated Product Team process for involving the operational components in S&T Directorate planning, formerly a keystone of the directorate's prioritization efforts, is still in effect, though less prominently than before. As currently structured, however, all these mechanisms appear to be focused mostly on obtaining input from the operational components, to guide the S&T Directorate's research and development programs, rather than on facilitating a two-way flow of information between S&T and the components. A more two-way approach could help S&T provide long-term scientific and technical guidance and alert the components to next-generation threats and new technology opportunities.

Instead of moving toward a longer-term approach, however, it appears that the S&T Directorate has recently increased its focus on delivering technologies that can meet immediate operational needs. For example, the directorate formerly had a goal of devoting 20% of its resources to long-term basic research. According to DHS officials, this goal is no longer in effect. Rather, the directorate's emphasis is increasingly on near-term technology development, operations analysis, and acquisition support. This trend is evident in directorate initiatives such as technology foraging, in the establishment of an Acquisition Support and Operations Analysis Group in the August 2010 management realignment, and in the establishment of a separate line item for Acquisition and Operations Support in the fiscal year 2012 budget. This shift toward a near-term focus may, in part, result from past criticism by policy-makers that the directorate has been insufficiently successful in transitioning the results of its research and development into fielded applications.