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OVERVIEW OF SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAMS AND PRIORITIES AT THE DEPARTMENT OF HOMELAND SECURITY

HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

MARCH 15, 2011

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OVERVIEW OF SCIENCE AND TECHNOLOGY RESEARCH AND DEVELOPMENT PROGRAMS AND PRIORITIES AT THE DEPARTMENT OF HOMELAND SECURITY

Tuesday, March 15, 2011

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:08 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Benjamin Quayle [Chairman of the Subcommittee] presiding.

RALPH M. HALL, TEXAS
CHAIRMAN

EDDIE BERNICE JOHNSON, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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Subcommittee on Technology and Innovation

An Overview of Science and Technology Research and Development Programs and Priorities at the Department of Homeland Security

Tuesday, March 15, 2011
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Panel 1

Dr. Tara O'Toole
Under Secretary, Science and Technology, Department of Homeland Security

Mr. Warren Stern
Director, Domestic Nuclear Detection Office, Department of Homeland Security

Panel 2

Dr. James Carafano
Director, Douglas and Sarah Allison Center for Foreign Policy Studies, Heritage Foundation

Mr. Marc Pearl
President and Chief Executive Officer, Homeland Security and Defense Business Council

Mr. David Maurer
Director, Homeland Security and Justice Team, U.S. Government Accountability Office

HEARING CHARTER

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION
U.S. HOUSE OF REPRESENTATIVES

An Overview of Science and Technology Research and Development Programs and Priorities at the Department of Homeland Security

TUESDAY, MARCH 15, 2011
10:00 A.M.—12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

On Tuesday, March 15, 2011 the Subcommittee on Technology and Innovation of the Committee on Science, Space, and Technology will hold a hearing to review activities at the Science and Technology Directorate of the Department of Homeland Security (DHS S&T) and the Domestic Nuclear Detection Office at the Department of Homeland Security (DNDO). There will be two panels; one panel will include Administration witnesses from DHS S&T and DNDO providing testimony for each agency, and the other panel will include stakeholders of the DHS enterprise.

Witnesses

Panel I

- **Dr. Tara O'Toole**, Under Secretary of Science and Technology, Department of Homeland Security.
- **Mr. Warren Stern**, Director of the Domestic Nuclear Detection Office, Department of Homeland Security.

Panel II

- **Dr. James Carafano**, Director of the Douglas and Sarah Allison Center for Foreign Policy Studies at the Heritage Foundation.
- **Mr. Marc Pearl**, President and Chief Executive Officer, Homeland Security and Defense Business Council.
- **Mr. David Maurer**, Director of the Homeland Security and Justice Team at the U.S. Government Accountability Office.

Brief Overview

The hearing will examine various elements of DHS S&T including the recent reorganization of the Directorate, the strategic planning process, stakeholder involvement in setting research priorities, and the role of research and development in the DHS S&T portfolio. Many of the areas reflect ongoing interest from Members of the Technology and Innovation Subcommittee.

Background

The Department of Homeland Security's research and development portfolio is concentrated in DHS S&T and DNDO. DHS S&T is responsible for carrying out research on behalf of federal homeland security needs and coordinating this research with other federal research entities.

Science and Technology Directorate (DHS S&T) Spending
(dollars in millions)

Account	FY10 Enacted	FY11 Request	FY12 Request	FY12 Request versus FY10 Enacted	
				$	%
Science and Technology Directorate					
Acquisition and Operations Support	*86.3*	*58.6*	*54.2*	*(32.1)*	*(37.2)*
Laboratory Facilities[1]	*150.2*	*122.0*	*276.5*	*126.3*	*84.1*
Research, Development, and Innovation	*577.4*	*645.7*	*659.9*	*82.5*	*14.3*
University Programs	*49.4*	*40.0*	*36.6*	*(12.8)*	*(25.9)*
Management and Administration	143.2	152.0	149.4	6.2	4.3
Totals:	**1006.5**	**1018.3**	**1176.4**	**169.9**	**16.9**

Domestic Nuclear Detection Office (DNDO) Spending
(dollars in millions)

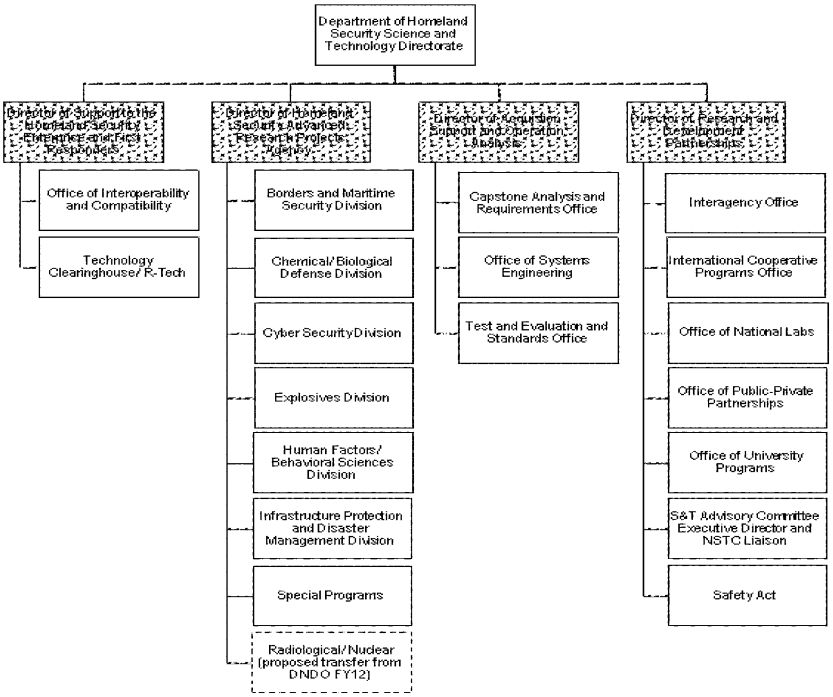
Account	FY10 Enacted	FY11 Request	FY12 Request	FY12 Request versus FY10 Enacted	
				$	%
Domestic Nuclear Detection Office					
Management and Administration	*38.5*	*37.0*	*41.1*	*2.6*	*6.8*
Research, Development, and Operations	*324.5*	*207.8*	*206.3*	*(118.2)*	*(36.4)*
Systems Acquisition	*20.0*	*61.0*	*84.4*	*64.4*	*322*
Totals:	**383.0**	**305.8**	**331.7**	**(51.3)**	**(13.4)**

[1] The FY12 Laboratory Facilities request reflects the initial construction of the National Bio and Agro-Defense Facility (NBAF), the replacement for the Plum Island Animal Disease Center.

The FY 12 budget request for DHS S&T is $1.2 billion and would increase by $170 million or 16.9 percent from the FY 10 enacted. Most of this increase reflects the transfer of research and development programs from DNDO to DHS S&T, which will consolidate all DHS basic research within DHS S&T. The FY 12 budget request for DNDO is $331.7 million, an overall reduction of $51.3 million or 13.4 percent. This includes a transfer of $108.5 million from the Transformational Research and Development account to DHS S&T. This transfer was also proposed in FY 11. If the DNDO transfer and funding for the construction of the NBAF is removed, the DHS S&T budget request represents an 11 percent decrease from FY 10 enacted.

Organization of the Science and Technology Directorate

DHS S&T is currently comprised of four groups that address basic research through advanced technology development and transition. An organizational realignment took place effective in late 2010.



Issues and Concerns

Science and Technology Research and Development Prioritization

Witnesses will discuss the methods and criteria used to develop long-term basic research and development priorities at DHS S&T and how these methods and criteria may be improved. Concerns continue to emerge in the current budget environment that in responding to immediate needs, DHS has experienced challenges in pursuing basic research and development that could potentially help aid the development of the innovative long-term capabilities needed to protect the homeland years down the road. In addition, witnesses will assess how research priorities align with the needs of DHS stakeholders, and how the Department coordinates its efforts with other federal research entities.

Reorganization Impacts and Implications

The Subcommittee has requested that witnesses address the impact of the changes that have occurred at DHS S&T following the Quadrennial Review[2] and the Bottom-Up Review[3], including the 2010 realignment of DHS S&T, and the recent portfolio analysis.

Stakeholder and Private Sector Engagement

DHS S&T has cited an increased emphasis on partnerships to increase the efficiency and timeliness of delivering needed capabilities. Witnesses will address the manner in which DHS S&T and DNDO collaborates throughout the various DHS offices, as well as the relationship and interaction between DHS science and technology programs and the private sector. Also, the Subcommittee has asked witnesses to discuss the manner in which DHS responds to customer and stakeholder needs through collaborative agency partnerships.

Science and Technology Informing DHS Program Decisions

The Subcommittee has requested that witnesses address the DHS research and development information provided in the recent GAO report: "Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue".[4] The GAO has identified concerns regarding the manner in which DHS completes testing and cost-benefit analyses in the acquisition process. One of S&T's FY 12 strategic initiatives is focused on acquisition support. Specifically, DHS S&T has established an Acquisition Support and Operations Analysis group. The Subcommittee has asked witnesses to discuss the current and potential role of science and technology research and development programs at DHS in supporting the technology acquisition programs of the Department and whether a more active role for DHS S&T could assist with reducing costs affiliated with acquisition programs.

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[2] Department of Homeland Security, Science and Technology Directorate, *Quadrennial Homeland Security Review Report: A Strategic Framework for a Secure Homeland,* February 2010,

[3] Department of Homeland Security, Science and Technology Directorate, Bottom-Up Review Report, July 2010, *http://www.dhs.gov/xlibrary/assets/bur—bottom—up—review.pdf.*

[4] http://www.gao.gov/new.items/d11318sp.pdf

Chairman QUAYLE. The Subcommittee on Technology and Innovation will come to order.

Good morning, everybody. Welcome to today's hearing entitled "An Overview of Science and Technology Research and Development Programs and Priorities at the Department of Homeland Security." In front of you are packets containing the written testimony, biographies and truth in testimony disclosures from today's witnesses.

Before we get started, this being the first meeting of the Technology and Innovation Subcommittee for the 112th Congress, I would like to ask the Subcommittee's indulgence to introduce myself and welcome Members. It is an honor and a pleasure for me to chair the Technology and Innovation Subcommittee for this Congress and it is a position that I do not take lightly. I want all Members of this Subcommittee to know that my door is always open and that I will endeavor to serve all Members fairly and impartially. I will also work to serve the best interests of all Americans and this Congress to ensure that the agencies and programs under our jurisdiction are worthy of the public's support.

Today's hearing includes two panels. Our first panel will feature Department of Homeland Security Under Secretary for Science and Technology Dr. Tara O'Toole, and Mr. Warren Stern, Director at the Department's Domestic Nuclear Detection Office. Our second panel will feature Dr. James Carafano from the Heritage Foundation, Mr. Marc Pearl from the Homeland Security and Defense Business Council, and Mr. David Maurer, Director of the Homeland Security and Justice Team at the U.S. Government Accountability Office.

I now recognize myself for five minutes for an opening statement. I would like to welcome everyone to today's hearing, my first as chairman of the Subcommittee on Technology and Innovation. I look forward to working with you. We have a distinguished panel of witnesses before us who will discuss the Department of Homeland Security's research and development programs. At the outset, I wish to extend my appreciation to each of our witnesses for taking the time and effort to be here and appear before us today. Please know that your testimony will help the Members of this Subcommittee understand the strategic direction of research and development at the department, and determine how Congress can support efforts to ensure the security of our homeland.

I am pleased to discuss activities at the Science and Technology Directorate and the Domestic Nuclear Detection Office at the Department of Homeland Security. The hearing will examine the recent reorganization of the Science and Technology Directorate, the strategic planning process, stakeholder involvement in setting research priorities and the role of research and development in the DHS S&T portfolio. Many of these areas reflect ongoing interest from Members of the Subcommittee. There will be two panels. The first panel will include Administration witnesses from DHS S&T and DNDO, and the second panel will include stakeholders of the DHS enterprise.

This Subcommittee has always encouraged Administration witnesses to testify on panels with non-governmental witnesses, allowing for a beneficial interaction amongst stakeholders. While it is

unfortunate that the two panels couldn't have served together this morning to provide a more cohesive conversation, the Subcommittee appreciates the opportunity to hear from both industry experts and senior agency officials.

I note that the budget requests for DHS S&T and the DNDO in fiscal year 2012 cumulatively represent more than $1.3 billion. DHS S&T's budget would increase by 17 percent, however, most of this increase reflects the transfer of research and development programs from DNDO to DHS S&T. Excluding the DNDO transfer and new funding for the construction of a National Bio and Agro-Defense Facility, the DHS S&T budget request represents an 11 percent decrease.

In the current budget environment, there continue to be concerns that DHS is having difficulty responding to immediate needs, while also pursuing basic research and development that can help with the long-term capabilities needed to protect the homeland in the future.

In my home State of Arizona, violence and security issues along the border are, tragically, a regular occurrence. In a recent study conducted by the Government Accountability Office, the Border Patrol reported that only 44 percent of the border was under operational control. This has to be improved. I am particularly interested in learning about the research and development activities conducted by the DHS components before us today that support border security, as well as border crossing efficiency. How can we find ways to reduce the cost of maintaining our safe borders? Are technologies being developed to help support safe and secure crossings?

Thanks again to our witnesses, and I look forward to a productive conversation.

[The prepared statement of Mr. Quayle follows:]

PREPARED STATEMENT OF CHAIRMAN BEN QUAYLE

Good morning. I'd like to welcome everyone to today's hearing, my first as Chairman of the Subcommittee on Technology and Innovation. I look forward to working with you all.

We have a distinguished panel of witnesses before us who will discuss the Department of Homeland Security's research and development programs. At the outset, I wish to extend my appreciation to each of our witnesses for taking the time and effort to appear before us today. Please know that your testimony and wisdom will help the Members of this Subcommittee understand the strategic direction of research and development at the Department, and determine how Congress can support efforts to ensure the security of our homeland.

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Thanks again to our witnesses, and I look forward to a productive discussion. With that, I now recognize the gentleman from Oregon, Mr. Wu, for his opening statement.

Chairman QUAYLE. With that, I now recognize the gentleman from Oregon, Mr. Wu, for his opening statement.

Mr. WU. Thank you very much, Chairman Quayle.

As this is our first hearing of this Congress of this Subcommittee, I want to take a moment to welcome you to the Full Committee and to this Subcommittee. We have already had a fruitful private meeting. I look forward to working with you and to find common ground on many of the important issues that fall within this Subcommittee's jurisdiction.

I want to thank also Mr. Lujan, who will be the ranking member for the second half of this meeting. Here in the Congress, March Madness refers not only to basketball, but also to this pressing period when so many of our constituents come to Washington, D.C., for about a month-and-a-half to two-month period.

And finally, I want to thank our first panel, Under Secretary O'Toole and Director Stern, for appearing before us today. I do believe that this marks the first time that either one of you has appeared before this Subcommittee, so welcome. I look forward to hearing your testimony.

In fact, I couldn't be more pleased that our first hearing is on research and development at the Department of Homeland Security. The work that you do is critically important, literally life and death. It is work to keep the American people and our first responders safe. Precisely because the work you do is so important, we hold you to the highest of standards. We can't and should not ignore the problems that have plagued both the Science and Technology Directorate and the Domestic Nuclear Detection Office in past years. However, I do believe that both of you are taking energetic steps to get the components of your programs on the right track and I commend each of you for that.

That being said, we need to do everything we can to make sure that things continue to improve. When I was chairman of this Subcommittee, I repeatedly expressed concern that the S&T Directorate did not effectively prioritize its research activities and I questioned whether its investments were targeted first to the most critical threats. I also criticized the Directorate for not being sufficiently responsive to the needs of its customers, its end users, par-

ticularly first responders, when developing new technologies, making research decisions and taking deployment issues into account.

I recognize that efforts are well underway to address these problems, including the reorganization that was implemented late last year and the creation of the first responder IPT. I want to know when we can expect the rubber to hit the road with respect to these efforts and start seeing results. I also want to get an update on the status of your strategic planning efforts. When the Directorate last testified in front of this Subcommittee in 2009, we were told that a new and improved strategic plan was under development to supplement or replace the 2007 plan, which really wasn't of a long-term strategic nature, but here we are a year and a half later and we do not have an updated strategic plan in hand. I also want to learn about any new efforts including those reflected in the fiscal year 2012 budget request to carry our your responsibilities more efficiently and, more importantly more effectively.

I also look forward to hearing from our second panel of witnesses about additional steps that the Directorate can take. In the past, I have also made my concerns clear over the testing and evaluation of technologies at DHS within the S&T Directorate, DNDO and other DHS components and the extent to which the results of those tests are guiding acquisition decisions. Is the testing rigorous enough? Is DHS evaluating the likelihood that a new technology will be accepted by those who will use it?

Today I hope that we can get a good sense of what, if anything, S&T and DNDO are doing to help ensure that DHS's testing and evaluation shortcomings are indeed a thing of the past.

Thank you again for being here and I look forward to your testimony.

[The prepared statement of Mr. Wu follows:]

PREPARED STATEMENT OF RANKING MEMBER DAVID WU

Thank you, Chairman Quayle. As this is our first hearing of the Congress, I want to take a moment to welcome you. I am confident that we will find common ground on many of the important issues that fall within this subcommittee's jurisdiction, and look forward to working with you.

I also want to thank our first panel, Under Secretary O'Toole and Director Stern, for appearing before us today. I believe this marks the first time that either of you have appeared before this subcommittee, so welcome. I look forward to hearing your testimony. In fact, I couldn't be more pleased that our first hearing is on research and development at the Department of Homeland Security. The work that you do is critically important—literally, life and death. It is work to keep us, our constituents, and our first responders safe.

Precisely because the work you do is so important, we hold you to the highest of standards. We can't—and shouldn't—ignore the problems that have plagued both the Science & Technology Directorate and the Domestic Nuclear Detection Office in the past. However, I believe that both of you are taking the steps that need to be taken to get your components on the right track, and I commend each of you for that.

That being said, we need to do everything we can to make sure that things continue to improve. When I was chairman of this subcommittee, I repeatedly expressed concern that the S&T Directorate did not effectively prioritize its research activities and questioned whether its investments were targeted to the most critical threats. I also criticized the Directorate for not being sufficiently responsive to the needs of its customers, particularly first responders, when developing new technologies and making research decisions.

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In the past, I have also made clear my concern over the testing and evaluation of technologies at DHS—within the S&T Directorate, DNDO, and other DHS components—and the extent to which the results of those tests are guiding acquisition decisions. Is the testing rigorous enough? Is DHS evaluating the likelihood that a new technology will be accepted by those who will use it? Today, I hope that we can get a good sense of what, if anything, S&T and DNDO are doing to help ensure that DHS's testing and evaluation shortcomings are a thing of the past.

Thank you again for being here. I look forward to your testimony.

Chairman QUAYLE. Thank you, Mr. Wu.

If there are Members who wish to submit additional opening statements, your statements will be added to the record at this point.

At this time I would like to introduce our first panel of witnesses and then we will proceed to hear from each of them in order. Our first witness is Department of Homeland Security Under Secretary for Science and Technology Dr. Tara O'Toole. Prior to serving at DHS S&T, Dr. O'Toole was the CEO and Director of the Center for Biosecurity at the University of Pittsburgh Medical Center and Professor of Medicine and of Public Health at the University of Pittsburgh. Next we will hear from Mr. Warren Stern, the Director at the department's Domestic Nuclear Detection Office. Prior to joining DNDO, Mr. Stern served as the head of the International Atomic Energy Agency's Incident and Emergency Centre, where he led international efforts to prepare for and respond to nuclear and radiation emergencies.

Thanks again to our panel for being here this morning. As our witnesses should know, spoken testimony is limited to five minutes each. After all witnesses have spoken, Members of the Committee will have five minutes each to ask questions.

I now recognize our first witness, Dr. Tara O'Toole, Under Secretary for Science and Technology at the U.S. Department of Homeland Security.

STATEMENTS OF DR. TARA O'TOOLE, UNDER SECRETARY, SCIENCE AND TECHNOLOGY, DEPARTMENT OF HOMELAND SECURITY

Ms. O'TOOLE. Thank you, Mr. Chairman, Ranking Member, distinguished Members of the Committee. It is a pleasure to be here today to talk to you on behalf of the Department of Homeland Security about the Science and Technology Directorate of which I became Under Secretary November 2009.

S&T, as we refer to the Directorate, was one of the few pieces of the Department of Homeland Security to be created de novo in 2002 by an act of Congress, and it was given a huge task, that is providing research and development for all of the activities of this enormously broad set of missions which is the Department of Homeland Security. So we remain a young organization but I think

we have evolved considerably over the past nine years and continue to do so.

With your permission, Mr. Chairman, I would ask that my written testimony be entered into the record and I will summarize briefly some of the highlights.

S&T is responsible for conducting all of the research and development, both basic and applied, needed by the components, the operating components, of the Department. We also have a statutory responsibility to serve the science and technology needs of the larger Homeland Security enterprise including first responders and other State and local entities who have to respond to disasters, intercept illegal aliens, et cetera, et cetera.

I want to make clear that although we do a lot of work in developing or adapting technologies for use by Homeland Security, we also have a big responsibility to do assessments, analyses and develop knowledge products such as the bio threat risk assessment for the Department and for the entire Federal Government.

S&T acts as the technical core of the Department of Homeland Security. Many of our operating components do not have rich R&D histories or experience bringing technology available in the public sector or in the private sector or being developed by universities into use, and we are their principal advisor in that endeavor and we hope to become ever more useful to the operating components in that capacity.

We also maintain fundamental research investments in S&T in Homeland Security-related endeavors, particularly through our maintenance and funding of the Centers of Excellence, which now comprise over 200 universities across the country.

This exceptional breadth of the Homeland Security mission which we are charged to serve and the urgency of the operational needs in DHS which we are trying to meet not only by increasing the capabilities of DHS components through new technologies but also by making their operations more effective, more cost efficient and safer requires us to be very clear about our priorities, to constantly reevaluate where we are investing and how we are doing and to be as efficient as we can within S&T as is feasible. We have R&D projects ongoing now in all five DHS mission areas: counterterrorism, border security, immigration, cybersecurity and disaster resilience. We have undertaken a strategic planning process and a realignment of the structural organization of S&T to help us deliver products and technologies to use in the field. Our first priority in that strategic planning was to deliver products to use in the field.

There is, as is well known in R&D worlds, a very difficult transition, often referred as the valley of death that occurs after you have developed a successful prototype of a new technology that has been proven to work in an operationally realistic setting and deployment of that technology on a wide scale for routine use. Crossing that valley of death has many aspects to it, and we are very mindful of these different facets of transition in S&T but we have done a number of things to try and make that transition faster and more likely.

First of all, we know from lots of experience in the R&D world generally that it is critically important to understand your user's

needs in detail and with fidelity. We are making several moves to make sure that we understand what the components' mission needs are. Translating those needs into testable requirements against which you can build technologies is another critical step, and we have reorganized to create an office of operational analysis and acquisition support to help the components do just that: develop clear, testable requirements.

Secondly, we are instituting a much more far-reaching and disciplined process of what we call technology foraging. We want technologies very quickly within a year or two but the usual R&D process to go from an idea developed on a laboratory bench to use in the world is about a decade, on average. So we want S&T to become extremely disciplined and very efficient at scanning the whole environment of available technologies in the commercial sector, in universities and other uses in the federal agencies and so forth to make sure that there isn't something out there that we can go and get and adapt to DHS uses. We do technology foraging now. We are going to become more disciplined, more effective and more far-reaching at it. An example of this is our new partnership with In-Q–Tel, which I would be happy to talk more about, but I want to end with a note on first responders.

I am very focused on meeting their needs as required by the Homeland Security Act. I think we all recognize that their needs are different from those of the DHS components. Being a firefighter in a small town in Arizona is very different from meeting the requirements implicit in firefighters in New York City. So we have stood up a component office that is specifically focused on understanding the first responders' needs and delivering to them the knowledge products and the technologies that they most require, again in a timely and efficient way, and the head of that office is himself a former fire chief of Loudon County with a Ph.D..

Mr. Chairman, I would be happy to answer further questions but I think I will stop there for now.

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

PREPARED STATEMENT OF DR. TARA O'TOOLE

Strategy and Goals of the DHS Science and Technology Directorate

Good afternoon, Chairman Quayle, Ranking Member Wu, and distinguished Members of the Subcommittee. I am honored to appear before you today on behalf of the Department of Homeland Security (DHS) Science and Technology Directorate (S&T). My testimony will describe the Directorate's strategic direction and top priorities, as well as some of the challenges facing our comparatively modest research and development (R&D) organization in our efforts to support the third largest federal agency.

Mission of the DHS S&T is Broad, Varied and Serves Many Partners

The mission of the S&T Directorate is to:

Strengthen America's security and resiliency by providing knowledge products and innovative technology solutions/or the Homeland Security Enterprise. [1]

Congress created S&T as part of the Homeland Security Act of 2002 to "conduct basic and applied research, development, demonstration, testing, and evaluation ac-

[1] The Homeland Security Enterprise is defined in the Quadrennial Homeland Security Review (QHSR) as "the Federal, State, local, tribal, territorial, nongovernmental, and private–sector entities, as well as individuals, families, and communities who share a common national interest in the safety and security of America and the American population".

tivities relevant to any or all elements of the Department". S&T also has a statutory responsibility to transfer useful technologies and information to state and local governments, the first responder community and the private sector. During the past eight years, S&T has undergone many changes and continues to mature. Because DHS's mission is so broad, S&T's work must address a wide and varied range of programs. DHS is primarily an operational agency, and its components need analyses and technologies that provide near-term improvements in operational effectiveness; our staff serves as the technical core of the Department. Moreover, some of S&T's most important contributions are not technologies alone, but knowledge products-assessments of technical problems or feasible solutions; analyses of complex issues; objective tests of proposed technologies; and the creation of consensus standards which enable cost-effective progress across many fields.

S&T Strategic Planning Process and Key Goals

Shortly after I was confirmed as Under Secretary, S&T instituted an inclusive and comprehensive strategic planning process. All S&T employees were invited to participate in a questionnaire, and interviews were held with Congressional staff, first responder representatives, and leaders of the DHS components. We also held two off-site meetings to have more in-depth conversations with S&T senior executives and project managers. We heard similar messages from many directions, and used this input to establish our key goals for the next year. These are described below:

S&T Goal #1 – Rapidly develop and deliver knowledge, analyses, and innovative solutions that advance the mission of the Department.

This first goal is intended to place a strong emphasis on transitioning products to use in the field -a goal which is in keeping with the intense operational focus of the Department and the need for near-term improvements in operational capabilities, efficiencies and security. Research and development efforts are notoriously unpredictable. Research is inherently about discovery -but this path is rarely linear or straightforward. By its very nature, R&D takes a long time. The usual estimate of the time required for a "new idea"–a novel understanding of how nature works–to be translated into effective technologies is about a decade, which is longer than S&T has been around. To implement the goal of transitioning products to use in the field, S&T must do three things well:

- We must become "best in class" at technology foraging.
- We must invest more resources on the "back end" of R&D projects, i.e. on transitioning projects through operational testing and pilots to adoption by the customer.
- We must closely manage individual projects and continuously review our entire R&D portfolio to ensure projects are making clear progress and that we are investing in high impact projects for DHS.

Becoming Best-in-Class at Technology Foraging

Technology foraging refers to a complex process of scanning the horizon for technologies that are already in use or being developed, and adopting these technologies for new purposes, new environmental conditions, or at new scales. Technology foraging leverages the work being done in other federal agencies, at universities, by our international partners, and in industry against possible applications to DHS needs. The breadth and scope of DHS's mission, requires us to look at the good ideas and investments being made by others, to forage for solutions among existing ideas and technologies, and harvest them in the most cost-effective way possible. It is an extremely challenging task because of the vast and continuously shifting body of R&D unfolding in public and private sectors around the world. However, when done correctly, technology foraging can have a large impact on S&T's efficiency and effectiveness.

Technology foraging has always been a part of S&T and has yielded some significant successes in the past year. For example, through our Integrated Product Team (IPT) Process, the U.S. Coast Guard (USCG) identified a need to be able to track small vessels approaching a seaport. While most large vessels have tagging systems for identification, there is a gap in our capability to track small vessels with no tag. Drug running and other illicit activities will use craft that lack the required communication and tracking devices. These "dark boats" represent a significant security and law enforcement challenge. S&T, in partnership with the National Oceanic and Atmospheric Administration (NOAA) and USCG, has developed software that can

use currently deployed coastal NOAA weather radar systems to process the radar signal differently, enabling the USCG to identify and track small vessels. This is a new capability for the USCG that was realized with a relatively small S&T investment and leverages the already-deployed NOAA radar infrastructure.

Another example is the investment in software by the Department of Defense (DOD) to predict high threat areas in Iraq where improvised explosive devices may be placed. S&T has worked with DOD to alter those computer programs so they can identify commercial aviation routes most at risk to a potential attack by analyzing flight information data, suspicious activity and other intelligence indicators. This information is used to help determine on which flights Federal Air Marshals should be deployed.

We plan to institutionalize technology foraging best practices to ensure we harvest the best technologies, at the lowest cost, and in the timeliest manner possible.

Leveraging the Private Sector to Maximize Efficiency

S&T has also begun engaging with the private sector through its investments in In-Q–Tel. In 1999, the CIA supp0l1ed the establishment of In-Q–Tel as a not-for-profit strategic investment firm designed to bridge the gap between new advances in commercial technology and the technology needs of the U.S. intelligence and security communities. Most In-Q–Tel investments combine funds from more than one partner agency, allowing S&T to leverage significant investments from the Intelligence Community. According to In-Q–Tel's figures, $1 of government investment can attract over $10 in private-sector funding. In addition to rapidly delivering innovative technologies to their government customers, In-Q–Tel also supports small businesses that may not normally work with the government. In-Q–Tel estimates that following investments via In-Q–Tel, companies have created more than 10,000 jobs.

Overcoming Hurdles in Project Management

Research and development efforts often confront difficulties when crossing the "valley of death"-the phase of technology development between the creation of a successful prototype and the routine use of the technology in operational environments. There are many reasons for this gap. Successfully transitioning projects demands a close working relationship with the customer and a deep understanding of the operational needs and constraints associated with the problem to be solved. To better bridge this gap, it may be necessary on a case-by-case basis for S&T to bear some of the costs of operational testing and piloting of new technologies. This could shift S&T spending to fewer projects as well as a continuous assessment of projects' progress.

Apex Projects Solve Strategic Component Needs

S&T must also ensure that R&D investments meet the longer-term strategic needs of DHS and first responders. This is a challenging task in an environment where urgent operational needs are constantly pressing. To this end, and to provide DHS Component leaders with an understanding of S&T capabilities, we have instituted "Apex" projects, which are intended to collaboratively solve a problem of strategic operational importance. Each Apex project is a joint agreement between the head of a DHS operational component and me. Together, we must approve the project's goals and approach, providing a leadership imprimatur which energizes both S&T and the partner organization. Apex programs are team-based and interdisciplinary. Best practices learned in these projects will be documented and infused throughout the rest of our activities. S&T already has one Apex project underway, focused on improving the protective mission of the U.S. Secret Service. Another under development is a partnership with U.S. Customs and Border Protection to develop a secure transit corridor for goods shipped between Mexico, the U.S., and Canada.

Ongoing Review of the R&D Portfolio

To ensure that individual R&D projects are meeting the goals established by our partners in the operating components and the broader homeland security enterprise (HSE), S&T has committed to an annual review of our portfolio of basic and applied R&D and all proposed "new start" projects. The review process consists of written materials, an oral presentation by the project manager, and careful analysis of the project's likely impact and feasibility (or "riskiness") as judged against specific metrics determined by S&T with input from the operating components. These

metrics are designed to address elements essential to programmatic success in the context of the DHS's QHSR missions, namely:

- *Impact:* Is our portfolio making a significant impact on our customer's mission?
- *Transition:* Are we transitioning relevant products to the field?
- *Technical Positioning:* Is our investment positioning the organization for the future?
- *Customer Alignment:* Are our projects aligned with well-understood customer requirements?
- *Customer Involvement:* Do we have the appropriate level of customer interaction?
- *Innovation:* Are we sufficiently innovative in the way we approach our challenges?

A review panel of S&T leaders, the DHS Component representatives, and outside experts evaluates and rates each project. By measuring all of our projects against this framework, we will: provide a transparent and "shareable" view of all R&D within S&T; enable more strategic, longer-term budget decisions; ensure efficient delivery to the component or end user; and nurture effective communication throughout the process. This particular review model has been used by both federal and private R&D organizations, including the prize-winning Army Engineering, Research and Development Laboratory.

S&T Goal #2 – Leverage technical expertise to assist DHS Components' efforts to establish operational requirements, and select and acquire needed technologies

A critical part of successfully transitioning technology is gaining an accurate understanding of the customer needs at the beginning of the project. This is true not only for the technology products that S&T develops, but also for more near-term technologies that components may acquire from the commercial sector. In both cases, the specification of operational requirements is critical. While S&T has been statutorily designated the important role of independent Test and Evaluation authority within the DHS, this role addresses the "back end" of acquisition programs. S&T is currently working with the DHS Under Secretary for Management on a plan to use our collective expertise and resources to better address the "front end" of the acquisition cycle, namely, the translation of mission needs into testable requirements. To focus efforts in this area, S&T has established an Acquisition Support and Operations Analysis (ASOA) Group to provide a full range of coordinated operations analysis, systems engineering, test and evaluation, and standards development support to the DHS Components.

S&T Goal #3 – Strengthen the Homeland Security Enterprise and First Responders' capabilities to protect the homeland and respond to disasters

In addition to serving the technical needs of the DHS Components, S&T is also committed to addressing the needs of the larger HSE–especially first responders–for technologies and knowledge based on the best science. The nation's first responder community incorporates a range of organizations, including law enforcement, fire suppression, emergency management, search and rescue, emergency medicine and public safety communications. Despite a wide array of defined responsibilities, their job descriptions vary dramatically based on geography, population, and climate. Above all, they are the groups we call upon to tackle unexpected events as they occur in real time, and must therefore maintain a wide breadth of expertise, adapt at a moment's notice, and protect citizens' lives. Additionally, communication poses significant challenges with first responder groups because of varying local, state, and national levels of hierarchy. Realizing this, S&T has made serving the homeland security needs of first responders a top priority. To this end, we have created an organization dedicated to understanding first responders' operational needs and delivering technologies, knowledge products, and services to the first responder community. Many of these technologies target improved interoperability, such as Virtual USA for federal, state, and local data sharing and multi-band radios for voice interoperability. They also range from everyday technologies, such as a lightweight self-contained breathing apparatus for firefighters, to standards that many local agencies may only need occasionally, such as white-powder response standards.

S&T Goal #4 – Conduct, catalyze, and survey scientific discoveries and inventions relevant to existing and emerging homeland security challenges

Supporting 12 University Centers of Excellence

S&T relies upon the University Centers of Excellence (COEs) -a consortium of universities and colleges -to tap the expertise and resources of academia to provide critical homeland security tools, technologies, training, and talent. The COEs maximize S&T's investment by working closely with academia, industry, the DHS components, and first responders to develop customer-driven research solutions. Their collective portfolio is a mix of basic and applied research addressing both short-and long-term needs. To better tackle urgent needs, the DHS components can directly engage the COEs for specific research. To date, these DHS offices have invested a total of $22.6 million in targeted research programs, resulting in over 70 technologies for use across the HSE.

Investing in the Homeland Security Workforce of the Future

S&T's university-based educational programs develop essential scientific and technical expertise through a suite of scholarship, fellowship, and research opportunities. These programs prepare the next generation of scientific and engineering leaders to work in the homeland security arena.

S&T's Minority–Serving Institution (MSI) programs engage traditionally underserved universities in research and education to confront homeland security challenges and ensure that the face of America is reflected in the future homeland security science and engineering workforce. Our MSI Scientific Leadership Awards are designed to incorporate select MSIs into the fabric of the COEs and provide a path to technological employment for MSI students.

S&T Goal #5 9 Foster a culture of innovation and learning in S&T and across DHS that addresses challenges with scientific, analytic, and technical rigor

Build a Culture of Innovation and Learning

The development and translation of science and technology from ideas to products requires technical competence, creativity, agility, sustained effort and strong teamwork. To maintain a high level of success, S&T needs to constantly evolve. We have to approach R&D problems from a multidisciplinary and collaborative perspective that can only be achieved by having experts from all fields working at close proximity in an open environment.

S&T is working to truly achieve an ecosystem of innovation. We encourage collaboration through Apex projects that bring together teams of experts from all of our groups to focus on a single critical problem highlighted by our DHS partners. S&T is increasing the interaction between our program managers and Component operations to better understand operational constraints and conditions and deliver cross-cutting products.

We have recently expanded our access to online scientific journals, which are the lifeblood of scientific discourse. And we are reworking offices and collaborative spaces to create a more open environment while introducing new technologies that can help us communicate ideas and viewpoints. Our staff is highly educated and technical; however, that high level of technical knowledge is perishable. Scientists must constantly stay in tune with new developments in the field. We are starting new programs at our COEs to encourage our employees to pursue advanced degrees, increasing S&T's expertise and effectiveness.

Realignment of S&T

New Structure Emphasizes Cross–S&T Communications and Teamwork

The structural realignment of S&T provides the organizational framework needed to implement our top strategic goals. The number of direct reports to the Under Secretary was reduced from 21 to 10, streamlining the chain of command. This structure allows for efficient interaction among four "Group Leads," and creates a leadership cadre that spans the extent of S&T's work.

The four Group Leads are:

Homeland Security Advanced Research Projects Agency (HSARPA)

The HSARPA Office includes seven technical divisions:

- Borders and Maritime Security
- Chemical/Biological Defense
- Cybersecurity
- Explosives
- Human Factors/Behavioral Sciences
- Infrastructure Protection & Disaster Management
- Special Projects (Classified and Intelligence-related programs)

The former office of cybersecurity has been elevated to a division within HSARP A. Uniting all of the technical divisions will encourage collaboration across divisions, and enable the interdisciplinary work that is required for today's R&D.

Homeland Security Enterprise and First Responders Group

As discussed in our goal to strengthen first responders' capabilities, S&T realizes that it takes a unique mindset, direct experience and an operating structure different from traditional R&D to understand and serve first responders. The first responder community is broad and varied and their challenges and opportunities differ from those of federal agencies.

By establishing this Group, S&T will be able to respond to the different needs, acquisition methods, implementation requirements, and management structure of first responders. This group will put particular focus on improved best practices, standards for equipment and interoperability, and information sharing. Finally, the Group includes a leader and staff who have first responder backgrounds, including some who work or volunteer part-time in the field when not working at S&T. This Group consists of:

- Office for Interoperability and Compatibility
- Office of First Responder Technology Clearinghouse

Acquisition Support and Operations Analysis (ASOA) Group

Establishing the ASOA Group is part of the next evolution of S&T. My predecessor performed an invaluable service by connecting S&T projects to the operational DHS Components, developing the IPT process to identify component technology needs, and linking S&T investments to those needs. The ASOA Group will leverage S&T's critical mass of technical capability within DHS and will work with the Under Secretary for Management to: aid the components in developing high-fidelity, testable operational requirements for their acquisitions; aid in executing an analysis of alternatives to ensure that the most appropriate technical approach is taken; and partner with the components throughout an acquisition so that user needs are translated into real capabilities that can be validated upon delivery and deployed without delay. To do this, we've established three elements within ASOA:

- Capstone Analysis and Requirements Office
- Systems Engineering Office
- Test and Evaluation and Standards Division
- Research and Development Partnerships Group (RDP)

The Research and Development Partnerships Group is comprised of:

- Interagency Office
- International Cooperative Programs Office
- Office of National Labs
- Office of Public-Private Partnerships
- Office of University Programs

The RDP was created to ensure that S&T has a rich "situational awareness" of- and is able to use and leverage–the scientific research and technology development occurring in the public and private sectors, across federal agencies, and in the international sphere. Furthermore, through RDP, S&T is fostering an openness to work collaboratively with these partners on challenges facing the Department.

The Office of Public-Private Partnerships continues to increase its outreach to the private sector, gathering a growing repository of capabilities from over 500 small businesses potentially aligned to DHS technology needs. S&T's Small Business Innovation Research (SBIR) program and Long Range Broad Agency Announcement contracting vehicle are open solicitations designed to seek private sector ideas and technologies. Responses are reviewed by the S&T technical divisions seeking technologies that may be further developed with S&T funding.

This outreach has already been a success. This year, an S&T staffer was awarded one of the eight Small Business Administration's 2011 Tibbetts Award for outstanding service to small businesses in the SBIR program.

The RDP acts as a critical portal to S&T, providing commercial entities with easy access to the information on DHS needs, while enabling S&T program managers to make connections across the entire horizon of R&D. RDP also allows S&T to leverage the investments and innovations of other federal agencies, foreign governments, universities and the private sector through mutually beneficial partnerships.

Conclusion

S&T strives to provide cutting edge scientific knowledge, technical analysis, and innovative technologies to the third largest federal agency, to first responders, and to the HSE. The missions and technical needs of homeland security are broad in scope, varied, and constantly evolving. To meet the challenges of this mission, S&T must also evolve. I believe that the implementation of the strategic plan and our organizational realignment are important steps toward realizing the technical needs of homeland security.

Thank you for inviting me to appear before you today. I look forward to answering your questions and to working with you on S&T's evolving strategic direction and other homeland security issues.

BIOGRAPHY FOR DR. TARA O'TOOLE

Dr. O'Toole was sworn in as Under Secretary of the Science and Technology (S&T) Directorate at the Department of Homeland Security on November 12, 2009.

Created at the same time as the Department, S&T's mission is to strengthen America's security and resiliency by providing knowledge products and innovative technology solutions for the Homeland Security Enterprise. S&T's partners comprise the Department of Homeland Security's operational components; first responders; the private sector and other members of the Homeland Security Enterprise. As Under Secretary for S&T, Dr. O'Toole oversees the Directorate and serves as the science advisor to the Secretary of Homeland Security.

Dr. O'Toole is internationally known for her work on biosecurity and on health and safety issues related to the U.S. nuclear weapons complex. Prior to serving at S&T, Dr. O'Toole was the CEO and director of the Center for Biosecurity at the University of Pittsburgh Medical Center (UPMC) and Professor of Medicine and of Public Health at the University of Pittsburgh from 2003 to 2009. Prior to founding the UPMC Center, Dr. O'Toole was one of the original members of the Johns Hopkins Center for Civilian Biodefense Strategies, serving as its director from 2001 to 2003. At both centers, she created independent organizations dedicated to improving the country's resilience to major biological threats.

Dr. O'Toole was a founding coeditor-in-chief of the journal Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science. She was a principal author and producer of Dark Winter, an influential exercise conducted in June 2001 to alert national leaders to the dangers of bioterrorist attacks. She was also a principal writer and producer of Atlantic Storm, an international ministerial-level biosecurity exercise held in 2005. She is a member of the Council on Foreign Relations and served as chair of the board of the Federation of American Scientists.

From 1993 to 1997, Dr. O'Toole served as Assistant Secretary of Energy for Environment, Safety and Health. In this position, she was principal advisor to the Secretary of Energy on environmental protection and on the health and safety of the approximately 100,000 workers in the U.S. nuclear weapons complex and Department of Energy (DOE) laboratories. She developed the first overall management and safety plan for dealing with the highly enriched uranium, plutonium, spent fuel, and radioactive waste that had been left in place when nuclear weapons production was stopped in the early 1990s. She ran the multi-agency, multimillion-dollar task force that oversaw the government's investigations into human radiation experiments conducted during the Cold War. And she led the U.S. delegation to Russia to establish the U.S./Russia cooperative effort to study radiation exposure and environmental hazards of the Russian nuclear weapons complex.

Prior to her work at DOE, Dr. O'Toole was a senior analyst at the Congressional Office of Technology Assessment (OTA). Dr. O'Toole also practiced general internal medicine in community health centers in Baltimore from 1984 to 1988. She is board certified in internal medicine and in occupational and environmental health.

Dr. O'Toole holds a Bachelor's of Science from Vassar College, an MD from the George Washington University, and a Master of Public Health degree from Johns Hopkins University. She completed internal medicine residency training at Yale and a fellowship in Occupational and Environmental Medicine at Johns Hopkins University.

Chairman QUAYLE. Thank you, Dr. O'Toole.

Now I would like to recognize Mr. Warren Stern, Director of the Domestic Nuclear Detection Office at the U.S. Department of Homeland Security, to present his testimony.

STATEMENT OF WARREN STERN, DIRECTOR OF THE DOMESTIC NUCLEAR DETECTION OFFICE, DEPARTMENT OF HOMELAND SECURITY

Mr. STERN. Thank you, Chairman Quayle. Good morning, Ranking Member Wu and distinguished Members of the Subcommittee. I have submitted written testimony and I would like to now highlight some of the main points of that testimony.

I have been at DNDO now for a little more than six months and I have tried to bring three basic principles: discipline, transparency and intellectual rigor. In terms of discipline, I am encouraging DNDO to focus on our legislative mandates and our Presidential directives. We also are going to be disciplined in our utilization of resources. We have developed a solutions development process which I believe we have provided to your staff which ensures that for any activity we undertake, material or non-material, we follow a process that ensures that there is proper coordination within DNDO and outside DNDO and at each transition point there is a stage gate to make sure that the basic requirements have been met be-

fore proceeding to the next part of the process, but this discipline I think will help ensure that some of the problems we faced in the past we won't face in the future.

In terms of transparency, I fundamentally believe that we need to make sure that Congress is aware of all of our activities, and I will do my best to make sure that your staff is aware of our projects currently and planned and we try our best to be transparent with the public too.

In terms of intellectual rigor, I am trying very hard to ensure that all of our activities have the intellectual rigor that will allow outsiders to examine what we do and to defend what we have done in an intellectually honest way.

Within the context of these three principles, one of the first things we did when I arrived at DNDO was to develop a GNDA strategic plan. Congress had pressed for such a strategic plan for several years. We worked hard with seven different agencies and within four months delivered to Congress this strategic plan, which you should have. I think that plan and the effort involved reflected those three principles: the discipline to deliver something to you on time, the transparency which the plan gives to you, and the intellectual rigor which was necessary to go into the plan.

In terms of strategic changes I am working within DNDO to bring is the way we look at the architecture. We have looked at the architecture in a very static way, which has the problem in terms of intellectual rigor in that looking at the architecture this way doesn't reflect physical reality. It is extremely hard to detect certain types of nuclear material and it is quite likely that in the case of some sort of illicit trafficking of nuclear material or weapons or radiological material or weapons, there will be some intelligence information, so the new way we are trying to look at the architecture is intelligence-informed architecture and we are developing scenarios with the intelligence community and we are going to try our best to develop an architecture that can respond to the information that may be available. I believe this is the most intellectually rigorous way we can approach the architecture, and I also believe this approach will allow us to develop metrics to deliver to Congress that will help ensure that you are able to judge our degree of success in developing the architecture.

In terms of technology development testing and evaluation, there are two key changes we hope to implement and are beginning to implement at DNDO. First, in terms of testing, as you may know, the National Academy of Sciences has recommended that we move to what is called the model test model approach for examining new technology, and we are in fact doing that. Historically, we have done actual testing to examine different systems, physical testing. By moving to a model test model approach, we can in a sense make a model or have industry make a model, test to the model and then examine a number of scenarios with the model so we fully endorse the National Academy recommendation for testing and we are moving very quickly in that direction.

In addition, we are looking outside in terms of transitioning detector technology that exists outside to a greater extent than we have before. We find ourselves now six years after the creation of DNDO in a situation where a lot of technology that didn't exist in

the commercial sector six years ago does exist now and so we are going to enhance our focusing in developing standards and testing and modeling to those standards based on technology that is available in the commercial world. Now, that doesn't mean we won't be doing internal development. There are certain elements, certain technologies that just don't exist in the commercial world, and through our various parts of DNDO we will be developing new technologies and both pushing out to users and trying to ensure that users can pull technologies out from us. One of the good examples is this long-range radiation detector system which to me is really the first new piece of technology I have seen in a long time and we are pushing out this to engineers in a demonstration in a few weeks, first responders, the military, others, so they can examine and see if there are applications for this.

With that, I would just like to conclude. Again, thank you again for the opportunity to talk before you and answer your questions. Chairman Quayle, Ranking Member Wu, I am happy to answer any questions that you may have.

[The prepared statement of Mr. Warren M. Stern follows:]

PREPARED STATEMENT OF MR. WARREN M. STERN

Introduction

Good morning Chairman Quayle, Ranking Member Wu, and distinguished Members of the Subcommittee. Thank you for the opportunity to appear before you today with my colleague Dr. O'Toole to discuss research and development (R&D) programs at the Department of Homeland Security (DHS). In order to fully express the Domestic Nuclear Detection Office's (DNDO) R&D efforts, I would first like to share my strategic vision for DNDO and provide insights into our programs.

The Domestic Nuclear Detection Office's (DNDO) mandate is to improve the nation's capability to detect and report unauthorized attempts to import, possess, store, develop, or transport nuclear or radiological material for use against the nation, and to further enhance this capability over time. With assistance and participation from a wide variety of U.S. government departments and agencies, DNDO synchronizes and integrates inter-agency efforts to develop technical nuclear detection capabilities, characterizes detector system performance, ensures effective response to detection alarms, integrates nuclear forensics efforts, coordinates the global detection architecture and conducts a transformational research and development program for advanced technology to detect nuclear and radiological materials. Countering nuclear terrorism is a whole-of-government challenge and DNDO must work with federal, state, local, international, and private sector partners to develop and implement the Global Nuclear Detection Architecture (GNDA).

Three Principles

My strategic vision for DNDO is based on three key principles that I think will help shape the office and all our activities: discipline, intellectual rigor, and transparency.

One of the first things I would like to build upon at DNDO is the discipline with which we approach our work. In DNDO's nearly six years of existence, the office has embarked on many efforts to enhance the GNDA, but in order to ensure that we address the most pressing and impactful needs, we must carefully review all our plans and expenditures so that we exercise discipline in utilization of resources. While we have implemented a range of measures designed to provide oversight and instill appropriate processes for administrative, management, and program activities within DNDO, we must find ways to be more efficient, especially in the current budget climate.

Building upon a disciplined approach to executing our mission, we must also ensure that there is intellectual rigor behind our analyses, strategies, and programs. Our decision making and planning must be supported by strong methodologies and analyses. This includes making use of available expertise and tools, like peer review, that can assist us in developing the best strategies and solutions. We must make

sure that our assumptions, strategies, and solutions reflect thoughtful and deliberate analyses and defensible conclusions.

Finally, I support increased transparency at DNDO. Transparency is essential in providing an understanding of our mission and receiving the necessary oversight and feedback to improve our operations. I pledge that DNDO will work with all relevant stakeholders and provide as much insight as possible into our programs and planning for our partners, including Congress, the Government Accountability Office (GAO), and the American public. Working within all applicable laws and classification regulations, we will provide as much information as possible about our programs.

GNDA Strategic Plan

As you may know, National Security Presidential Directive (NSPD)-43/Homeland Security Presidential Directive (HSPD)-14 and the Security and Accountability For Every (SAFE) Port Act of 2006 (P.L. 109–347) require that DNDO be the lead federal agency for coordinating the and implementing the domestic portion of the GNDA. We worked with federal partners to define the GNDA and the necessary roles, responsibilities, and objectives. Completion of this strategic plan was a priority when I took the lead at DNDO.

The GNDA is an interagency product that represents the inputs of: the departments of Defense, State, Energy, and Justice; the Office of the Director of National Intelligence; Intelligence Community members; the Nuclear Regulatory Commission; and the National Security Staff. The completion of the GNDA Strategic Plan represents a high degree of cooperation and coordination among the interagency to create a document that will guide multiple U.S. government efforts to fulfill the objectives and goals set forth in the plan. I am proud to say that we were able to deliver the GNDA Strategic Plan to Congress in December 2010, as promised.

Implementation of the GNDA is an ongoing process. Currently, there are many existing programs and initiatives that fall under the GNDA and many more programs that support these efforts. Using the Strategic Plan as a framework, DNDO will continue to work with interagency partners on GNDA implementation. DNDO's forthcoming domestic implementation plan will outline programs, technologies, execution, and timelines in greater detail.

DNDO will also complement the GNDA Strategic Plan with a revised GNDA annual review report. The annual report, required by Congress under the "Implementing Recommendations of the 9/11 Commission Act of 2007" (Pub. L. 110–53), will provide a means to evaluate, document and track progress to assist in refining the GNDA. It will also link the U.S. government's organizational roles and responsibilities to the GNDA's goals, and identify the analyses and investments necessary to achieve those objectives. Like the Strategic Plan, the GNDA annual report will be jointly produced and approved by all relevant USG stakeholders.

Within DNDO we will place much greater emphasis on defining the GNDA, both as it exists now and as we determine it should exist in the future. The responsibility to define the architecture is DNDO's greatest challenge and its greatest opportunity. Over the next years, our long-term architectural vision can be characterized by several common themes that apply across all layers. In every layer and pathway we will seek to increase detection coverage and capability and deter terrorists from planning or attempting nuclear terrorism. The architecture will also introduce uncertainty for adversaries with regard to the risk of interdiction, and take maximum advantage of existing activities that can contribute to the overall capability to prevent nuclear terrorism.

Strategic Emphasis

Our future enhancements to the domestic architecture will focus on situations where there is some intelligence information available, but where information may not be precise. Future implementations of the GNDA will emphasize mobile or agile detection components, which will increase our capability to respond to escalated threat levels by focusing detection assets to interdict these threats. These threats will impact the way we move forward with deployments and systems development, as well as how we provide support and training to build effective operational concepts. We will use existing capabilities and assets, on a federal, State, and local level, to surge our radiological and nuclear detection abilities in a coordinated fashion to respond to suspected threats or radiological/nuclear detection scenarios. This will not be one specific program, rather a concept of operations that will bring together multiple capabilities and rely on a breadth of assets.

We need to utilize the integrated efforts of federal, state, and local responders to perform radiological and nuclear detection in concentrated regions or areas when in-

formation indicates there may be a need for responsive search operations for preventive detection. We have many programs, assets, and capabilities that contribute to radiological and nuclear detection response activities, and we must work to enhance coordination and implementation mechanisms to ensure that we make the best use of all available personnel, equipment, and knowledge. A more flexible architecture will strategically bring together the assets and capabilities for detection and search operations into a unified effort for the domestic prevention of radiological and nuclear terrorism. Some current programs have begun to establish more randomized and mobile capabilities with broad applications, including the radiological and nuclear detection equipment and training DNDO has provided for all U.S. Coast Guard boarding teams and Transportation Security Administration Visible Intermodal Prevention and Response teams. We have recently reached an important milestone for the development of advanced handheld systems, which were developed through DNDO and approved for production and deployment in September 2010. This system is the first of DNDO's next generation human–portable systems and will be acquired for U.S. Customs and Border Protection and other users in support of their operations. Following the success of our advanced handheld, the small area search handheld system, RadSeeker, will be ready for a production and deployment system this year. Our work will continue to enhance our federal capabilities and build on these efforts in a strategic way so that the pieces are linked together and can respond as needed.

DNDO also has a number of separate state and local pilot programs and training efforts that can contribute to distributed, agile capabilities to develop an effective domestic architecture. My objective for 2011 is to increase our focus on DNDO state and local support programs and consolidate the efforts into an integrated program. One element for doing that is the Securing the Cities (STC) initiative. The current STC pilot was initiated in the New York City region and has resulted in unprecedented regional cooperation among federal, state, county, and city agencies in the Tri-state region. The STC program provides assistance to state and local jurisdictions, which enable these entities to build and sustain capabilities by: deploying current technologies regionally in a coordinated manner; designing, acquiring, and deploying a regional architecture for radiological/nuclear detection focused on state and local jurisdictions; developing and implementing a common, multi-agency concept of operations (CONOPS) for sharing sensor data and resolving alarms; and instituting training and exercising by the regional agencies to execute the CONOPS at a high level of proficiency. STC partners in the New York region use commercially available radiological and nuclear detection equipment and work with DNDO to establish requirements and conduct operational assessments of equipment in the development stages. The President's FY 2012 budget request outlines a transition from the STC pilot to a three-phased program that will continue in NYC and commence in another UASI Tier I region. DNDO will assist regional partners in implementing self-supported sustainment of capabilities and real-time sharing of data from fixed, mobile, maritime and human-portable radiation detection systems.

New Approach for Technology Development, Test, and Evaluation

As we develop solutions that support flexible, coordinated capabilities and a deeper understanding of an effective architecture, we need to continue to improve our technological capability. DNDO is mandated to serve as "the primary entity in the U.S. Government to further develop, acquire, and support the deployment of an enhanced domestic system to detect and report on attempts to import, posses, store, transport, develop . . . "1A[1] nuclear weapons or materials. Historically, we have focused on developing technology and detection systems to address identified needs. We are now transitioning to a new approach, focusing on commercially developed devices, developing government standards, and testing to those standards. Because industry has repeatedly demonstrated the ability to rapidly improve detection technologies, we have an opportunity to shift our approach to one that is more flexible and adaptable and relies on the private sector—as well as other DHS components—to enhance existing products and develop new devices. This technical transition will also include a new approach at the systems level, which defines strategic interfaces at various points in the detector/system architecture, allowing improvements without wholesale changes to the entire system.

DNDO will place greater emphasis on developing standards for radiological/nuclear detection equipment and testing to those standards, while taking advantage of the technological advancements made by the private sector and building upon

[1] Security and Accountability For Every Port Act of 2006 (SAFE Port Act, P.L. 109–347, Sec. 1802)

those efforts. In addition, we will enhance our approach to testing to reflect the recommendations of the recent report from the National Academies of Sciences, which encouraged us to more heavily integrate detector modeling. Data collected in the field can then be used with the models to understand system behavior instead of relying on new testing alone.

Testing and evaluating systems to achieve technical and operational standards is crucial in developing and delivering the necessary equipment to our stakeholders. DNDO is required by the SAFE Port Act "to carry out a program to test and evaluate technology for detecting a nuclear explosive device and fissile or radiological material, in coordination with the Secretary of Defense and the Secretary of Energy, as appropriate." In response, DNDO has conducted more than 50 separate test and evaluation campaigns at more than 20 experimental and operational venues. These test campaigns were planned and executed with the interagency using rigorous, reproducible, peer-reviewed processes. Tested detection systems include pagers, handhelds, portals, backpacks, mobiles, boat- and spreader bar-mounted detectors, and next-generation radiography technologies. The results from DNDO's test campaigns have informed federal, state, local and tribal operational users on the technical and operational performance of radiological and nuclear detection systems to select the most suitable equipment and effective CONOPs as we work to keep the nation safe from nuclear terrorist threats.

DNDO is also required by the SAFE Port Act, in collaboration with the National Institute of Standards and Technology, to publish technical capability standards and recommended standard operating procedures for the use of nonintrusive imaging and radiation detection equipment in the United States. In executing its T&E and Standards responsibilities, DNDO collaborates with the Test & Evaluation and Standards Division of DHS S&T. This collaboration includes coordination of American National Standards Institute (ANSI) N42 consensus standards, major systems operational testing and evaluation, including large programs like the Advanced Spectroscopic Portal (ASP) program, the implementation of DHS T&E guidance in smaller systems development efforts, and coordination of T&E facilities. The DNDO T&E lead participates on the DHS T&E Council, and DNDO T&E staff has made good use of T&E training and certification capabilities developed by S&T.

We also have supported the development, publication and adoption of national consensus standards for radiation detection equipment. Several such standards now exist for use in homeland security. The DNDO Graduated RN Detector Evaluation and Reporting (GRaDER℠) Program is using these standards to test and evaluate both commercially developed systems. GRaDER is a conformity assessment program that provides independent standards compliance information for selected radiation detection equipment. The program has created the infrastructure for vendor voluntary testing of commercial off-the-shelf radiological/nuclear detection equipment by independent accredited laboratories against national consensus standards and government-unique Technical Capability Standards. Final test results for our initial GRaDER testing are expected beginning this month. We anticipate that the GRaDER Evaluated Equipment List—which is supported by the Federal Emergency Management Agency's guidance for compliance in relation to their grants program—will enable federal, state, local, tribal and territorial agencies to make more informed radiological/nuclear detector procurement decisions by ensuring they are buying equipment that has demonstrated compliance with published standards.

Beyond our work with Component partners, DNDO's testing expertise and experience is sought by interagency partners, such as the departments of Energy and Defense, and international partners such as the United Kingdom, Canada, Israel, the European Union, and the International Atomic Energy Agency. DNDO has an active partnership with the European Commission's Joint Research Center to conduct the Illicit Trafficking Radioactive Assessment Program+10, an ambitious three-year test program to evaluate nine classes of radiological/nuclear detection systems in U.S. and European test facilities.

Research and Development: Programs and Coordination

The Transformational and Applied Research (TAR) programs at DNDO support basic and applied research of systems with increased capabilities. I will describe the TAR portfolio as it currently exists within DNDO. Our research and development contributes to advances in nuclear detection and technical nuclear forensics. TAR projects feed into the DNDO Solutions Development process and shape our work on systems development. Within DNDO, these programs address advanced compact high-performance handheld systems; advanced passive standoff detection technologies; improved detection through networked and distributed detection systems; better detector materials; and improved material characterization and radiochemistry. Additionally, DNDO is pursuing targeted technologies for the detec-

tion of shielded special nuclear material through passive, active, and radiographic interrogation programs, and the development of key supporting systems for varied deployment schemes. TAR divides projects between the Exploratory Research Program (ERP) and the Near Term Research Program (NTRP). Underlying these efforts is our work to ensure a continued pipeline for human capital development and basic research, executed through DNDO's partnership with the National Science Foundation for the Academic Research Initiative. Currently, the Academic Research Initiative has awards with 30 universities through 36 grants supporting 118 students.

The ERP explores innovative, high–risk, early–stage technologies, concepts and ideas that can make transformational contributions to support the GNDA and reduce the risk of nuclear terrorism. Specifically, the ERP researches technology and techniques that: 1) address capability gaps and weaknesses in the GNDA, with an emphasis on radiological and nuclear detection; 2) provide substantial performance improvement or cost reductions of radiological/nuclear detection capabilities; and 3) improve nuclear forensics capabilities. Efforts under the ERP are intended to transform the basic building blocks of nuclear detection technology and supporting fields for dramatic improvements in technical capabilities, with the research generally culminating in a proof of concept or proof of feasibility demonstration in a laboratory setting. Successful ERP technologies and concepts may then transition to support a subsequent near-term research project or spur commercial development. ERP also provides performance modeling, improved algorithm development, and other support capabilities for the broader DNDO mission.

Additionally, our ERP work began exploring options for alternative neutron detection, years before the recent helium-3 shortage was identified. Helium–3 is commonly used as a neutron detector material in radiation detection equipment. Our exploratory research projects have been developing near and long-term alternatives to helium–3 neutron detectors for different applications, including portals, backpacks, handhelds, and pagers. These technologies are aimed at achieving efficiencies and discrimination capabilities that are equivalent to or better than helium-3 detectors, as well as examining detector cost–competitiveness. Approximately 15 different technology approaches are being pursued, including those based on boron or lithium.

Some of these technologies have advanced to a point where they could be tested with other alternative neutron detection technologies. We have completed a test campaign for neutron detection at Los Alamos National Laboratory that evaluated 11 units in three application spaces, which helped us to identify and verify the performance of several very promising technologies and effectively target funding.

The second program within TAR is the NTRP, which performs accelerated development, characterization, and demonstration of leading-edge technologies to address critical gaps in nuclear detection capabilities. The NTRP was started in 2006 and was formerly called the Advanced Technology Demonstration (ATD) Program.

Contracts awarded under the NTRP are typically executed in four distinct phases: preliminary design review, critical design review, characterization readiness review, and characterization assessment. The NTRP characterization results form the basis for a subsequent initial cost benefit analysis to determine if the technology should transition to system development and eventual production and deployment.

Our basic and applied research efforts push the envelope by identifying gaps in current technologies and architectural needs and selecting R&D programs that can begin the early stage work necessary to address these challenges. Our programs must be able to reach out to operators for user requirements and to balance both "technology push" and "technology pull" efforts, as appropriate. For technology push efforts, the developer of a technology is pushing a new concept out for examination by the operator. These are often new or advanced concept detectors that could improve threat detection or allow for altered or simplified CONOPS. These technology push systems are often state-of-the-art with enhanced or dramatically improved capabilities that might be otherwise unknown to operators. Technology pull refers to equipment and programs where operators have identified CONOPS and features that they need in order to achieve their missions. The operators are pulling the technologies in directions that guide development for industry and the government.

Many of our important research and development successes highlight the necessity of integrating architectural analyses with R&D efforts. One example of DNDO's R&D work that is transitioning through technology push efforts is our Long Range Radiation Detection (LRRD) program. The LRRD program is the follow-on program to the Stand-Off Radiation Detection Systems (SORDS) ATD program, completed in FY 2010. The overarching goal of the LRRD program is to determine if a passive, long-range, radiological/nuclear detection system with localization capability should be developed and fielded. To achieve this goal, the LRRD program will allow systems developers to determine if there is a need, identify that need with a gap in

the GNDA, and evaluate whether that need can be met in a cost effective manner. Next, we must collect user requirements and perform an analysis of alternatives, the result of which helps us determine if we will field one or more systems.

The LRRD systems are undergoing a series of activities that engage federal, state, and local partners in utilizing and assessing the technology. Participating in these activities are two SORDS prototypes and the Roadside Tracker (RST), which were developed through the ERP. The SORDS technologies are designed to detect and identify sources from 100 meters away on a mobile platform, and the RST is designed to detect and identify sources in vehicles over five lanes of traffic at speeds of up to 70 mph. An operational demonstration will evaluate the potential utility of these systems in a simulated urban environment, and follows the technology demonstration that was conducted at Fort Belvoir in November 2010. Next week, the operational demonstration will include the cooperative efforts of DNDO, Fort Indiantown Gap Military Reservation, the 3rd Civil Support Team, Nassau & Suffolk County Police Departments, the Department of Energy's National Nuclear Security Administration, and the Defense Threat Reduction Agency. Following the completion of the operational demonstration, we will work with the Nassau & Suffolk County Police Departments to provide a live demonstration of the LRRD systems for radiological/nuclear scanning at a real event. The live demonstration will allow operators to use the systems and provide feedback for future technology and CONOPS development. This project is illustrative of the important interplay between R&D efforts, technical and operational evaluation activities, and operators in the field, which all together lead to the best solutions.

As Under Secretary O'Toole mentioned, the FY 2011 and FY 2012 President's Budget Requests transfer our TAR activities to DHS S&T, pending Congressional approval of the budget. In order to maintain and improve the current levels of integration for transformational research and development activities and transitions of technologies for use by operators, my office will work closely with S&T to ensure that the pipeline for technological advancements remains coordinated to address gaps in the GNDA and operational needs.

Nuclear Forensics

DNDO has an additional mandate, codified last year in the "Nuclear Forensics and Attribution Act" (P.L. 111–140), to provide stewardship and integration for U.S. government technical nuclear forensics efforts. Nuclear forensics is a key supporting element to the GNDA and must be closely linked in order to receive relevant information and provide data and analyses that can impact detector development, tuning, and deployment. Established in 2007, DNDO's National Technical Nuclear Forensics Center (NTNFC) serves as a national-level "system integrator" for joint planning, exercising and evaluating our national capabilities, while also investing in technical capability advancement. Last year, the NTNFC led the interagency effort to develop the "National Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States," which was signed by the President and submitted to Congress. NTNFC also has the responsibility to develop the U.S. government's capability to rapidly, accurately and credibly identify the origin and history of radiological and nuclear materials intercepted before a detonation. We work with laboratory experts to develop standard reference materials for the validation of analytical methodologies; develop validated methodologies to be employed in nuclear forensics activities; and develop and validate predictive models and techniques to improve the understanding of how material signatures.

Conclusion

My vision of DNDO is for us to continue to improve our work developing a broad spectrum of capabilities, including nuclear detection, reporting and analysis, and nuclear forensics. Our responsibilities include coordinating the development of the GNDA and implementing the domestic portion of that architecture. We also must provide the analyses and integration mechanisms for detection and reporting that will link technical elements like research, systems development, testing and evaluation to operational solutions for mitigating the threat of nuclear terrorism. Our research and development work will consistently be matched with needs in the GNDA and the operational requirements of our end users. My hope and expectation is that, over time, we will develop a reputation that allows us greater leverage in defining detection architecture throughout the world.

Other U.S. government agencies and Congress make important contributions in accomplishing the mission to prevent nuclear terrorism, and I am committed to working in coordination with all parties to develop effective strategies, capabilities, and technologies.

Chairman Quayle, Ranking Member Wu, I thank you for this opportunity to discuss DNDO's strategic direction and my vision for its future. I am happy to answer any questions the Subcommittee may have.

BIOGRAPHY FOR MR. WARREN M. STERN

Mr. Stern is the Director of the Domestic Nuclear Detection Office (DNDO), a position he has held since August 2010. Prior to joining DNDO, Mr. Stern served as the Head of the International Atomic Energy Agency's (IAEA) Incident and Emergency Centre from August 2006 to March 2010-where he led international efforts to prepare for and respond to nuclear and radiation emergencies and helped create the IAEA's Response Assistance Network.

Mr. Stern began his career in 1985 at the Central Intelligence Agency, then served as the Senior Technical Advisor in the U.S. Arms Control and Disarmament Agency-where he advised senior U.S. officials on nonproliferation and nuclear security issues-from July 1990 until May 1999.

He later served as a Fellow in Senator Hillary Clinton's office in 2003-providing guidance on nuclear energy, waste, safety and security issues and helping to write the Dirty Bomb Prevention Act-and went on to serve as the Department of State's Senior Coordinator for Nuclear Safety and Deputy Director of the Office of Nuclear Energy, Safety and Security.

Mr. Stern received his M.S. in National Security Studies from the National War College, his M.S. in Nuclear Engineering from the Massachusetts Institute of Technology, and his B.A. in Physics from Brandeis University.

Chairman QUAYLE. Thank you, Mr. Stern. We are going to move into the question portion. I want to remind Members that committee rules limit questioning to five minutes, and at this point I will open up the questions and recognize myself for five minutes.

My first question is to you, Mr. Stern. Much of the DNDO R&D has been proposed to be transferred from your office to the S&T Directorate. What R&D will be housed at DNDO after that transfer to the Directorate?

Mr. STERN. Sure. I appreciate the question. Within the DNDO, we are structured in a way that goes from long-range research, very basic research, to the actual production and acquisition of equipment. What is proposed to be moved is the transformational and applied research Directorate within TAR that does what you might call more basic research. Even within TAR, there are subdivisions but it is that part of the R&D that is proposed to be moved to S&T.

Chairman QUAYLE. You are now focusing more along the lines of commercially developed devices and establishing government standards. Is that the appropriate role for DNDO given the challenges of commercialization, and because of NIST's involvement with establishing government standards?

Mr. STERN. An excellent question. I mean, the first point is, we work extremely closely with NIST and ANSI in developing standards, so together we develop standards. I believe it is one of our statutory and explicit responsibilities, actually, so we have clear roles and responsibilities and I don't think there is really a conflict in the things that we do with NIST to establish roles and standards.

Chairman QUAYLE. Thank you.

Dr. O'Toole, when they canceled SBInet recently, was there some technological consideration in making that decision, and what was your role in that decision–making process?

Ms. O'TOOLE. When Commissioner Bersinn and Secretary Napolitano started considering whether to proceed with SBInet as originally planned or altered that plan, S&T served on the executive board for the analysis of alternatives, which looked at various suites of technology that we could use to substitute for what was then being developed by the Boeing Corporation, and we also served on the executive board for the Southwest Border Technology Initiative and CBP.

Chairman QUAYLE. Will S&T be involved in that process going forward as DHS looks for a replacement for virtual fence or whatever technological advances DHS puts down at the border? Will S&T be involved in that process?

Ms. O'TOOLE. Yes. I continue to serve on the executive board that the chairman has put together and S&T is, for example, evaluating five different radars to understand the state-of-the-art technologies that are available right now that we might want to deploy to the border and we continue to do a lot of research in border-applicable technologies for detecting illicit use, crossing of people, movement of illicit cargo, et cetera, but yes, we will remain involved in border technology decisions.

Chairman QUAYLE. Okay. Great. I have another question; I have noticed that you have been taking some steps to really improve ac-

quisition efforts and I think those are good steps to make, but I have also heard from some stakeholders that end users who do not incorporate technical or economic feasibility are sometimes allowed to define the security needs. How do we ensure that we get cost-effective and innovative solutions?

Ms. O'TOOLE. Well, Mr. Chairman, that is a good question. I wish I had a succinct answer to that. It is very important to identify the requirements very carefully, and that, any technology developer will tell you, is not easy. We need to get S&T's technical heft more engaged in that, and we are. We are already engaged in doing the oversight of testing and evaluation of new technologies in DHS. That is by statute. Bu we need to get S&T more involved in the front end of deciding what is the mission need we are trying to serve and how might technology fill that gap and then how do we develop the technology.

If you don't really understand the users' needs, and this has to be an ongoing process in the course of the entire development process because users' needs change over time, everything is changing, then you are not going to come up with the right answer. So the users themselves in addition to the policymakers and the components need to be involved in developing these technologies. At the same time, as was mentioned earlier, you need to have a strategic view of where are we going to be in five years in ten years and how do we serve those far-off needs. So it is an ongoing set of parallel processes that have to be kept in motion.

Chairman QUAYLE. So you keep the end users involved in the process by setting R&D priorities as well?

Ms. O'TOOLE. The users are certainly part of how we set R&D priorities but the priorities mostly have to do with what are the top-level needs of the department. That comes since I have been here first of all with conversations between me and the component heads and an ongoing process that my predecessor developed called the Integrated Project Team process, which identifies needs that the operators have come up with and then prioritizes them, and then we take those needs in S&T and try and see what we can meet through either knowledge products or technology assessment via technology foraging, original R&D, et cetera, et cetera.

Chairman QUAYLE. Okay. Great. Thanks.

The chair now recognizes Mr. Wu for five minutes.

Mr. WU. Thank you, Mr. Chairman.

I would like to get in two questions, if I may, and the first is a question related to the horrendous earthquake and then the subsequent tsunami that occurred in Japan last week, and I want to ask about the Directorate's work in the area of natural-disaster detection, and I understand that in the fiscal year 2012 budget, some of the Directorate's natural-disaster detection program funding will be used for the design and development of models that will provide earlier prediction of seismic activity and will help integrate these predictive capabilities with emergency management alert and warning systems, and can you tell me a little bit more about the work that the Directorate is doing in this area, what it expects to do in 2012, and also involving you, Mr. Stern, particularly there a $19 million item in the Directorate's Natural Disaster Resiliency program to help respond to and recover from large-scale natural

disasters, and some of this funding will be to address the resiliency of critical infrastructure qua large and expressly nuclear reactors? And we do have a situation with nuclear reactors in Japan, and if both of you could address that as my first set of questions, if you will.

Ms. O'TOOLE. Okay. We do have a project going on. It is a very basic science fundamental research project to try and get advanced prediction of the occurrence of earthquakes. It involves studying the offgassing from the earth's crust to see if we can detect that and improve the time in which we have to get prepared for an earthquake. I emphasize, this is fundamental science. There is a reason we call it discovery. It may not work but it looks quite promising, certainly promising enough for us to invest in it.

Secondly, we do a lot of work in S&T trying to improve the resilience of critical infrastructures, so we have done a great deal of work, for example, in material science. There is something called ultra-high-performance concrete, which if used would make our buildings much more earthquake-proof. Getting that into commercial use is going to require a series of steps that S&T may be able to help with involving certification and so on and so forth. We also do a lot of different kinds of work involving disaster response generally. For example, situational awareness becomes extremely important as we are seeing played out in Japan in these complex, chaotic times after a calamity whether it is natural or manmade or a terrorist attack. We are doing a great deal of work, particularly on the ground with first responders, to bring together various communication systems in ways of moving and visualizing data so everybody has a common operating picture.

In terms of nuclear response, there is a budget line in TAR which we expect to come to S&T for response to nuclear events. This is work that is just beginning so we have a sketch or a roadmap for how we would spend those monies but have not begun that work yet.

Mr. WU. Terrific. Thank you.

And my second question is an arena in which I have had a long-term interest in which the Subcommittee over the last four years has held a series of hearings and it is on 9/11 interoperability and interoperability of systems, not only voice communications but all the different factors that make a system fully interoperable in voice and data and other factors, and I note that in the fiscal year 2012 budget request, there is $23.7 million for the Directorate's information sharing analysis and interoperability program, and according to the budget, some of this funding will be used to fully incorporate conformance testing into the P25 compliance assessment program, and these compliance tests and the P25 interfaces have been the subject of—it is very complex. We have had multiple hearings on this topic and I look forward to an update if you can give me a partial update at this hearing today.

Ms. O'TOOLE. Sure. We are doing a number of things and actually making real progress in interoperability of voice, data and visualization. I would be happy to come in and tell you about those products, three in particular which are being used on the ground in real time right now.

In terms of P25, this was a standard that was meant to and would in fact make interoperable all different kinds of handheld radios used by first responders who were using legacy systems that did not talk to each other. The problem, frankly, is that the two biggest manufacturers of these radios aren't particularly interested in complying with the standard. So the other manufacturers who do want to build a P25-standard radio have told us—actually this happened just in January at a meeting out in Arizona—that they cannot create the testing necessary to certify compliance, so S&T is working with these manufacturers to see if we can devise the tests that would affirm compliance, but it has been a long and frustrating road.

I would also mention, Congressman, that new technologies are basically overtaking the P25 standard and will be increasingly interoperable so as first responders buy new technologies, this problem will not be as germane but we still have to deal with the legacy which are a majority of what is in the field, and that will remain the case for some time because of the cost of replacing old systems.

Mr. WU. Well, I think it is terrific that S&T Directorate is moving forward in this arena, and as you know, NIST, one of the agencies under this Subcommittee's jurisdiction, has had a long-term interest in this and has a lab, I believe, in Boulder, Colorado, that is dedicated to this and I think that this Subcommittee will appropriately take continuing interest.

Thank you very much, Mr. Chairman.

Chairman QUAYLE. Thank you.

The chair now recognizes Mr. Rohrabacher for 5 minutes.

Mr. ROHRABACHER. Thank you very much, and congratulations to you, Mr. Chairman. When I came here, we didn't become chairmen when we were freshmen, but you do have an old hand to rely on there next to you as the ranking member so the old hands sort of welcome you today.

This is a very significant issue at hand because it covers things that are so important to our constituents.

I just want to get one bit of housekeeping out of the way. Apparently the American Institute for Research was supposed to conduct a validation of the TSA's Screening of Passengers by Observation Techniques, the SPOT program. Supposedly that report was due earlier this year. When is it going to happen? When are we going to see it? Ms. O'Toole?

Ms. O'TOOLE. Well, there are several evaluations of SPOT going on, Congressman Rohrabacher. I am not sure which is which. S&T has been trying to validate and working with TSA to validate the SPOT program and our preliminary results are available or almost available. I think the report that you have mentioned is going to be available in April.

Mr. ROHRABACHER. In April? Okay. Thank you very much.

You know, we go through these detectors every week, and I think frankly it is disgusting that we have seniors and people in wheelchairs and families that are having to go through the type of machinations that they have to go through to get onto an airplane in this country. It seems to me that with our technological capa-

bility, we could be doing something better that wouldn't create this roadmap.

Let me ask you about fingerprints. I took my family to Marine Land—not Marine Land, it was the Ocean World or whatever down in San Diego, and we have season passes for that, and have three little kids; God blessed us with triplets seven years ago. Thank God and modern science, I might add. But as we were going in, you actually just put your finger on the little thing and they were able to oh, okay, go right on in, you are obviously the person with this pass. How come we can't do that at the airports?

Ms. O'TOOLE. Well, I flew out of Boston yesterday and left a water bottle in my bag and had to go through again and also went through the AIT.

Mr. ROHRABACHER. Uh-oh. Oh, boy. You must have had to go through a strip search after that.

Ms. O'TOOLE. I did experience a pat-down. We all share your frustration. Here is the problem, and this might be worth a classified threat briefing for you so we can talk in more detail. But it is clear that al Qaeda, both al Qaeda core and the spin-offs, are targeting aviation, and they are probing our systems to find out how sensitive they are and where the seams are that they might exploit. So I can't go into sensitive intelligence but there is a reason that we are looking at everybody including babies and people with casts and so forth. It is not arbitrary. It is a real bother.

Mr. ROHRABACHER. Well, couldn't there be a technological, like I say, could you put your finger in something, could that——

Ms. O'TOOLE. We are working on it.

Mr. ROHRABACHER. —take the place of a pat-down?

Ms. O'TOOLE. Here is what we are working on. After the Christmas bombing, the Christmas attempted bombing, I should say, we started working with TSA to do a systems analysis of the entire checkpoint to see what works, what doesn't, how we could make that much more efficient either though combining technologies or making technologies faster and less intrusive. We are working on that. We are also working on upgrades, for example, to the AIT machine. One would be a software package that would automatically identify targets and lead to fewer false alarms. My watch alarmed the AIT yesterday, okay? So I had to go through the pat-down. If we had fewer false alarms, there will be fewer pat-downs and that will be less intrusive. That is just one of the things that we are working on to build a less-intrusive checkpoint. I could go on forever. I won't now. But yes, there is hope.

Mr. ROHRABACHER. Well, thank you very much, and that is one thing I think all of our constituents are very concerned about.

Ms. O'TOOLE. Yes.

Mr. ROHRABACHER. But safety of our country and of our families is important as well and that this what you are trying to do.

Thank you very much, Mr. Chairman.

Chairman QUAYLE. Thank you, and the chair now recognizes Mr. Lujan for five minutes.

Mr. LUJAN. Mr. Chairman, thank you very much.

Dr. O'Toole, I want to thank you for being here as well as Mr. Stern and the other staff that you have with you.

Dr. O'Toole, just to follow up on that last line of questioning, after we are looking at capabilities that other agencies have come up with that could integrate into the system to find our vulnerabilities, doesn't it make sense that if we can identify molecular footprints of materials that are attempting to be brought on so that when you have that bottle of water, if it indeed is water, you could bring it on? Or we have all these taste tests that sometimes we see competing interests like Coke and Pepsi on television where they have people taste one the other and see if you can tell the difference or which one tastes better or new Coke versus old Coke, if we had a technology that you could put that liquid in a machine and they could tell you the difference between Coke and Pepsi even though they look the same and may be in different cans. What are your thoughts with being able to use technologies that will be able to identify these areas as opposed to having some of these false positives that we are trying to prevent?

Ms. O'TOOLE. Congressman, I think you are referring to the MagViz project.

Mr. LUJAN. Dr. O'Toole, MagViz, Bottle Viz, probably what can be sized up to if there is a client that can be brought in, a People Viz as well.

Ms. O'TOOLE. We are working on a lot of technologies to try to make detection of explosives and other illicit cargo on passengers or even in passengers more available. We can do a lot of things on the bench but making it portable, able to sit in the footprints which are very limited in airports that we have to use, keeping throughput fast—even a minute, as we have all experienced, extra time in that line counts, and in cargo screening, for example, seconds are actually measured at ports. So the operational realities of making these very fascinating and capable technologies useful in actual practice are very difficult to comb through. We are going through a process of evaluation and testing and development with MagViz and other technologies now. That is a fairly lengthy process. You can make it shorter but then you are faced with more surprises usually in the end. It doesn't work, doesn't work the way you hoped it worked, you have to diddle with it a little bit more, so there are new technologies coming but nothing is going to be simple or a one-size-fits-all solution to our many needs, I am afraid. MagViz is promising.

Mr. LUJAN. I appreciate that, Dr. O'Toole, but as we look to technologies that we order up on large scale that failed with the bomber attempt on Christmas Day, there are other technologies that I have seen put to work and tested where we have been able to see these put to use. There are other technologies that appear to have received some tests that could have prevented some of these efforts and I certainly hope that going forward that with the new Directorate to be able to create the testable requirements that there are some areas that we can improve along those lines, and I hope we get a second round of questioning because I would like to pursue that a little bit.

One area that I would like to bring up as well, Dr. O'Toole, what are the responsibilities with the Science and Tech Directorate under DHS with drugs, with narcotics and countertrafficking?

Ms. O'TOOLE. We have been working with both Customs and Border Protection and with ICE to help them detect people coming across the border with illicit materials, and we are also doing a lot on air cargo security, mostly with TSA. We have developed algorithms, for example, for use by CBP, software that helps them better target cargo and people that should be given a second look based upon manifests and so on and so forth, and I can go into a whole list of technologies if you wish, but we are doing a lot of things in that regard to try and get a better look at vehicles passing border points, for example.

Mr. LUJAN. Thank you very much, O'Toole.

Mr. Chairman, I have some other questions but I will wait until the second round.

Thank you, Dr. O'Toole.

Chairman HALL. [Presiding] At this time I would like to recognize myself for about five minutes or four minutes.

Mr. Stern, in light of the damage that was sustained at three separate reactors after the very powerful earthquake and tsunami in Japan, and release of radioactive material, I guess everybody who is stuck to the television today wants to ask the same question. What kinds of technologies would be useful or are already available to respond to, detect or mitigate the effects of a radiological nuclear disaster here? They indicate that Japan was ready for a disaster as much as you can be ready for anything like that, and I wonder if we are.

Mr. STERN. Thank you for the question, Chairman.

You know, my background is actually in emergency response, and one of the key lessons of any emergency but in particular a nuclear emergency is that there is conflicting information streaming from all over the place, and one of the most important things that emergency responders can do is to use a very disciplined approach to ensuring that a single message goes out, and within the United States it is actually Department of Energy, NRC and the EPA that have responsibility for this, and given that DNDO doesn't, I am very reluctant to make any comment on this. I apologize.

Chairman HALL. Would you like to make any comment on it Dr O'Toole?

Dr. O'TOOLE. I think we can and should learn from every disaster. I think one of the things that is very impressive about Japan is their preparedness efforts involving all of the community, not just the emergency responders, and I think that is the kind of preparedness that we need to start thinking about and taking seriously in the United States, not just for nuclear reactors. That would be at the top of my list, given what I know about those technologies, but certainly we are going to have natural disasters like earthquakes and we need to think in advance about how we would respond. I am a physician by training, and I can tell you it is always very difficult to get people to take preventive steps until after the heart attack, and this is one of those periods after the heart attack. Hopefully Japan will be fine and the worst nightmares will not come to pass but this is a time when we should look to our own preparedness efforts and make sure we are as resilient as possible against the likely natural disasters we may face.

Chairman HALL. I thank you.

Now I recognize Mr. Wilson, the gentleman from Florida, if he is still here. The lady from Florida. With that hat on, I have been wondering what I was going to do when I saw you in here with a hat on, and I tell you, I am not one that going to complain about it. That is for the Speaker to do. I am glad to recognize you.

Ms. WILSON. Thank you, Mr. Chairman. I appreciate it.

Chairman HALL. Pardon me, all I saw was the hat.

Ms. WILSON. You weren't sure if it was a man or woman. Thank you, Mr. Chair.

My question has to do with the technologies that have been deployed in our system, and I am wondering about the testing and making sure that they will work and what kind of challenges do you face by making sure that these technologies are operable before we put them into play. We see many times in the newspaper where people have come through playing some sort of joke where they can bring scissors on, they can bring all sorts of things on, yet and still they have come through a screening. So what do you propose that we do to make sure that before we deploy any kind of system that it has been tested and vetted?

Ms. O'TOOLE. Well, thank you, Congresswoman. It is very important that we do testing and evaluation of technologies, not just at the end of development. That is a process that has to go on throughout the development process of a new technology. I think you are referring to the screening devices in airports. Those were developed by commercial sector, and S&T, for example, helped develop the testing process, what it is that we need to test, and we did a lot of the testing according to those criteria at the Transportation Security Lab in New Jersey. We also have a responsibility by statute to oversee operational testing and evaluation towards the end of the process of R&D just before we are getting to put something in the field. You test against requirements that get established at the very beginning of the R&D process. So the rigor and appropriateness of those requirements is very important. If the requirements aren't right, the T&E, the testing and evaluation, may not give you the full view that you need to understand how that machinery will operate in practice. So one of the things that we are doing in S&T with our realignment and strategic plan is placing a lot more emphasis on having our technical people advise the operating components on what they might do to create rigorous requirements at the beginning of the R&D process.

Ms. WILSON. Thank you very much. In light of what has happened in Japan in the nuclear power plant, this is sort of like a personal question. In Miami, Florida, we have a nuclear power plant called Turkey Point, and we have hurricanes, huge hurricanes, and near Turkey Point is a charter school and the charter school was established for the people who work at Turkey Point so that their children could be near them when they are at school and they can have lunch with them. In light of what has happened in Japan, I am going to ask, and I know you probably can't answer this openly but I am going to ask someone to take a look at Turkey Point and the relationship of Turkey Point and that charter school and try to figure out if a catastrophic hurricane comes—we haven't had one since the school has been built—what kind of impact if that Turkey Point explodes the way it exploded in Japan, what

kind of impact would that have on that charter school. Someone needs to investigate that and do something about warnings or moving or something because it is dangerous.

Mr. STERN. Thank you for the question. I think there are important lessons to be learned from any event such as this. The proper authority to answer the question of the potential damage or likelihood of an event at that reactor is of course the Nuclear Regulatory Commission, and they continuously look at these issues, and I think it would be probably a good idea to direct the question to NRC and in coordination with FEMA I think will come up with a complete answer.

Ms. O'TOOLE. I would add, Congresswoman, that FEMA regularly works with the NRC to devise disaster plans around all of the domestic nuclear power plants and they work with the plant management and with the local first responders. So there, I am sure is a plan in place. There is a plan in place around every U.S. power plant but FEMA would also be a source to question.

Ms. WILSON. Thank you. But I am sure they questioned it, I am sure they looked at it, I am sure they have a plan, but I am sure no one expected what happened in Japan and so that just adds a new height to my uneasiness, and thank you very much.

Chairman HALL. I thank the lady. Her time is expired.

Mr. Wu, did you want to be recognized for a unanimous consent request?

Mr. WU. Thank you, Mr. Chairman, yes. Mr. Chairman, I ask unanimous consent to include in the hearing record a written statement from the Center for Excellence for Awareness and Localization of Explosives and Related Threats.

Chairman HALL. And it has been read by our side, has it not?

Mr. WU. That is my understanding, Mr. Chairman.

Chairman HALL. Without objection, it will be admitted.

Mr. WU. Thank you very much. I yield back.

[The information appears in Apendix II]

Chairman HALL. Okay, yields back, so at this time I could recognize Mr. Rohrabacher again if he wants to be recognized.

Mr. ROHRABACHER. Mr. Chairman, as long as everyone on the other side has gone first, I am——

Chairman HALL. Mr. Lujan expressed some indication that he had further questions. I recognize you for another 5 minutes.

Mr. LUJAN. Mr. Chairman, I appreciate that very much, sir.

Dr. O'Toole, just picking up on that last line of questioning regarding DHS's responsibility associated with combating narcotics trafficking, and if I remember the Directorate correctly, one of the elements is to be able to take away resources from those that are engaging in trafficking, especially when those drugs are targeting the United States. Can you talk about the importance of the screening and detection technologies that DHS currently has access to or is looking to strengthen?

Ms. O'TOOLE. We are working right now on new technologies that might be able to detect bulk cash, for example. One of the real problems with these narcotics smugglers is that they bring drugs in and then they have to get cash out of the country. The estimates from ICE are—and this is thought to be a conservative estimate—as much as $40 billion might be flooding out of the country in bulk,

and it is very difficult to see using traditional techniques at the border, so we are developing technologies, which I don't want to describe in detail in open session, that might be able to detect those efforts.

For example, we have a lot of work underway in biometrics to better identify people coming through the points of embarkation and entry to the United States who might need a second look. Those include a number of technologies, and of course, we are working with CBP at ports to make sure that illicit cargo including drugs doesn't make it into the country, again using a variety of technologies.

Mr. LUJAN. And I have a question for Mr. Stern as well. Thank you, Dr. O'Toole.

One concern that I have, and it may be the Science and Tech Directorate, but it is in the reporting of what happens when those drugs are coming in. There was a GAO study that was conducted in 2009 that said when drugs are found between ports, they go to the DEA, but when drugs are found at the ports, they go to ICE, and there is a problem between those folks talking to each other, and I look forward to visiting more on what we could to talk about that.

Mr. Stern, just quickly, because time is limited and I apologize and I would be happy to visit with you more about this, if there was fissionable material identified in the United States that was in the hands of some people that shouldn't have it, are we able to identify where those folks are and do our capabilities allow us to go back and identify how those fissionable materials entered the country and how we could stop it or who even brought them to that point?

Mr. STERN. Thank you for the question. It really depends on the circumstances. There are real physical limitations in being able to detect material, and I think you are referring to forensics being able to identify where it ultimately came from. We would need to sit down as an interagency using whatever intelligence information was available as well as the technical information we have from our detectors and our forensics to do our best, but it is certainly not an easy task to achieve.

Mr. LUJAN. Thank you.

And Mr. Chairman, my concern is this, is that in different parts of the country we have narcotics problems where there is heroin coming in from other parts of the world, there is drugs coming in from all parts of the world. Granted, I know that we have to stop use in the country, and if we can eliminate the demand here, we certainly won't see the supply entering. Nonetheless, those drugs are entering the country. How safe should we feel if heroin can't be stopped and identified from entering the United States that nuclear materials are going to be stopped and identified as entering the United States? We need to do a better job on both fronts, and especially looking at how resources are being used within DHS outside of Science and Tech Directorate where I think there is other tools that are out there to be able to work with our scientists, physicists and engineers at our national labs, maybe our NNSA facilities, who are coming up with technologies and techniques every day based on federal agencies that are working with them to be

able to stop problems that are identified. There is a lot of tools and resources that are out there, and I appreciate very much the fact that there is an attempt for an inventory process to begin, if you will, of the tools and resources that other clients have ordered so that way we can see how they can be applied to homeland security safety. This is something that worries me every day, and we have people dying in my district every day from overdoses with heroin, and I know there are other problems that we have to combat, but if we can't stop one, how do we stop the other? And I think we need to make sure that we support the necessary screening and detection technologies to be able to combat that.

Thank you very much and I look forward to visiting more with you, and Mr. Chairman, thank you for your indulgence.

Chairman HALL. Thank you. It is my understanding Mrs. Wilson does not have other questions. If you do, I recognize you.

I recognize Mr. Rohrabacher if you have further questions, sir.

Mr. ROHRABACHER. Thank you very much, Mr. Chairman. Let me just note that earlier Dr. O'Toole mentioned some fundamental research going into trying to detect whether or not there is a means of determining if an earthquake was well on the way. I want to suggest that that is a very good use of taxpayer money. In California, we are very conscious of the fact that we could suffer exactly what happened, if not even worse than what happened in Japan, and we also know, I have read accounts of the San Francisco earthquake that animals seemed to know that there is going to be something happening, and if animals can sense that, there is something in nature that could tip us off and so as that progresses, I would like to make sure that we are kept informed on that because that sounds like a very good use of taxpayers' money to try to discover that type of thing.

In terms of discovering techniques of discovering large amounts of cash, well, you don't necessarily have to come to California for that because we don't have any more cash in California. We are going out of business.

About nuclear detection, let me ask you, Mr. Stern, do we now have the means technologically to detect what would be a dirty bomb or even a nuclear weapon that was not a dirty bomb in a container that is coming to the United States? Do we have something in place overseas that would make sure that those containers were screened for that type of threat and do we have the technology to actually do that screening?

Mr. STERN. Yeah. I mean, essentially all of our C1 cargo is scanned at U.S. ports. It is course an incredibly challenging task technically to have high confidence if certain material were very heavily shielded that we would find it, which again is why I think the approach that we could take at DNDO is in essence an intelligence informed approach. We will develop scenarios so we can in essence conceptually——

Mr. ROHRABACHER. So actually your tests find today that overseas intelligence and a more proactive approach is much better than a meet them at the door and pat them down approach?

Mr. STERN. In fact, the U.S. approach to nuclear terrorism is a layered approach, and in each of those approaches we don't want to assume that everything else fails because that is not a reflection

of reality. So it makes more sense to assume that there will be some level of success in some of the other layers including intelligence and then build our scenarios around that, and that is the most efficient way to use taxpayers' money.

Mr. ROHRABACHER. Do you have technology that is currently under—we just mentioned earthquake fundamental research that is going on. Is there research going on that will directly affect the safety of our country in terms of this type of nuclear smuggling?

Mr. STERN. Yes, there is a broad range of technologies being examined both in the early stages by our transformational research Directorate and the more later stages by our production and acquisition Directorate of technologies that will improve our detection capabilities.

Mr. ROHRABACHER. Okay. For the record, I represent both the ports of Los Angeles and Long Beach, where I believe 40 percent of all foreign trade to our country goes through those ports. We have tens of thousands of containers a day coming through these ports. It is insane. I don't see how, unless with technology, we do that per–person type of situation. We have to have technology to help us achieve that goal. And I think that if I had to guess, I am guessing that narcotics and I don't know about cash going the other way but I know narcotics and other types of things that threaten the well–being of the American people are coming through that port every day and anything we can do technologically to strengthen our ability to cope with that will certainly be a benefit to our country. So we will be grateful to hear about your efforts as time goes on, and thank you very much, Mr. Chairman.

Chairman HALL. The gentleman yields back. The chair recognizes the gentleman from Texas, Mr. Neugebauer, for 5 minutes.

Mr. NEUGEBAUER. Thank you, Mr. Chairman. This is kind of a little bit different twist but I think a real relevant subject, and I am sorry, I have been in two other hearings this morning, but with the events that are going on in Japan right now, obviously we are all very concerned as to what some of the problems with these reactors are, and I think there are reports today that one of the containment areas of one of the reactors possibly could have some issues. I guess the question that I have, from your perspective, do we have modeling capability that would allow us then to once we get some data from Japan and if in fact there is a discharge in the atmosphere of what the potential impact would be down range from those spills, and do we have a way to model and the levels that we might impact and then how does that translate into what kind of—if we think there are significant amounts, what kinds of actions that we would take domestically down range from those areas based on the levels of activity? I will let you both take a stab at that.

Mr. STERN. Yeah, I want to try in the middle of this crisis not to create any conflicting information, so I think it is best to point out that yes, there are models that exist but the appropriate agencies are the Department of Energy and the Nuclear Regulatory Commission, who are both looking very carefully at this issue.

Ms. O'TOOLE. Yes, we have been modeling radiation for a long time. Weather is difficult to model, as we know, but it is—the situation is being monitored, not just modeled, and I think Mr. Stern

is right, we have to wait until we have some actual data but it is a very big ocean. There is a long distance between us and the besieged people of Japan. A lot of people are very carefully watching the situation, Congressman.

Mr. NEUGEBAUER. And you may have already outlined this but what would be some of the mechanisms for measuring, for example, if there is a plume or a movement in the atmosphere? Do we have technology to monitor the levels in the atmosphere by flying those areas? I mean, I don't know how you——

Ms. O'TOOLE. Yes.

Mr. NEUGEBAUER. —do that but——

Ms. O'TOOLE. Yes.

Mr. NEUGEBAUER. —what would be the procedure for that?

Ms. O'TOOLE. Do you want to take that?

Mr. STERN. Again, I have to apologize because in the middle of this, I am very cautious about saying things that are outside of my line of my responsibility, and this is primarily an EPA, NRC, DOE responsibility and I think it is best to get the answer from them, again to avoid any new confusion in the middle of this crisis.

Chairman HALL. You are not under oath, and we do all the time up here. We will give you a chance if you have some suggestions or anything that you think might help Mr. Neugebauer, or you can decline, whatever you want to do.

Mr. STERN. I mean, again, there are detectors but again, they are under the authority, responsibility, operation of other agencies and the best answer is to get it from those agencies.

Mr. NEUGEBAUER. Well, I guess with those answers, I will yield back my time, Mr. Chairman.

Mr. LUJAN. Mr. Chairman, if the gentleman would just yield quickly? One thing that I would be interested in doing maybe jointly, Mr. Chairman, is if we could engage the NNSA national laboratories under Mr. Tom D'Agostino, and I know that they do have modeling capacity and capabilities not only with oceans but with—that there may be some answers that we could you directly from them. Maybe we could work together on that. Thank you, Mr. Chairman.

Chairman HALL. Thank you.

Ms. Biggert, we recognize you at this time for five minutes.

Mrs. BIGGERT. Thank you, Mr. Chairman.

I am from Illinois and have one of the national labs in my district, Argonne, and Dr. O'Toole, I have a question about how you would characterize how the university Centers of Excellence and the Department of Energy's labs support the research and development of DHS and how their work is integral to the development and demonstration and testing of technology. I know that right after 9/11, Argonne had several, I don't want to call them products but several things that were very helpful for our national security and were developed before we ever thought that they would be needed. How is that integrated to work together and how does DHS internal laboratories work with the national labs to avoid duplication of efforts?

Ms. O'TOOLE. We work very closely with the DOE national labs. Forty percent of our R&D budget goes to the DOE national labs. That may be a little high. It may be perfect. It may be a little low.

But they are obviously very close partners of ours, and we have various mechanisms to maintain close relationships so that they know what our needs are and we know what capabilities that they are developing. There is a national level effort going on at the level of the deputy and under secretaries in which Mr. D'Agostino from NNSA is included to make sure that critical capabilities in the national labs which are needed by the country on a long-term strategic basis, whether by the intelligence community or needed by DHS or needed by other elements of the government get maintained, and we have robust working relationships down at the project-manager level as well.

The Centers of Excellence are also critical to our R&D effort. They of course as is the case with most university work, work on a more fundamental science basis than does the commercial sector or some of the labs but they are both critical partners in our R&D effort.

Mrs. BIGGERT. Well, the research activities at the university Centers of Excellence are managed by administrative staff at each of the centers and not directly by DHS, so how do these activities align with the S&T enterprise?

Ms. O'TOOLE. Well, we have an ongoing dialog with them, both the administrative staff and the faculty, about what is in their charter. First of all, these Centers of Excellence are focused on certain areas. STAR in Maryland, for example, is looking at the sociological and criminological science behind terrorism. Others are more statistics-oriented. Others are focused on transportation and so forth. So they start with the focus area and a set of objectives which we work out mutually between the partners and the COEs and DHS.

Furthermore, we are making great strides in making the resources of the universities directly available to the DHS components, and I think the success of that is evidenced in the fact that the DHS components have directed more than $22 million go the COEs outside of the money that comes from S&T in order to do particular projects the components want done. So I think we have an ongoing dialog, tight connections and I think we are getting better and better over time as we get to know each other.

Mrs. BIGGERT. Thank you. I yield back.

Chairman QUAYLE. Thank you, and if there is nobody else who wants to be recognized, I thank the witnesses for their valuable testimony and to the Members for their questions. The Members of the Subcommittee may have additional questions for the witnesses, and we will ask for you to respond to those in writing. The record will remain open for two weeks for additional comments and statements from Members and also, because we are trying to keep this in a timely fashion and we thank the patience of the second panel, if we could make the transition into the second panel as quickly as possible, that would be great. The witnesses are excused. Thank you very much.

We now move to our second panel, and as a reminder, spoken testimony is limited to five minutes after which Members of the Committee will have five minutes each to ask questions.

Our first witness is the Director of the Douglas and Sarah Allison Center for Foreign Policy Studies at the Heritage Foundation,

Dr. James Carafano. Prior to joining the Heritage Foundation, Dr. Carafano had been a Senior Fellow at the Center for Strategic and Budgetary Assessments. Next we will hear from Mr. Marc Pearl, the President and Chief Executive Officer of the Homeland Security and Defense Business Council. Before joining the Council, Mr. Pearl was the Principal and Chairman of IT Policy Solutions. Our final witness is Mr. David Maurer, the Director of the Homeland Security and Justice Team at the U.S. Government Accountability Office. Mr. Maurer served in many capacities at the GAO, previously as Acting Director in GAO's Natural Resource Environment Team, where he managed the work assessing U.S. global nuclear detection programs.

Dr. Carafano, we will begin with you, and I recognize you for five minutes.

STATEMENTS OF JAMES CARAFANO, DIRECTOR, DOUGLAS AND SARAH ALLISON CENTER FOR FOREIGN POLICY STUDIES, HERITAGE FOUNDATION

Mr. CARAFANO. Thank you, Mr. Chairman. I have three quick comments: the good, the bad and the future.

You know, first I would say I think everybody on the panel would agree that we have come a long way since a few years ago. A center report characterized the S&T Directorate as a rudderless ship. I think no matter how you look at it, you can see that there has been a real progress but I would point to two areas very quickly.

The first is the reorganization, which I think has had a lot of positive benefits. I think particularly creating the analysis and operational office is a tremendous step in the right direction. The other thing I would really like to compliment the Directorate on is their increasingly and more efficient use of the Centers of Excellence and the federally funded Research and Development Centers. One particular program that I have worked with is called the Community Processions of Technology program where they bring in stakeholders and they evaluate technologies for policy implications. It is a model program that really ought to be emulated by other parts of the Federal Government.

There are long-term concerns, and I will just raise the three that are raised most often. The first is that DHS still lacks a fully integrated acquisition process, and I think that is a real issue, and they need to learn not to repeat the mistakes of the Department of Defense in that you need both the formal acquisition, long-term acquisition process and you need the rapid acquisition for crisis needs and new opportunities. DOD often ad hocs the second, and I think that is a big mistake. Both processes need to be formal and structured and built so they are non-competitive, and acquisition is integrated. It is not—it is everything from R&D to T&E and to buying the equipment but it also includes the integration with all the other elements which include training and human capital and operational practices, and unless you have that full spectrum of acquisition and it is integrated, you are not really getting your bang for the buck.

The second issue is transition. I think we would all acknowledge that there is still significant issues in terms of transitioning tech-

nologies, I think particularly in the first-responder area, and I really think that calls for a rethinking of priorities.

The third one I will mention very quickly is the lack of a really overall strategic plan. I mean, having a plan and writing "strategy" on the front page is not strategic. Strategic plans make hard decisions, and I don't honestly think that the department really has a portfolio that makes hard decisions, I think particularly if you look in the area of the money we have invested in scanning and detection technologies.

The two areas that I would recommend to the Committee to look into and for the Directorate to look at is I think international partnerships, public-private partnerships are vastly important, I would argue maybe the most important part of the scenario or the portfolio. I think a key element of that is the SAFETY Act. I think the SAFETY Act has been great at fostering the development of new technologies. An idea that we would suggest would be to internationalize the SAFETY Act, which is the United States should go out and proactively seek to engage other global partner countries to develop similar regimes that are comparable to the SAFETY Act and then we could have reciprocity where something could be developed in Israel, for example, and if they got the Israeli SAFETY Act qualification and it was comparable to U.S. SAFETY Act qualification that we would grant them reciprocal status here and vice versa. I would think this would really help the proliferation of homeland security technologies and I think it would be great in terms of encouraging the development of new technologies that all the allies could use.

The other area I will just mention very, very briefly and then conclude is nanotechnology. I think nanotechnology is one of the breakthrough technologies that is going to have wide application across the Federal Government. There is almost no area of technology that you can't see where it could have dramatic applications. In homeland security, for example, in the target delivery of drugs, which can be very important for therapeutics, for bio response, materials, I mean, it just goes on, and power generation. It just goes on and on and on. And I think DHS should partner with other federal agencies in creating something similar to what we did with fostering the semiconductor industry to create the public-private partnership that would really begin to set up the prototype industrial base so we could really leverage this going forward. I mean, right now we basically have a lot of individual nanotechnology research programs proliferated throughout the Federal Government and we need to start thinking corporately on how the Federal Government is going to be a good customer for these nanotechnologies as they evolve. Thank you very much.

[The prepared statement of Dr. James Carafano follows:]

PREPARED STATEMENT OF DR. JAMES CARAFANO

My name is James Jay Carafano. I am the Deputy Director of the Kathryn and Shelby Cullom Davis Institute for International Studies and the Director of the Douglas and Sarah Allison Center for Foreign Policy Studies at The Heritage Foundation. The views I express in this testimony are my own, and should not be construed as representing any official position of The Heritage Foundation.

Thank you for the opportunity to appear before the committee today and address this vital subject. In my testimony I will address: (1) the progress the Department of Homeland Security (DHS) has made in improving the organization and processes

for homeland security research; (2) remaining concerns; (3) vital steps to improving the organization of these activities; and (4) priorities for future research.

My responsibilities at The Heritage Foundation comprise supervising all the foundation's research on public policy concerning foreign policy and national security. Homeland security has been a particular Heritage research priority. The foundation produced the first major assessment of domestic security after 9/11.[1] Over the past nine years we have assembled a robust, talented, and dedicated research team. I have had the honor and privilege of leading this team for many years. Heritage analysts have studied and written authoritatively on virtually every aspect of homeland security and homeland defense. The results of all our research are publicly available on the Heritage Web site at www.heritage.org. We collaborate frequently with the homeland security research community, including the Center for Strategic and International Studies (CSIS), the Aspen Institute, the Center for National Policy, the Hudson Institute, the George Washington University Homeland Security Policy Institute, and the Strategic Studies Institute and Center for Strategic Leadership at the Army War College. Heritage analysts also serve on a variety of government advisory efforts, including task forces under the Homeland Security Advisory Council and Advisory Panel on Department of Defense Capabilities for Support of Civil Authorities. I also am a member of the National Academies Board on Army Science and Technology and served on the DHS advisory board for the Quadrennial Homeland Security Review (QHSR).[2] Heritage's research programs are strictly non-partisan, dedicated to developing policy proposals that will keep the nation safe, free, and prosperous.

Call to Action

From the outset our research has focused on ensuring that the organization and activities of the Department of Homeland Security are as efficient and effective as possible. In 2004 David Heyman, who headed the Homeland Security program at CSIS (and who now is Assistant Secretary for Policy at the U.S. Department of Homeland Security), and I led a research project that produced "DHS 2.0: Rethinking the Department of Homeland Security," the first comprehensive review of the newly established Department of Homeland Security.[3] When we wrote this initial report, the Science and Technology Directorate (S&T) did not have enough of a "track record" for the task force to make a detailed assessment. In 2007, however, my colleague at the Hudson Institute, Dr. Richard Weitz, and I published "Rethinking Research, Development, and Acquisition for Homeland Security," the results of a follow-on research project that specifically focused on the activities of the S&T Directorate.[4] The major concerns we identified were:

- Lack of response to customer needs. From the beginning, agencies within the DHS have complained that the Directorate's portfolios do not adequately reflect their requirements and are not sufficiently responsive to operational needs.
- Inability to manage complex programs. The Directorate's most prominent accelerated R&D effort-the attempt to rapidly deploy new technologies to defend against smuggled nuclear and radiological weapons-failed so badly that in April 2005 the Administration established the separate Domestic Nuclear Detection Office (DNDO) to manage these programs.
- Limited success in partnering with other federal agencies and international partners. The S&T Directorate faced significant challenges in sharing homeland security responsibilities and resources with other federal departments and agencies that are not incorporated within the DHS. These entities retain

[1] L. Paul Bremer III and Edwin Meese III, Defending the American Homeland: A Report of the Heritage Foundation Homeland Security Task Force (Washington, D.C.: The Heritage Foundation, 2002).

[2] I testified on the results of the QHSR before the House Homeland Security Committee. See James Jay Carafano, ?What Comes After Quadrennial Homeland Security Review?? Testimony before the Committee on Homeland Security, Subcommittee on Management, Investigations, and Oversight, United States House of Representatives, April 29, 2010, at *http://www.heritage.org/Research/Testimony/What-Comes-After-Quadrennial-Homeland-Security-Review#—ftn2.*

[3] James Jay Carafano and David Heyman, "DHS 2.0: Rethinking the Department of Homeland Security," Heritage Foundation Special Report No. SR–02, December 13, 2004, at *http://www.heritage.org/Research/Reports/2004/12/DHS–20–Rethinking-the-Department-of-Homeland-Security.*

[4] James Jay Carafano and Richard Weitz, "Rethinking Research, Development, and Acquisition for Homeland Security," Heritage Foundation Backgrounder No. 2000, January 22, 2007, at http://www.policyarchive.org/handle/10207/bitstreams/11911.pdf .

key roles in researching and developing scientific, engineering, and medical technologies relevant to homeland security.

- Failure to convert technologies for use by non-federal customers. Of particular note, the S&T Directorate had yet to develop a clear strategy for acquiring and converting technologies for use by the state and local governments and the private sector.

In response to these challenges among our key recommendations were:

- Putting First Things First. The Directorate needed to tighten its focus on its primary customer base-the agencies within the department. We recommended that DHS should get out of the business of brokering and developing technologies and supporting research for state and local responders and the private sector. Rather, government should limit its support to these other users to setting national standards in coordination with established government agencies such as the National Institute of Standards and Technology and non-governmental organizations such as the American National Standards Institute.
- Getting a Bigger Bang for the Buck. Rather than treating collaborative research with other federal agencies and international partners as an afterthought, we concluded the Directorate should give first priority to establishing effective partnerships and leveraging the capabilities of these other efforts.
- Reorganizing and Reprioritizing. We recommended restructuring R&D programs to best serve the operating agencies within the DHS, and concluded the S&T Directorate should provide the DHS with overall acquisition guidance as well as basic science and technology.
- Rethinking Acquisition. In many cases, R&D was not linked to acquisition or there was a failure to recognize that a new technology was not the best answer to the department's needs. Furthermore, the department lacked an integrated program that matches acquisition with training, human capital development, and improving operational practices.

Present Assessment

I would like to credit the current leadership of the DHS and the S&T Directorate for making a sincere effort to address these shortfalls. In particular:

- The current organization of the S&T Directorate represents a significant improvement in aligning research portfolios; establishing effective representation of stakeholder interests; and improving the capacity of S&T to contribute to acquisition and operational analysis. Furthermore, the department has announced plans to expand S&T's role in test and evaluation, as well as involving S&T in "life cycle" assessment of acquisition programs. The role of the director of the office of Acquisition and Operational Analysis should probably be expanded.
- S&T has made a more concerted effort to leverage the Centers of Excellence and its Federally Funded Research and Development Centers (FFRDC). Developing homeland security technologies and expertise requires years of intense effort by an integrated team of scientists, engineers, and managers. Repeated reorganizations only disrupt this challenging effort and should be avoided. Specifically, not curtailing or further limiting the terms of the Centers of Excellence is important. Likewise, the FFRDCs and their expanding capacity to provide operational research, systems engineering, and complex systems analysis have demonstrated real value added. They should be sustained and further exploited.
- The Directorate has also made a sincere and significant effort to establish federal research partnerships and to improve the oversight process for interagency agreements.[5] Likewise, DNDO was cited by the department's Inspector General in 2007 for improving coordination between federal and state agencies on domestic protocols for detection and response.[6]

[5] See, Office of the Inspector General, "The Science and Technology Directorate's Process for Funding Research and Development Programs, Department of Homeland Security," OIG–09–88, July 2009, pp. 24–25.

[6] Office Inspector General, DHS' Domestic Nuclear Detection Office Progress in Integrating Detection Capabilities and Response Protocols, OIG–08–19, December 2007, p. 1.

What has been accomplished is noteworthy, especially for a Directorate that in 2006 was criticized in Congress for being a "rudderless ship without a clear way to get back on course."[7] In contrast, a 2009 report by the National Academy of Public Administration concluded, "S&T has made strides towards becoming a mature and productive research and development organization, particularly during the last three years."[8]

Yet, despite this leadership team's hard work, significant concerns remain.

- *DHS still lacks an integrated requirements and acquisition process* and a means for integrated development of human capital, operational, training, education, and sustainment programs. DHS needs an integrated end-to-end process. This system needs to be formal and robust and include both a "deliberate" process for developing long-term needs as well as a "crisis-action" process for meeting unanticipated requirements and ensuring rapid acquisition to meet challenges such as those faced during the 2010 Gulf oil spill.
- *The DNDO model remains a concern.* In 2007, we expressed concern about establishing organizational activities that tried to do too much-overseeing everything from concept development to testing and evaluation, acquisition and deployment. We were also concerned that creating a "stovepipe" activity to manage the nuclear detection portfolio, as a separate activity made sense. Those concerns still remain.[9]
- *S&T still lacks a solid track record for transitioning technologies,* particularly for partners outside the department. S&T has improved stakeholder input primarily through its Integrated Product Teams.[10] Particularly noteworthy is the Directorate's Community Perceptions of Technology Program managed by the Homeland Security Studies and Analysis Institute, which provides early stakeholder input on the policy implications of fielding new technologies. I have participated in several of the roundtables organized under this program. It is an exceptional initiative, one that should serve as a model for other government R&D efforts. Nevertheless, transitioning technology is still a significant challenge.
- *The department still lacks a truly strategic approach to research and innovation* that would allow appropriately prioritizing and focusing its efforts. HSARPA (the Homeland Security Advanced Research Projects Agency) has been a disappointment.

Moving Forward-The Organization

Organizational and process restructuring bring costs and as well as benefits. That reality is often forgotten when attention is turned to improving the efficiency and effectiveness of an organization. Opportunity costs matter. This truism is nowhere more important to remember than when considering the DHS and S&T, which have seen a tsunami of reorganization and restructuring over the department's short tenure of existence.

That said, while tinkering ought to be kept to a minimum, there are some critical changes that might to be considered.

- *The time has probably come to give S&T a more defined statutory mission* that clearly outlines its role in acquisition, life-cycle management, and the integration with other enablers for the department, such as training, human capital management, and sustainment. This step should be taken through a reauthorization bill.
- *It might be time to rethink the mission, structure, and purpose of the DNDO* and whether these activities would not be better managed under major department activities rather than as a stand-alone activity.[11] It might make sense, for example, to transfer the office's transformational and applied R&D portfolios to S&T.
- *Congress and the department need to decide-whither the Homeland Security Advanced Research Projects Agency?* The act establishing the DHS created

[7] Senate Report. 109–273, p. 88.

[8] National Academy for Public Administration, "Department of Homeland Security Science and Technology Directorate: Developing Technology to Protect America," June 2009, p. ix.

[9] See, for example, U.S. Government Accountability Office, "Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities," GAO–09–257, January 2009.

[10] Ibid., pp. 42–53.

[11] For the challenges faced by the DNDO, see, for example, Gene Aloise and Stephen L. Caldwell, "Combating Nuclear Smuggling," U.S. Government Accountability Office, GAO–10–1041T, September 15, 2010.

HSARPA. At the time, legislators assumed its mission would parallel the function that DARPA serves for the Department of Defense. That vision has never been fully realized and it is an open question whether a DARPA-like activity is truly essential for DHS or whether DHS would not be better off putting the overwhelming majority of its resources on its present operational needs and leveraging existing organizations, like DARPA, for the rare occasion it needs to look at truly futuristic or "out of the box" solutions.

Today, HSARPA primarily provides an additional layer of management for a broad portfolio of programs and projects. While it is important to reduce the overwhelming number of direct reports to the undersecretary, it is an open question whether HSARPA best fills this role. [12]

Moving Forward-The Mission

It is time for a serious strategic debate on the direction of the department's homeland security research. We know an awful lot about the competitive environment of ensuring our nation's Transitioning technology outside the department is extremely difficult. Given that reality and all the serious competing priorities for resources (with a very few "strategic" exceptions) it is time for the department to make the tough call and dramatically scale back its efforts in this area.

S&T should

- Focus laser-like on getting close to its "internal" department customers.
- Limit itself to a coordinating and standards-setting role on technologies for state and local governments, first responders, and the private sector.
- Acknowledge there may be exceptions to the general rule of doing less, particularly in the areas of cybersecurity, [13] exceptionally vital infrastructure (such as the national electrical grid) [14] and technologies that might impact on the resiliency of small and medium business. These areas are the true Achilles' heel of the U.S. economy. Small and medium businesses, for example, make up over half of the American work force. The workers and the companies they serve are the backbone of the U.S. economy. On average, they create about two-thirds of all new jobs each year. Yet, they are most susceptible to interruptions from attacks and disruptions-and there is dearth of research supporting their particular needs. [15]

The department continues to have difficulty putting dollars where they can make a difference. The S&T agenda is still driven too much by stakeholders rather than real strategy. S&T should:

- Dramatically scale back on screening and detection technologies. The needs for these technologies should be driven real assessments of the most efficacious means to achieve risk reduction; the costs and benefits of measures, and limits of current technology rather than legislative fiats of Congress and whims of government officials.
- Step-up cyber-research. Cyber-research must be a high priority for the whole of government and DHS must play an important part. There is no area of homeland security threats, including our knowledge of the dangers of weapons of mass destruction, where government's basic knowledge of the challenge is more deficient. A 2007 Computer Science and Telecommunications Board research report concluded:

  > [B]oth traditional and unorthodox approaches will be necessary. Traditional research is problem-specific, and there are many cybersecurity prob-

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[12] See, National Academy for Public Administration, "Department of Homeland Security Science and Technology Directorate," pp. 11–13.

[13] As a 2007 Computer Science and Telecommunications Board research report concluded, however, the national research and development program is wholly inadequate. Homeland Security is a vital component of this program. See, James Jay Carafano and Eric Sayers, "Building Cyber Security Leadership for the 21st Century," Heritage Foundation Backgrounder No. 2281, December 16, 2008, at *http://www.carlisle.army.mil/DIME/documents/bg—2218%5B1%5D.pdf,*.

[14] The resilience of the U.S.-Canadian electrical grid and telecommunications systems, including developing limited redundancy and identifying means for the timely replacement of essential damaged parts or their rapid substitution is vital to ensure national resiliency in the face of catastrophic disasters. See, James Jay Carafano and Richard Weitz, "EMP Attacks-What the U.S. Must Do Now," Heritage Foundation Backgrounder No. 2491, November 17, 2010, at *http://www.heritage.org/research/reports/2010/11/emp-attacks-what-the-us-must-do-now.*

[15] James Carafano, "Homeland Security's blind spot" The Examiner, September 14, 2009, at *http://washingtonexaminer.com/op-eds/2009/09/james-carafano-homeland-securitys-blind-spot.*

lems for which good solutions are not known.. Research is and will be needed to address these problems. But problem-by-problem solutions, or even problem-class by problem-class solutions, are highly unlikely to be sufficient to close the gap by themselves. Unorthodox, clean-slate approaches will also be needed to deal with what might be called a structural problem in cybersecurity research now, and these approaches will entail the development of new ideas and new points of view that revisit the basic foundations and implicit assumptions of security research. Addressing both of these reasons for the lack of security in cyberspace is important, but it is the second-closing the knowledge gap-that is the primary goal of cybersecurity research..." [16]

Today, that goal (though admittedly the S&T agenda in this area is much improved) is still not being met.

Finally, while much has been to done to improve "partnerships," these activities must be further stressed as the highest priority. Some specific initiatives that S&T might consider include:

- Become a full partner in the federal nanotechnology effort. DHS, as do many federal agencies, has some nano-related programs, but these disparate research efforts are inadequate for what could be the greatest "game-changing" technology of the next decade. Today, the United States leads the world in nano-science, but that lead is narrowing fast. Our private sector can't plunge much further into nano-industries, given the current economic climate. But that could change rapidly, with a little help from Washington. In high-tech manufacturing, the main cost issue is tech investment-something quite sensitive to tax and regulatory policy. If federal policymakers lowered the cost of capital-by reducing taxes on capital gains and dividends, as well as corporate income taxes-it would stimulate capital investment in a variety of promising technologies. And few, if any, are more promising than nanotechnology. DHS, along with the rest of the government, should rethink its nanotechnology investment strategy. They should pivot right now to help foster the development of nanotechnology manufacturing infrastructure. That way, DHS and other federal agencies can incorporate innovations into its equipment-quickly and cheaply-as soon as the innovations emerge. The Pentagon has done this before. In the 1980s, the Defense Research Projects Agency helped set up Sematech, a consortium of U.S. semiconductor companies called to resolve common manufacturing challenges. DHS and other partner agencies should do the same for nanotechnology manufacturing. [17]
- Internationalize the SAFETY Act. [18] After 9/11, the U.S. Congress established one potential instrument: The Support Anti-Terrorism by Fostering Effective Technologies (SAFETY) Act. The SAFETY Act lowered the liability risks of manufacturers that provide products and services used in combating terrorism. The act, passed in 2002, protects the incentive to produce products that the Secretary of Homeland Security designates as "Qualified Anti-Terrorism Technologies." The Department of Homeland Security has made a concerted effort to implement the program, and, as of 2009, about 200 companies have obtained SAFETY Act certification. This program should be used to accelerate the fielding of commercial products and services for cybersecurity.
- If other nations adopted similar liability protection regimes they could form a network to promote innovation. One potential source of outreach might be the Technical Cooperation Program (TTCP), an international organization that collaborates in defense-related scientific and technical information exchange and shared research activities with Australia, Canada, New Zealand, the United Kingdom, and the United States. TTCP is one of the world's largest collaborative science and technology forums. Outreach might focus initially on U.S. partners in Asia including Japan, Australia, New Zealand, Taiwan, South Korea, India, Hong Kong, and Singapore. Singapore is the United States' 15th-largest trading partner and ninth-largest export market. Foreign

[16] Computer Science and Telecommunications Board, Toward A Safer and More Secure Cyberspace (Washington, DC: National Academies Press, 2007), p. 61.

[17] Adapted from James Carafano, "U.S. must gird for war in very small places," The Examiner, December 12, 2010, at *http://washingtonexaminer.com/opinion/columnists/2010/12/james-jay-carafano-us-must-gird-war-very-small-places#ixzz1GViM4F10.*

[18] Recommendations are adopted from James Jay Carafano, "Fighting Terrorism, Addressing Liability: A Global Proposal," Heritage Foundation Backgrounder No. 2138, May 21, 2008, at *http://www.heritage.org/Research/Reports/2008/05/Fighting-Terrorism-Addressing-Liability-A–Global-Proposal.*

direct investment in Singapore is concentrated largely in technical service sectors; manufacturing; information; and professional scientific knowledge, skills, and processes.

As national liability protection proliferates, new opportunities for international cooperation will emerge. Countries that adopt verifiably similar liability protections should extend reciprocal privileges to one another. An expanding global web of liability protection will facilitate the proliferation of homeland security technologies..

Thank you for the opportunity to testify today.

BIOGRAPHY FOR DR. JAMES CARAFANO

James Jay Carafano, Ph.D. Deputy Director, Kathryn and Shelby Cullom Davis Institute for International Studies and Director, Douglas and Sarah Allison Center for Foreign Policy Studies

Areas of Expertise:

Homeland Security, Defense, Military Affairs, Interagency (whole-of-government) Operations, Counterterrorism

Summary:

James Carafano, one of the nation's leading experts in defense and homeland security, directs Heritage's Douglas and Sarah Allison Center for Foreign Policy Studies.

Carafano is an accomplished historian and teacher as well as a prolific writer and researcher on a fundamental constitutional duty of the federal government: to provide for the common defense.

His research focuses on developing the national security required to secure the long-term interests of the United States—protecting the public, providing for economic growth and preserving civil liberties.

In this capacity, Carafano is one of the principal policy experts who appear in Heritage's gripping documentary on the case for missile defense, *"33 Minutes: Protecting America in the New Missile Age."*

In August 2009, Carafano was promoted to director of the Allison Center for Foreign Policy Studies as well as to deputy director of the Kathryn and Shelby Cullom Davis Institute for International Studies.

Carafano, a 25-year veteran of the Army, manages day-to-day research and program activities of the Allison Center. He also serves as deputy to Kim R. Holmes, vice president for defense and foreign policy studies, in overseeing the centers and projects of Davis Institute, where Carafano had been assistant director since 2006.

He is a weekly columnist on national security affairs for the Washington Examiner newspapers.

Carafano's most recent book is *Private Sector/Public Wars: Contracting in Combat-Iraq, Afghanistan and Future Conflicts (Praeger, 2008),* a rigorous study of contractors' role on the battlefield and their impact on military effectiveness and civil society.

Carafano's current book project is a history of the modern military. He is editing a new book series, "The Changing Face of War," which examines how emerging political, social, economic and cultural trends will affect the nature of armed conflict.

Carafano joined Heritage as a senior research fellow in 2003. He had been a senior fellow at the Center for Strategic and Budgetary Assessments, a Washington policy institute dedicated to defense issues.

In his Army career, Carafano rose to the rank of lieutenant colonel. He served in Europe, Korea and the United States. His assignments included head speechwriter for the Army Chief of Staff, the service's highest-ranking officer. Before retiring, Carafano was executive editor of Joint Force Quarterly, the Defense Department's premiere professional military journal.

A graduate of West Point, Carafano holds a master's degree and a doctorate from Georgetown University as well as a master's degree in strategy from the U.S. Army War College.

He is a visiting professor at National Defense University and Georgetown University. He previously served as an assistant professor at the U.S. Military Academy in West Point, N.Y., and as director of military studies at the Army's Center of Military History. He taught at Mount Saint Mary College in New York and was a fleet professor at the U.S. Naval War College.

Carafano is the co-author with Paul Rosenzweig of *Winning the Long War: Lessons from the Cold War for Defeating Terrorism and Preserving Freedom (2005).* The authors, first to coin the term "the long war," argued that a successful strategy requires a balance of prudent military and security measures, continued economic

growth, zealous protection of civil liberties and prevailing in the "war of ideas" against terrorist ideologies.

Carafano also co-authored a textbook, *Homeland Security* (McGraw-Hill), designed as a practical introduction to everyday life in the era of terrorism. The textbook addresses such key details as the roles of first responders and volunteers, family preparedness techniques and in-depth looks at weapons of mass destruction.

His other works include *G.I. Ingenuity: Improvisation, Technology and Winning World War II (2006); Waltzing Into the Cold War (2002);* and **After D–Day (2000),** a Military Book Club main selection.

As an expert on defense, intelligence and homeland security issues, Carafano has testified many times before Congress.

He is a regular guest analyst for all the major U.S. network and cable television news organizations, from ABC to FOX to MSNBC to PBS, as well as such outlets as National Public Radio, Pajamas TV, Voice of America and the History Channel. From SkyNews to Al Jazeera, he also has appeared on TV news programs originating in Australia, Austria, Canada, France, Great Britain, Greece, Hong Kong, Ireland, Iran, Japan, Portugal, Spain and Sweden.

Carafano's op-ed columns and commentary are published widely, including the Baltimore Sun, Boston Globe, New York Post, Philadelphia Inquirer, USA Today and Washington Times in addition to the Washington Examiner.

He is a member of the National Academy's Board on Army Science and Technology and the Department of the Army Historical Advisory Committee. He is a senior fellow at George Washington University's Homeland Security Policy Institute.

In 2005, Carafano received Heritage's prestigious W. Glenn and Rita Ricardo Campbell Award. The honor goes to the staff member determined to have made "an outstanding contribution to the analysis and promotion of the free society."

Chairman QUAYLE. Thank you, Dr. Carafano.

Mr. Pearl, you are now recognized for five minutes.

STATEMENT OF MARC PEARL, PRESIDENT AND CHIEF EXECUTIVE OFFICER, HOMELAND SECURITY AND DEFENSE BUSINESS COUNCIL

Mr. PEARL. Thank you, Chairman Quayle, and welcome to you first hearing of the Subcommittee. There is going to be many more, and I hope that they are just as substantive at this first one is. I want to thank you and the Members of the Committee for giving the Homeland Security and Defense Business Council an opportunity to testify before you today.

The Council, just for background, is a not-for-profit, non-partisan organization of the leading companies that deliver homeland security solutions to the marketplace. Our organization works to ensure that the perspective, the innovations, the expertise and the capabilities of the private sector are fully utilized in our Nation's security as well recognized and integrated with the public sector at the same time. We appreciate, I want to say at the outset, the leadership of this Subcommittee and the Full Committee on the critical issues associated with improving R&D within government as well as your continued support for successful partnerships between government and the private sector in order to fulfill our collective mission, which is to keep our Nation safer and more secure. These partnerships, as has been talked about today, are key to the government's ability to deliver high-quality solutions to citizens effectively, efficiently and fiscally responsibly.

The Committee asked us to discuss any observable changes that have occurred following the QHSR and the reorganization of the Directorate and to provide as well the industry's collective perspective on the relationship between and interaction between DHS S&T programs, and my written testimony also goes into some sugges-

tions that the private sector has on recommendations for success. I ask that my full written testimony be included in the hearing record.

With respect to the QHSR, let me briefly comment that we applaud the department's efforts to collect and input and all of the things that came out of it last year. It is the hope of the Council and all of our members that the policy compilation leads to a successful strategic plan that all of the members discussed in their questions this morning that includes priorities, budgets and operational requirements as well as program alignments that will help achieve cost efficiencies and mission success. This process should serve to inform the business sector of the department's long-range priorities and long-term needs in a timely manner as well as giving industry solution providers and opportunity to engage the government, to help identify any gaps that may exist in technology, capabilities and reasonable expectations about timeliness and the cost of delivery.

While the Council fully supports the continued efforts to improve the S&T Directorate, reorganization as such is not as important as establishing an operational philosophy that includes more effective engagement across entire department components to better solicit and understand its requirements as well as with the private sector to solicit the most effective and efficient solutions to those requirements.

My written testimony outlines some of the examples of reorganization that might assist in improving mission success including the creation of an acquisition and operational analysis division to improve the writing of the necessary requirements and the overall strengthening of the individual components acquisition programs as well as we discuss the enhancement of the Homeland Security Advanced Research Projects Agency by combining all of the S&T divisions, thereby strengthening and gaining better alignment across the disciplines and needs.

The Council members, in reiterating what Dr. Carafano was saying, also believe that the acquisition process itself is a critical part of a lifecycle that must begin much earlier than contracting activities. Long before a blueprint is drawn up or before RFIs and RFPs are proffered, there must be a collective cooperation with and in substantive engagement between experts on the ground and practitioners in the field. The Council's continuing efforts to identify and develop successful interactions with the S&T Directorate we believe have paid dividends both for government and industry. We have historically worked closely with the Directorate since its inception and have developed and nurtured substantive engagements. We need to continue those discussions.

But even amidst the establishment of that effective relationship, the business sector as a whole is currently struggling to comprehend long-term strategic needs and goals of the department, especially within the Directorate. This has made our long-term investments towards innovative technologies that could become effective solutions challenging at best. Broad and interactive communications to inform strategic planning and developing a national technology framework are absolutely necessary in order to achieve a level playing field and spur innovative efforts. As I said, greater

long-term strategic planning and more opportunities to engage the department earlier in the planning process will also result in our fulfilling the needs of the Directorate and delivering innovative and successful solutions our Nation needs.

Lastly, my written testimony outlines a number of recommendations for consideration by the Subcommittee in addition to what I previously mentioned. Allow me to briefly highlight a couple of those. The S&T Directorate must have greater access across government and greater authority over Homeland Security R&D efforts. The S&T Directorate with Congressional support and encouragement to in essence couple on to what Dr. Carafano said must actively demonstrate a continued commitment to the SAFETY Act forgetting about international also within the country itself. This is one of the Directorate's best and most tangible methods for working with the private sector. And continued and adequate Congressional funding of technological R&D homeland security solutions is a worthy and a necessary investment. Without it, the department's ability to deliver solutions to protect our Nation and potentially extinguish technology advantages over an ever-evolving adversary will be compromised.

In conclusion, the Council once again expresses our appreciation for the opportunity to testify before you this morning. We pledge, the Council and its members, an opportunity to provide this committee and the department with appropriate support, expertise and input needed to achieve mission success, and we look forward to meeting with you and working with you as deliberations continue. Thank you.

[The prepared statement of Mr. Marc Pearl follows:]

PREPARED STATEMENT OF MR. MARC PEARL

Introduction

Chairman Quayle, Ranking Member Wu and Members of the Committee, I thank you for giving the Homeland Security & Defense Business Council an opportunity to appear before you today. At the outset, we want to express our appreciation to this Subcommittee and to the full Science, Space and Technology Committee for its continued leadership on the full range of critical issues associated with improving research and development (R&D) within government and encouraging even greater involvement of industry. We also want to recognize, in particular, your guidance on initiatives to enhance the partnership and recognition of the importance of substantive engagement between the government and the private sector when it comes to fulfilling our collective mission—to keep our nation safer and more secure. That partnership is essential to our government's ability to deliver high quality solutions to citizens effectively, efficiently, and fiscally responsibly.

I am Marc Pearl, President and CEO of the Homeland Security & Defense Business Council, a not-for-profit, non-partisan organization of the leading companies that deliver homeland security solutions to the marketplace. The Council works to ensure that the perspective, innovation, expertise and capabilities of the private sector are fully utilized in our nation's security, as well as recognized and integrated with the public sector.

The Council and its members, first and foremost, support fairness and openness in the Federal contracting process; inclusion of the private sectors' perspective in major legislative and administrative initiatives; and the effective use of resources and adoption of the most advanced security solutions to protect our citizens, economy and critical assets. Council members employ over 3 million Americans in all 50 states. We are honored and proud to work alongside leaders from civilian, defense and Intel agencies in support of their strategic initiatives, through our individual and collective expertise in technology, facility and networks design and construction, human capital, financial management, technology integration, and program management.

This focus of the Council's testimony is to provide the subcommittee with industry's collective perspective on the relationship and interaction between DHS science and technology programs and the private sector's recommendations for success. It will also address any observable changes that have occurred following the Quadrennial Homeland Security Review and reorganization of the Science and Technology Directorate.

Quadrennial Homeland Security Review (QHSR)

The Council applauds the Department's effort in collecting input and developing the Quadrennial Homeland Security Review published last year. The Council and all of our members hope the QHSR will lead to a strategic plan that would include priorities, budgets, operational requirements, and programmatic alignments that will help to achieve cost efficiencies and mission success. This process could serve to inform the business sector of the Department's long-range priorities and long-term needs in a timely manner. In addition, this process could give industry solution providers an opportunity to engage the government and help identify any gaps in technology, capabilities, and reasonable expectations about timeliness and cost of delivery.

The QHSR—in and of itself—has been an important policy guidance document, but it and the entire process need practical, identifiable and operational linkages to budget and a long-term strategic needs assessment with corresponding goals, priorities and budget.

Any strategic planning review and 'head-of-curve' discussions should focus on answering three basic, but crucial questions with respect to the specific linkage between the policy and the implementation:

1. Is the plan *economically reasonable*?
2. Is it *technologically feasible*?
3. Does it take into account any significant *unintended consequences*?

These fundamental questions should guide all future development, deployment, and implementation. When addressed—whether by program managers, senior officials and/or, even Members of Congress—we all will be able to successfully move forward to ensure industry's ability to align its business lines and strategies to meet the Directorate's and our nation's needs.

Science & Technology Directorate Reorganization

The Council supports the continued efforts to improve the Science and Technology Directorate. However, reorganization, as such, is not as important as establishing an operating philosophy that includes more effective engagement with Department's components to better solicit and understand its requirements; and with the private sector to better solicit the most effective and efficient solutions to those requirements. The Council's believes that the following examples of reorganization might assist it in improving mission success.

- The creation of an "Acquisition and Operational Analysis Division" to improve the writing of the necessary requirements and the overall strengthening of the individual components' acquisition programs can be of great benefit. Existing efforts to link R&D to operational requirements are a positive step forward, but there remains ambiguity over the requirements.
- Enhance the Homeland Security Advanced Research Projects Agency (HSARPA) by combining all the S&T divisions, thereby strengthening and gaining better alignment across the disciplines and needs. This process also has potential to improve consistency with the way DoD & DoE use DARPA and ARPA–E to leverage science. We recognize, of course, that there are still a lot of cultural changes required to ensure cooperation, but working towards such a goal will promote greater science, provide more effective and efficient solutions, and lead to practical applications that serve our nation's security needs.

Real mission success in R&D can be achieved through the establishment of policies and procedures that advance the movement of critical technologies from the laboratory, and early research and development to the field in a manner that supports successfully transition of these technologies for homeland security application.

Acquisition Process

The Council believes that the acquisition process is part of a lifecycle that must begin much earlier than contracting activity itself. Long before the 'blueprint' is drawn up, and before the RFIs or RFPs are proffered, there must be collective co-

operation with and substantive engagement between experts on the ground and practitioners in the field. A successful process should also require equipping the entire team with an understanding of the challenges and risks in place during the entire lifecycle of the project to ensure success. This process could successfully address a project's economic reasonability, technological feasibility, and unintended consequences.

A GAO Report that has been cited by the House and Senate leadership on countless occasions found that "contracts with well-defined requirements linked to measurable performance standards delivered results within budget and provided quality service." [1]

This process must be properly managed and communicated to ensure the necessary solutions are developed with "man on the ground" requirements development, including input from the private sector to meet the goals of the "final customer." We would very much like to see a functioning process that identifies and tracks requirements generated at any level through validation, budgeting, acquisition, and success or effect. The development of a clear DHS-wide process would not only serve to enhance efficiency, but would provide needed transparency so that end-users—acquisition and operations officials—and industry can work in concert, rather than exist in a seemingly disconnected and stove-piped environment.

The Relationship And Interaction Between DHS Science And Technology Programs and the Private Sector

We are very grateful that the subcommittee has also asked us to address this issue. The work and mission of the Council is primarily focused on how industry can be more successful in building trusting, cooperative, and substantive engagements with our counterparts in the public sector. There is no question that our continuing efforts in striving to identify and develop successful interaction with the Directorate have paid dividends for both government and industry. The Council and its members have successfully worked closely and nurtured a substantive relationship with the Directorate since its inception to discuss and develop innovative solutions to protect our country. But even amidst the establishment of an effective relationship, the business sector, as a whole, has struggled to comprehend the long-term strategic needs and goals of the Department, especially within the Directorate. This has made our long-term investments toward innovative technologies that might become effective solutions, challenging at best.

Similar to the Federal sector, industry has limited resources to devote to developing homeland security solutions. They cannot devote these resources to building speculative technologies. We want to deliver the solutions that the Department and our nation needs.

The Council's overarching mission is to work with DHS officials to improve its engagement with the private sector long before a crisis or even the development of a program. Ultimately, the private sector will provide the innovation needed to develop the appropriate solutions as demonstrated time over time in our nation's history. In order to pursue a level playing field across industry and to spur innovation efforts, broad and interactive communications to inform strategic planning and a national technology framework are needed. The business sector is willing to devote resources and take risks in order to help provide homeland security solutions, but we are looking to DHS to further improve its requirements development and definition.

Large amounts of guidelines, forms, databases and other documents must be reviewed and produced to initiate dialogue in some parts of the agency. Focusing less on documentation and process and more on interaction and partnership could substantially free up bottlenecks. In addition, identifying private sector SMEs in relevant scientific disciplines could enable partnerships more quickly and effectively.

The Council is hopeful that the future will include greater long-term strategic planning and more opportunities to engage the Department earlier in the planning process. Through early engagement in the process we can better understand and deliver the innovative solutions that will protect our country and its people.

Recommendations

The Council submits the following recommendations for consideration by the subcommittee:

- **Increased Cooperation and Visibility:** The private sector brings more than a 'vendor' mentality to the table. We have our own R&D projects ready

[1] GAO report GAO–08–263 entitled 'Department of Homeland Security: Better Planning and Assessment Needed to Improve Outcomes for Complex Service Acquisitions'—released on May 8, 2008.

to respond to stated needs of our nation, but we cannot develop them in a vacuum. We want to continue meeting the needs of the Department, the Directorate, and the nation as a whole. Government and its industry partners share the same goals. Projects completed on time and on target are a win-win. Programs that meet their objectives are a win-win. We understand the needs are complex and challenging, but our common goal is to find the most appropriate, effective, and efficient routes to mission success. The public and private sectors—working from previous recommendations and developing new ones if necessary—must be able to work from the same strategy.

- **Greater Authority and Planning for Science and Technology Directorate:** The Council supports greater authority for the Science and Technology Directorate. Currently homeland security R&D efforts are spread among many governmental organizations. The Directorate is highly dependent on other federal agencies to achieve its mission. However, there does not appear to be a clear strategy for how to do that effectively, and collaboration with DoD, DoE, NIST and other scientific organizations is not clearly organized, resulting in duplicate and potentially unleveraged efforts. It must be recognized that there are significant cultural challenges within the Department, and it remains a challenge to effectively bring new technologies to maturity, and concurrently, to gain broad acceptance in the operational communities. In order to succeed, the S&T Directorate must be able to direct the government-wide homeland security R&D agenda, not compete against numerous organizations inside and outside the Department.
- **Innovative Solutions vs. "Gadgets":** The Council believes there is a need to improve the way the Directorate thinks about and pursues innovation. "Needs" are typically defined by end-user practitioners and frequently fail to incorporate scientific perspectives and commercially available technologies effectively. As a result, requirements frequently end up defining a point source technology, product or service ("gadget") that may or may not successfully address the true need. Additionally, ineffective requirements processes result in increased or lost cost of development, commercialization delays across the board, and potential duplication of effort. Industry expertise in commercial technology development is also not leveraged to the extent it could be.
- **SAFETY Act Commitment:** The Council supports continued commitment to the SAFETY Act—one the Directorate's best and most tangible methods for working with the private sector. The SAFETY Act is the most reliable way DHS can learn about and encourage the deployment of critical security tools and services. The Council hopes for continued commitment from S&T leadership, starting with the Under Secretary and her personal staff, to implement the SAFETY Act in a full and complete fashion. Ideally, complete implementation would create a clear application process and establish standards that promote the full utilization of the law.
- **Continued Congressional Funding:** The Council also believes continued congressional funding of the research and development of technological homeland security solutions is a worthy and necessary investment. Without adequate funding, the Department will have a diminished ability to deliver solutions to protect our nation, have a devastating effect on the overall homeland security R&D enterprise, and potentially extinguish technology advantages over an ever-evolving adversary. HR–1 proposes to eliminate more than $500 million from the Department of Homeland Security's Science and Technology budget—effectively cutting it by half. The Council hopes that the legitimate desire on the part of Congress to curtail unnecessary spending will not result in the reduction of our nation's ability to develop tools to counter the threats it faces and spur its global competitiveness.

Conclusion

On behalf of the Homeland Security & Defense Business Council, I once again express our appreciation for the opportunity to provide our comments on the important issues before the Subcommittee. The Council and its members pledge to provide this Committee and the Department with the appropriate support, expertise and input needed to achieve mission success. We are prepared to work with the subcommittee not just as a neutral conduit between the public and private sectors, as a very interested actor and trusted advisor to mutually achieve the following goals:

- Identify and find real world solutions to our homeland security challenges;
- Work towards a strategic plan with visibility and cooperation in the research and development of homeland security solutions; and

• Ensure a sound, fair and responsible acquisition process.

We believe the achievement of these goals will help get our nation where it needs to be—where this Committee, the administration, the Department, and the private sector want us to go—and ensuring that we get there together.

We look forward to working with the Subcommittee as it continues its deliberations.

BIOGRAPHY FOR MR. MARC PEARL

Marc Pearl has served as President and CEO of the Homeland Security & Defense Business Council since March 2008. The seven-year old Council's membership consists of the leading companies that provide homeland security solutions for our nation, and actively involves their senior executives in developing substantive high-level thought leadership peer-to-peer interaction with their government counterparts. The Council's programs and initiatives focus on ensuring that the perspective, innovation, expertise and capabilities of the private sector are fully utilized in our nation's security.

Prior to joining the Council, Marc was the principal and chairman of IT Policy Solutions, which he founded to counsel private sector organizations in meeting their public policy challenges. He concurrently served as executive director of the Consumer Electronics Retailers Coalition. Pearl had previously been a partner at the international law firm, Shaw Pittman and led their e-commerce policy practice; served as general counsel and senior vice president at ITAA (now TechAmerica); and was chief of staff and legislative counsel to U.S. Representative Dan Glickman, when the former congressman chaired the House Intelligence Committee.

Marc has lived and worked in DC for more than three decades, focusing his work on technology and cyber security policy issues since the mid-1990s. Pearl's grasp of the federal, state/local and global policy issues important to industry, together with his non-partisan, substantive approach to policymaking have made him an invaluable resource to clients and a trusted advisor to numerous decision makers. He helped form and led broad-based coalitions on Y2K liability legislation, e-commerce transaction jurisdiction laws, digital authentication and the DTV "transition." Marc was also privileged to represent the private sector on U.S. government delegations at the Hague Conference on Private International Law, the World Trade Organization (WTO) and the World Intellectual Property Organization (WIPO).

Born and raised in Detroit, Marc graduated with honors from Case Western Reserve University and received his law degree from Emory University's School of Law.

For more information on the programs, initiatives and mission of the Homeland Security & Defense Business Council visit: http://www.homelandcouncil.org.

Chairman QUAYLE. Thank you, Mr. Pearl.

Mr. Maurer, you are recognized for five minutes.

STATEMENT OF DAVID MAURER, DIRECTOR OF THE HOMELAND SECURITY AND JUSTICE TEAM AT THE U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. MAURER. Thank you. Good morning, Chairman Quayle and Members of the Committee. I am pleased to be here today to discuss the recent findings from past work looking at research and development at the Department of Homeland Security.

Two weeks ago, GAO issued its first mandated review of potential duplication, overlap and cost savings within federal programs. In that review, we identified research and development at DHS as a potential area for cost savings. Drawing on years of work at DHS, we found that the department has the potential to reap important cost savings by taking two commonsense actions. First, test systems to make sure they meet requirements before deciding to buy them. Second, conduct cost-benefit analysis to ensure that taxpayer dollars are buying systems that improve Homeland Security capabilities.

In recent years, we found that DHS has not always taken these actions. As a result, DHS ends up taking risks that multi-billion-dollar programs may not deliver their expected results. In some cases, DHS spent millions on systems that did not work and that did not enhance security.

For example, in 2006, the Transportation Security Administration began deploying explosive trace portals, or ETP, in airports. These so-called puffer machines blow air on passengers and check for residue of explosives. Unfortunately, TSA deployed ETPs knowing that operational testing had not been completed, that the system's functional requirements had not been fully tested and that ETPs had not performed well on the tests that had been completed. TSA ended up spending millions on a system that had a lower capability, broke down more frequently, and cost more to install than initially planned. As a result, TSA stopped buying new systems and pulled what they had deployed out of service.

We have also previously reported significant problems with DHS's efforts to deploy and develop the advanced spectroscopic portal monitor, or ASP. Within DHS, the Domestic Nuclear Detection Office, or DNDO, wanted to develop and deploy improved radiation detection equipment. DNDO believed ASPs would better perform than the equipment currently being used on the Nation's borders. However, DNDO did not conduct a meaningful cost-benefit analysis comparing ASPs to existing systems. Our work found that DNDO overestimated the capabilities of the ASPs, underestimated the capabilities of the current systems, and underestimated the costs to develop and deploy ASPs. In short, it was not clear that spending taxpayer dollars on this program would deliver improvements in primary radiation screening capabilities. As a result, in February of last year, the Secretary of Homeland Security scaled back plans for the number of ASPs DHS would purchase and how they would be used.

Now, when you hear examples like this, it is important to remember why DHS presses the envelope. The department faces a constant balancing act between immediate mission needs and the need to make sound, informed choices, following processes that are not always designed for speed. Within this context, DHS needs to make difficult decisions on when and how to develop, deploy and purchase new technologies. However, as our work has found, there have been too many cases of DHS rushing to failure. Failure to adequately test or conduct meaningful cost-benefit analysis can end up wasting taxpayer dollars and not enhancing our security.

The good news is that DHS has taken actions to address these problems. In the past several months, DHS has issued new policies for acquisition and testing and evaluation. It has implemented a reorganization of the Science and Technology Directorate and has developed plans to revamp how DHS approaches overall investment decision-making. Taken together, these changes indicate an important commitment from department leadership to take these problems head on. That is encouraging. But it is still too early to tell the impact of these actions. The hope is that DHS will leverage these relatively new changes and turn plans into actions to ensure that, among other things, it adequately tests new systems and conducts cost-benefit analysis before making multi-million or multi-bil-

lion-dollar decisions. By doing so, DHS makes it more likely that systems will be delivered on time, within budget and capable of meeting critical mission needs.

Mr. Chairman, thank you for the opportunity to testify today. I look forward to your questions.

[The prepared statement of Mr. Maurer follows:]

PREPARED STATEMENT OF MR. DAVID C. MAURER

United States Government Accountability Office

GAO

Testimony before the Subcommittee on Technology and Innovation, Committee on Science, Space, and Technology, House of Representatives

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HOMELAND SECURITY

Improvements in Managing Research and Development Could Help Reduce Inefficiencies and Costs

Statement of David C. Maurer, Director
Homeland Security and Justice Issues

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GAO-11-464T

Chairman Quayle, Ranking Member Wu, and Members of the Subcommittee:

I am pleased to be here today to discuss our past work examining the management of research and development (R&D) at the Department of Homeland Security (DHS). DHS acquisition programs represent hundreds of billions of dollars in life-cycle costs and support a wide range of missions and investments including Coast Guard ships and aircraft, border surveillance and screening equipment, nuclear detection equipment, and technologies used to screen airline passengers and baggage for explosives. Since its creation in 2003, DHS has spent billions of dollars on R&D on technologies and other countermeasures to address various threats and to conduct its missions. Within DHS, the Science and Technology Directorate (S&T) conducts overall R&D efforts to improve homeland security. Among other things, S&T works with DHS components to provide assistance in researching and developing technologies to meet their specific missions, while the components themselves are responsible for developing, testing, and acquiring these technologies. For example, DHS's Domestic Nuclear Detection Office (DNDO) is charged with developing, acquiring, and deploying equipment to detect nuclear and radiological materials, supporting the efforts of DHS and other federal agencies. The Transportation Security Administration (TSA) is responsible for securing the nation's transportation systems and, with S&T, researching, developing, and deploying technologies to, for example, screen airline passengers and their baggage. Furthermore, the Coast Guard utilizes a variety of assets such as small boats, ships, helicopters, and other aircraft to perform its missions and regularly develops and procures new assets to replace its aging fleet. In recent years, DHS has experienced challenges in managing its multibillion dollar R&D and acquisition efforts, including instances where technologies were implemented before testing and evaluation was complete. We have also identified problems with its testing and cost-benefit analyses efforts in this area.

My testimony today is based on reports and testimonies we issued from May 2009 through March 2011, including a report we issued earlier this month regarding opportunities to reduce potential duplication in government programs, save tax dollars, and enhance revenue. My testimony today is based on the section from that report related to the

management of R&D within DHS.[1] Specifically, this testimony discusses inefficiencies in homeland security R&D and potential for cost savings in this area.

For our past work, we reviewed program schedules, planning documents, testing reports, and other acquisition documentation. For some of the programs we discuss in this testimony, we conducted site visits to a range of facilities, such as national laboratories, airports, and other locations to observe research, development, and testing efforts. We also conducted interviews with DHS component program managers and S&T officials to discuss R&D issues related to individual programs. We conducted this work in accordance with generally accepted government auditing standards. More detailed information on the scope and methodology from our previous work can be found within each specific report.

DHS Could Reduce Cost Overruns and Procurement Delays by Completing Testing and Conducting Cost-Benefit Analyses before Deploying Technologies and Systems

In March 2011, we reported that in managing its multibillion-dollar research and development efforts, DHS had experienced cost overruns and delays in the procurement and deployment of technologies and systems needed to meet critical homeland security needs.[2] We further reported that DHS could help reduce inefficiencies and costs by completing testing efforts before making acquisition decisions and by including cost-benefit analyses in its research and development efforts.

Overview of Our Past DHS R&D Work

DHS has made acquisition decisions without completing testing efforts to ensure that the systems purchased meet program requirements. Our prior work has shown that failure to resolve problems discovered during testing can sometimes lead to costly redesign and rework at a later date. Addressing such problems during the testing phase before moving to the

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

[2] GAO-11-318SP.

acquisition phase can help agencies avoid future cost overruns. Specifically:

- In September 2010, we reported that the Domestic Nuclear Detection Office (DNDO) was simultaneously engaged in the research and development phase while planning for the acquisition phase of its cargo advanced automated radiography system to detect certain nuclear materials in vehicles and containers at ports.[3] DNDO pursued the deployment of the cargo advanced automated radiography system without fully understanding that it would not fit within existing inspection lanes at ports of entry and would slow down the flow of commerce through these lanes, causing significant delays. DHS spent $113 million on the program since 2005. DHS cancelled the acquisition phase of the program in 2007.

- In June 2010, we reported that the Coast Guard placed orders for or received significant numbers of units for three programs—the Maritime Patrol Aircraft, Response Boat–Medium, and Sentinel Class Patrol Boat—prior to completing testing, placing the Coast Guard at risk for needing to make expensive changes to the design of these vessels after production had begun if significant problems were to be identified during future testing.[4] Acquisition cost estimates for these three programs together totaled about $6.8 billion, according to Coast Guard data.

- In October 2009, we reported that TSA deployed explosives trace portals, a technology for detecting traces of explosives on passengers at airport checkpoints, even though TSA officials were aware that tests conducted during 2004 and 2005 on earlier models of the portals suggested the portals did not demonstrate reliable performance in an airport environment.[5] TSA also lacked assurance that the portals would meet functional requirements in airports within estimated costs. In addition, the machines were more expensive to install and maintain

[3]GAO, *Combating Nuclear Smuggling: Inadequate Communication and Oversight Hampered DHS Efforts to Develop an Advanced Radiography System to Detect Nuclear Materials*, GAO-10-1041T (Washington D.C.: Sept. 15, 2010).

[4]*GAO, Department of Homeland Security: Assessments of Selected Complex Acquisitions*, GAO-10-588SP (Washington, D.C.: June 30, 2010).

[5]GAO, *Aviation Security: DHS and TSA Have Researched, Developed, and Begun Deploying Passenger Checkpoint Screening Technologies, but Continue to Face Challenge*, GAO-10-128 (Washington, D.C.: Oct. 7, 2009).

than expected. In June 2006, TSA halted deployment of the explosives trace portals because of performance problems. We recommended that TSA ensure that tests are completed before deploying checkpoint screening technologies to airports. The agency concurred with the recommendation and has taken action to address it. For example, TSA has required more-recent passenger checkpoint technologies to complete both laboratory tests and operational tests prior to their deployment.

In addition, our prior work has shown that cost-benefit analyses help congressional and agency decision makers assess and prioritize resource investments and consider potentially more cost-effective alternatives. However, DHS has not consistently included cost-benefit analyses in its testing efforts and acquisition decision making.

- In 2006, we recommended that DHS's decision to deploy next-generation radiation-detection equipment, or advanced spectroscopic portals, used to detect smuggled nuclear or radiological materials, be based on an analysis of both the benefits and costs—which we later estimated at over $2 billion—and a determination of whether any additional detection capability provided by the portals was worth their additional cost.[6] DHS subsequently issued a cost-benefit analysis, but in June 2009, we reported that this analysis did not provide a sound analytical basis for DHS's decision to deploy the portals. We also reported that an updated cost-benefit analysis might show that DNDO's plan to replace existing equipment with advanced spectroscopic portals was not justified, particularly given the marginal improvement in detection of certain nuclear materials required of advanced spectroscopic portals and the potential to improve the current-generation portal monitors' sensitivity to nuclear materials, most likely at a lower cost.[7] At that time, DNDO officials stated that they planned to update the cost-benefit analysis. After spending more than $200 million on the program, in February 2010 DHS announced that it was scaling back its plans for development and use of the portals technology.

[6] *GAO, Combating Nuclear Smuggling: DHS's Program to Procure and Deploy Advanced Radiation Detection Portal Monitors Is Likely to Exceed the Department's Previous Cost Estimates*, GAO-08-1108R (Washington, D.C.: Sept. 22, 2008).

[7] *GAO, Combating Nuclear Smuggling: Lessons Learned from DHS Testing of Advanced Radiation Detection Portal Monitors*, GAO-09-804T (Washington, D.C.: June 25, 2009).

- In October 2009, we reported that TSA had not yet completed a cost-benefit analysis to prioritize and fund its technology investments for screening passengers at airport checkpoints.[8] One reason that TSA had difficulty developing a cost-benefit analysis was that it had not yet developed life-cycle cost estimates for its various screening technologies. We reported that this information was important because it would help decision makers determine, given the cost of various technologies, which technology provided the greatest mitigation of risk for the resources that were available. We recommended that TSA develop a cost-benefit analysis. TSA agreed with this recommendation and has completed a life-cycle cost estimate and collected information for its checkpoint technologies, but has not yet completed a cost-benefit analysis.

In January 2011, DHS reported that it planned to take additional actions to strengthen its R&D efforts. For example, DHS reported that it planned to establish a new model for managing departmentwide investments across their life cycles. DHS reported that S&T will be involved in each phase of the investment life cycle and will participate in new councils and boards DHS is planning to create to help ensure that test and evaluation methods are appropriately considered as part of DHS's overall research and development investment strategies. According to DHS, S&T will help ensure that new technologies are properly scoped, developed, and tested before being implemented. In addition, DHS reported that the new councils and boards it is planning to establish to strengthen management of the department's acquisition and investment review process will be responsible for, among other things, making decisions on research and development initiatives based on factors such as viability and affordability, and overseeing key acquisition decisions for major programs using baseline and actual data.

Actions Needed and Potential Cost Savings

Our work has highlighted the need for DHS to strengthen its R&D efforts by ensuring that (1) testing efforts are completed before making acquisition decisions and (2) cost-benefit analyses are conducted to reduce research and development inefficiencies and costs.[9] The planned actions DHS reports it is taking or has under way to address management of its research and development programs are positive steps and, if implemented effectively, could help the department address many of these

[8] GAO-10-128.

[9] GAO-11-318SP.

challenges. However, it is too early to fully assess the effect of these actions.

Rigorously testing devices using actual agency operational tactics before making decisions on acquisition would help DHS reduce inefficiencies and costs. Further, conducting cost-benefit analyses as part of research, development, and testing efforts would help DHS and congressional decision makers better assess and prioritize investment decisions, including assessing possible program alternatives that could be more cost-effective. We are currently assessing S&T's efforts to oversee testing and evaluation across DHS for the Senate Committee on Homeland Security and Governmental Affairs and plan to report on that issue later this year.

Chairman Quayle, Ranking Member Wu, and Members of the Subcommittee, this concludes my prepared statement. I would be pleased to respond to any questions that you or other members of the subcommittee may have.

Contacts and Acknowledgments

For questions about this statement, please contact David C. Maurer at (202) 512-9627 or maurerd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals making key contributions to this statement include Chris Currie, Ned Woodward, and Michele Mackin, Assistant Directors; Bintou Njie, Joe Dewechter, Molly Traci, and Kevin Tarmann. Key contributors for the previous work that this testimony is based on can be found within each individual report.

Related GAO Products

Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue. GAO-11-318SP. Washington, D.C.: March 2011.

Combating Nuclear Smuggling: Inadequate Communication and Oversight Hampered DHS Efforts to Develop an Advanced Radiography System to Detect Nuclear Materials. GAO-10-1041T. Washington, D.C.: September 15, 2010.

Combating Nuclear Smuggling: DHS Has Made Some Progress but Not Yet Completed a Strategic Plan for Its Global Nuclear Detection Efforts or Closed Identified Gaps. GAO-10-883T. Washington, D.C.: June 30, 2010.

Department of Homeland Security: Assessments of Selected Complex Acquisitions. GAO-10-588SP. Washington, D.C.: June 30, 2010.

Aviation Security: DHS and TSA Have Researched, Developed, and Begun Deploying Passenger Checkpoint Screening Technologies, but Continue to Face Challenges. GAO-10-128. Washington, D.C.: October 7, 2009.

Combating Nuclear Smuggling: Lessons Learned from DHS Testing of Advanced Radiation Detection Portal Monitors. GAO-09-804T. Washington, D.C.: June 25, 2009.

Combating Nuclear Smuggling: DHS Improved Testing of Advanced Radiation Detection Portal Monitors, but Preliminary Results Show Limits of the New Technology. GAO-09-655. Washington, D.C.: May 21, 2009.

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BIOGRAPHY FOR MR. DAVID C. MAURER

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

From 2008–9, Mr. Maurer worked as an Acting Director in GAO's Natural Resource and Environment team, where he managed work assessing U.S. global nuclear detection programs, and enforcement of federal environmental law. Mr. Maurer was also detailed to the House Committee on Appropriations, Surveys and

Investigations staff. From 1993–2007, Mr. Maurer managed and led work in GAO's International Affairs and Trade team, where he reviewed U.S. efforts to combat international terrorism and proliferation of weapons of mass destruction, U.S. assistance to the former Soviet Union, peacekeeping in the Balkans, and several other international issues. He also served as the team's manager for staffing and human capital issues. In recognition of his contributions to audit work, training, and operational responsibilities, Mr. Maurer has received several GAO awards during his career.

From August 2005 through June 2006, Mr. Maurer was a student at the National Defense University where he was recognized as a Distinguished Graduate of the Industrial College of the Armed Forces and received an M.S. in national resource strategy. Mr. Maurer also has an M.P.P in international public policy from the University of Michigan and a B.A. in international relations from Michigan State University.

Chairman QUAYLE. Thank you very much, Mr. Maurer, and thanks to the whole panel for your testimony. We are going to start the questioning, and I want to remind members that committee rules limit questioning to five minutes. I will now recognize myself for the first five minutes.

Mr. Maurer, I was just listening to your testimony. You expressed a lot of concerns with the Directorate and DNDO including the need to improve R&D efforts by ensuring that testing and the cost-benefit analysis happens prior to making any acquisition decisions. Now, does the creation of the acquisition support and operations analysis group fully address this issue or is it just another layer of bureaucracy within the agency?

Mr. MAURER. I really think that remains to be seen. If you look at it on paper, it definitely shows promise, and our hope is that it is implemented in a way to address the deficiencies we found in the past, and one thing I would caution everyone on that there has never been a shortage of plans coming out of the Department of Homeland Security, so we really want to see the transition from plans into reality and implementation in the real world.

Chairman QUAYLE. So this is a wait-and-see approach to see if it actually has some benefit with actually making sure that it is on time, on budget and is actually making the acquisitions based on looking at efficiencies and cost-benefit analysis?

Mr. MAURER. Absolutely. We have work underway for the Homeland Security Committee currently looking at S&T's role in testing and evaluation within the department so we will be able to report on that later this year. We are also taking a careful look at how DHS is revamping its acquisition approach as part of our high-risk update.

Chairman QUAYLE. Dr. Carafano, do you have any thoughts about that new portion of the agency that is going to be developed?

Mr. CARAFANO. Yes. It can't solve the problem. It is going to help—if it is done right, it will help with the requirements process. That is for sure. It may help in terms of the guidance, the testing and evaluation, but it doesn't manage the entire acquisition process so there is still lots of places where things can run off the rails. So I think fundamentally what has to be addressed is DHS has to create an established acquisition process that does the end-the-end management from requirements to testing and evaluation to fielding to integrating with the other department needs. The question I think is what is the role of S&T in that, how much of that does it bite, and I think for a starter, I mean, we ought to revisit the

legislative language of S&T's mission and that ought to be part of that, and I really do look to—we have never had an authorization bill, reauthorization bill for the Department of Homeland Security. This would be the perfect thing for the Congress to address, is to at least establish its formal expectations across the department for how it is going to do that. And again, I am not saying S&T should be in charge of everything to do with acquisition but it is going to definitely be a big player in that, and all the other pieces have to be established.

Chairman QUAYLE. On that, if we are looking at it to address the immediate needs and also take into account the long-term R&D goals, you have been critical about the lack of a strategic approach for that. Could you just give some suggestions on how to develop that strategic approach and what would you actually put into place, just off the top of your head?

Mr. CARAFANO. Well that is two different—there is a lot of questions. Let me just address the question of acquisition. So one is the formal acquisition process. The other one is rapid acquisition, and the rapid acquisition one is actually the one that is more difficult and problematic, and this is—I mean, we have seen this in DOD over and over again. They get into a war. They see something they never thought of before. They scramble around and figure out how to fix it. They eventually figure out how to fix it. Sometimes it costs a lot. Sometimes they get lucky. But the point is, is it is an—the rapid acquisition is an ad hoc process and then as soon as the war is done, they dissemble that process and reinvent it the next time. Because people don't like rapid acquisition because it is a competitor with long–term acquisition, right? Because somebody comes up with a great idea, I have been working on this for ten years you are not going to kill my program because you just found a better idea, right? So for those things not in a sense to be in competition, the lanes have to be designed and they have to be specified in a formal way ahead of time.

So I was just making a note that if you want to have a rapid acquisition process, you have to have a couple of things. First of all, you have to have a feedback loop that identifies a need. Second, you have to have an operational research capability so you can evaluate that need and determine if you need a technology fix or if you should do something else. If it is a technology fix, you have to have a horizon scanning, the kind of thing Tara talked about, the ability to go out and look and see what is out there, to grab the technology. Then you have to have a way to test and evaluate it and safety-certify it. And then most importantly, and this is where DOD fails again and again, you have to have a way to field it, train people in how to use it, and then sustain it. So all those pieces have to be part of a rapid acquisition process. Otherwise it doesn't work. And for DHS, the penultimate example was the response to the oil spill when they had a dramatic need for new technologies to deal with the oil spill and they had absolutely no system in place to acquire those technologies and everything was done ad hoc, and I would go back now and say it would be a great question for the next time the Secretary comes to testify before you is, tell me what you have done to formalize the lessons that you learned in the Gulf oil spill to rapidly acquire technology.

Chairman QUAYLE. Thank you. The chair now recognizes Mr. Lujan for five minutes.

Mr. LUJAN. Thank you, Mr. Chairman.

Dr. Carafano, in your prepared testimony, you stated that—you called on the S&T Directorate to dramatically scale back on screening and detection technologies and to put those efforts straight into cybertechnology development. What is the rationale behind that?

Mr. CARAFANO. Well, cybertechnology among others would be my priority, and the reason why I think screening and detection technologies are a bit of a sinkhole is that we live in a country with almost infinite vulnerabilities. You know, if you spend infinity minus one, you have infinity vulnerabilities, right? I mean, this would be as if we approached the Prohibition with let us be able to detect alcohol. I mean at the end of the day, even lifting Prohibition didn't stop the Mafia. What stopped the Mafia was you went in and you identified the network and you attacked the network.

So the question really is, where do you get the best bang for the buck. Screening and detection technologies, I mean, we all know the problems with false positives and false negatives, and sure, everybody can find a technology, but then you go to operationalizing the technology and this is the essence of what I would hope that this operational analysis would get to is, for all the money we are going to invest in technology, are we getting the best bang for the buck. Do I get more money from finding another technology to find a fistful of money in a Buick at the border or would I be better off investing in something that is going to enable the integrated border enforcement team to go and find the network that is moving that money and take that network down.

Mr. LUJAN. I appreciate that very much.

Mr. Maurer, that would lead to a natural question, I believe, to yourself. In 2009, I believe it was the Justice Department that said that drug cartels are now the largest organized threat to the United States. We talked about drug trafficking, human trafficking. Based on the response from Dr. Carafano, what more can we be doing or how can we improve what we are doing with DHS and working with other entities to be able to better protect our homeland?

Mr. MAURER. Well, GAO has done a lot of work looking at U.S. efforts to combat drug smuggling and securing the border. I think as a general proposition, one of the key things that we found over the years is the importance of finding ways to have the different federal agencies work more closely together. We have ongoing work, for example, looking at the extent to which DEA and ICE are trying to operate under a new memorandum of understanding and are trying to do a better job of crafting a more integrated approach to the problem.

I think the bottom line is, there are a lot of different federal, state and local agencies that sort of play in this broader sandbox of addressing the problem of drugs being smuggled into this country, and if we can figure out ways to leverage the different capabilities of all these different agencies and apply them to the problem, we would be better off in the long run.

Mr. LUJAN. I appreciate that. And just going back to Dr. Carafano's response, Mr. Chairman, I think that what we see here

is that we need to identify that common purpose, and if MOUs are trying to be worked out, they need to be required to be worked out and that we have to find those networks to be able to combat them, and I appreciate that very much.

Mr. Pearl and Mr. Carafano, in your testimony and your responses to us here and not just your prepared testimony but in what you shared with us as a committee, I very much appreciate the fact that you are calling for clear projections or outlines or requests that are going to be coming from federal partners to give more certainty associated with the R&D efforts on the private side. My question is, we have an area when we have tech transfer sometimes is not making its way into the private arm and into the private sector because there is a need for maturation or seed support. What role do you see where there can be access to the engineers, physicists, scientists to be able to work closer with our private sector or to be able to develop that sector of the Federal Government where there is an emphasis on pushing that technology over the top so it makes its way into the private sector so that private sector then takes it over and takes it full steam ahead?

Mr. CARAFANO. Well, I think that trying to transition technology for users outside the department is really a very, very difficult process, and I would just question with everything the department has to go on and all of its priorities, is that the gorilla you really want to take on right now? I would really recommend that the DHS focus on technologies that it needs and push that other challenge later off down the road. There are some areas where I think partnerships are supremely important, and I raised the issue of nanotechnology and I would be pleased to talk about the Semitech model and how I think that model really is a model that we need in nanotechnology. Semitech is doing some work in nanotechnology but it is a very, very different field, and you almost need—you really need a new organization to deal with that.

And I will just point to four advantages of doing this. The first is in efficiencies. What these groups do is, they do basically noncompetitive research R&D, so it is the things that everybody is going to get in common so nobody gets a competitive advantage and it benefits everybody, and what that does is, it helps lay the baseline for the industrial base to then support and make products that are affordable and workable. And what that does is, it creates an—not necessarily more R&D spending but it creates an efficiency in R&D spending that allows people to spend the rest of their R&D money on other things. The most important thing is really does is it strengths the partnership between potential customers and potential suppliers. The success of these largely depends on the quality of the research agenda, and I would not—there is no magic bullet in a sense. This is, I think, the kind of complementary activity that government could do in public-private partnership but it doesn't necessarily replace all the other kind of research and R&D. But again, I think there are some niche areas like nanotechnology where the payoffs are so enormously unbelievable across not just for DHS but across the Federal Government, that these are the kinds of things that are worth our effort.

What we actually did to create Sematech is we actually took money out of DARPA and made DARPA do it. You know, I would

actually vote for that day. I would defund something else and I would make the Federal Government do this because I think in the long end, the federal consumer is going to really benefit. But I mean, I think it will have an enormous benefit across our economy.

Mr. LUJAN. Thank you very much.

And Mr. Pearl, maybe we will get a chance to follow up. I know the time we have gone over a little bit there.

Thank you, Mr. Chairman.

Chairman QUAYLE. Thank you.

Mr. LUJAN. And Mr. Chairman, with that, I was looking down there, I thought Mr. Neugebauer was still with us. I would like to ask unanimous consent for some additional time to ask a question for our colleague, Congresswoman Giffords.

Chairman QUAYLE. Without objection.

Mr. LUJAN. Mr. Chairman, thank you very much for that, and we know that Congresswoman Giffords is a leader on border security, and if she were here today, I know that she would be very engaged in this hearing.

Dr. Carafano, as you know, Congresswoman Giffords is deeply concerned about border security, which is why she is proud of the BORDERS Department of Homeland Security Center of Excellence at the University of Arizona. BORDERS singular focus is to provide government agencies and stakeholders with scientifically informed knowledge to expedite the development of innovative, practical and cost-effective solutions to meet the ever-changing operational demands at the northern and southern borders. This sounds like exactly the sort of thing that we need now. BORDERS is currently working with Customs and Border Patrol on a number of innovative projects to protect the Arizona border by, for example, developing new tunnel detection and container security technology. In your written testimony, you wrote that not curtailing or further limiting the terms of the Centers of Excellence is important. Can you comment further on the importance of funding these centers?

Mr. CARAFANO. Yeah, absolutely. So the centers do more what we talk of as really science and technology in the DOD world which is more of the six-one type which is a basic research, and if you want to build an effective basic research team, it takes time and facilities, and so if you are moving these things every couple of years, I mean, you might as well not even bother to do it. It really does take a long-term commitment and ten years or some time of renewable term that is much, much—is really, really important. And I think the borders center is a good example. I think they do some excellent work and you would want to keep them doing that.

And just in terms of border technology, I just would mention very quickly, one area where I do think there should be a lot more emphasis is small UAVs and there is a couple of reasons for that. First of all, the bag guys have a lot of eyes on the border and they track everything we do, and so anything that has kind of a big operational picture gets picked up. So small UAVs are important because you don't really need the infrastructure to set them up. It is not like the helicopter taking off. The other reason is, is that you can put a variety of sensor payloads on there very cost-effectively. You can look for tunnels. You can look for all kinds of things. And they are very cheap to operate, which is very good for state and

locals because they can't support an expensive thing or long training. It is a really, I think, a very, very dynamic and important field, and I think the limiting thing right now is actually getting FAA to authorize people to fly small UAVs at the border. But I think the small UAV at the border, it could be an enormous force multiplier for federal, state and local, and that would be a primary to look into.

Chairman QUAYLE. Thank you, Mr. Lujan.

Is there anybody else to be recognized? No? With that, I will just recognize myself for one additional question, and I am going to address this to Mr. Pearl, but if either of the other witnesses wants to address this as well and answer this question. The Homeland Security Science and Technology Advisory committee, also known as Haystack, has not been active for an extended period of time. With the Directorate's increased focus on stakeholder participation, do you feel that an independent advisory body on science and technology is an important component of S&T at DHS?

Mr. PEARL. I think it is an interesting way of going about it. I think it is absolutely necessary. What we have seen over the last few years in terms of the advisory committees is that it has made up in a very vertical way on government officials public sector. The private sector has not necessarily—and not to take anything away from think tanks and others or academics but the reality of the foot soldiers on the ground in terms of what the private sector brings and industry brings to the discussion in terms of people who have either been in these capacities before and they are now in the private sector or who are in researchers and developers and engineers onto themselves and the private sector have not been as involved for fear that there would be a best picking of winners with respect to identifying individual private sector organizations. That is something that we have tried to with the department on industry days that were very strong two, three, four years ago and have been in fact in touch with Dr. O'Toole and her team to try to encourage greater concentration of communication and cooperation between the private sector. Whether it is done formally or informally, Mr. Chairman, I think there has to be greater coordination of communication between those, the innovations and capabilities that exist in the private sector and that which exists and the desire in the long term.

We are fighting the last war in every single way, and whether that is a rapid acquisition process that Dr. Carafano is talking about or a long term, we have to think beyond the corner. We have to think beyond the curve. We have to start thinking ahead of what is going on, and that is before, I said, the RFP is offered up or before the acquisition process even starts, whether that is through a formal advisory process or whether that is through an informal process, we need to move forward on that and certainly the Council and the members that are providing homeland security solutions that are members of the Council want to take part in those discussions as quickly as possible.

Chairman QUAYLE. Dr. Carafano?

Mr. CARAFANO. I would—I serve on the Board of Army Science and Technology, which is sponsored by the National Academies, which I think is a terrific model that S&T and DHS should look

at so the board includes technical experts, scientists, operational experts and people with business experience, people with bench experience. I think the BAST is a really, really good model for that kind of support that S&T might need.

Mr. MAURER. I think going forward, and given where the country is right now and this overall fiscal condition is going to be important set of mechanisms like this to leverage expertise and knowledge and insight outside the department. I mean, for the past several years we have been able to throw a lot of money at the Department of Homeland Security and I just don't see that continuing in the near term, so having some kind of mechanism to build better bridges between private sector and public sector is going to become increasingly important.

Chairman QUAYLE. Thank you very much. I want to thank all of you for your valuable testimony today and for being very patient and the members for their questions. The members of the subcommittee may have additional questions for the witnesses, and we will ask you to respond to those in writing. The record will remain open for two weeks for additional comments and statements from members. The witnesses are excused.

Thank you all for coming. This hearing is now adjourned.

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

Appendix I:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Dr. Tara O'Toole, Under Secretary, Science and Technology, Department of Homeland Security

Questions submitted by Chairman Ben Quayle

Q1. DHS manages laboratories in multiple states, as well as FFRDCs and University Centers across the nation. Could you characterize how the University Centers of Excellence and the Department of Energy's National Laboratories support the research and development of DHS, and how their work is integrated into development, demonstration, and testing of technologies?

A1. The Science and Technology Directorate's (S&T) Office of National Laboratories (ONL) provides the Nation with a coordinated, enduring core of productive science, technology and engineering laboratories, organizations and institutions, which can provide the knowledge and technology required to secure our homeland. The Homeland Security Act of 2002 assigns ONL "the coordination and utilization of the Department of Energy (DOE) national laboratories and other sites under Section 309 in a manner to create a networked laboratory system for the purpose of supporting the missions of the Homeland Security Department." In addition to oversight of the S&T laboratory operations, ONL coordinates homeland security-related activities and laboratory-directed research conducted within the DOE's national laboratories.

The National Laboratories support of S&T focuses on development, demonstration, and testing of technologies in critical mission areas such as first responder technology needs, advanced passenger screening, explosive detection technologies, human factors and biometrics, and chemical and biological forensics. Examples of capabilities produced by S&T and National Laboratory cooperation include an early warning system for biological attacks; a chemical agent detection system for mass transit; a wireless communications system and data network to connect responders in the field; and a next generation liquid and gel-scanning system for airline passenger screening that distinguishes potential threat liquids from harmless ones.

S&T's Office of University Programs (OUP) conducts multi-disciplinary research and development in priority DHS mission areas at approximately 200 colleges and universities through 12 Centers of Excellence (COEs). The COEs align to S&T divisions and offices, to the DHS components, and to state and local first responders. For example, the National Center for Border Security and Immigration (NCBSI) aligns with the S&T Borders and Maritime Security Division whose partners include Customs and Border Protection (CBP), Immigration and Customs Enforcement (ICE), U.S. Citizenship and Immigration Services (CIS), and the U.S. Coast Guard (USCG). COEs improve understanding of the causes, elements, and consequences of a range of threats from terrorists and natural disasters. They also support countermeasure, mitigation, prevention, and resilience approaches based on both technologies and human behavior. The COEs work with and through the S&T divisions and complement other DHS research and development programs including those of federal laboratories and federally funded research and development centers (FFRDCs). They take advantage of other relevant Federal agency-sponsored research and provide outcomes useful to federal, state, and local government, private sector, and international partners. The selection process for the COEs is highly competitive, rigorously peer-reviewed, and merit-based.

Q2. Given the geographic distribution of these units, how do various S&T units work together?

A2. The Science and Technology Directorate's Office of National Laboratories coordinates the work of S&T's laboratories and organizes annual laboratory directors meetings and regular conference calls. Frequent site visits by S&T leadership and staff all assure the S&T laboratories are properly coordinated and integrated into S&T and DHS.

S&T's Office of University Programs (OUP) manages the COEs as a network. The COEs share resources, jointly fund projects and take advantage of each others' strengths. For example, there are approximately 35 projects that involve the participation of two or more COEs. This approach has led to a robust network of academic capabilities, including laboratories, experts, models and data that DHS and its partners can access at any time to address a wide array of difficult issues.S&T also leverages communication tools such as teleconferencing and online collaboration to minimize the effects of geographic distribution.

Q3. How do the DHS internal laboratories work with the National Laboratories to avoid duplication of efforts?

A3. The Department of Energy's (DOE) National Laboratories have very different missions than the Science and Technology Directorate's (S&T) laboratories which inherently limits duplication of efforts. DHS internal laboratories are single-focused research, development, testing and evaluation (RDT&E) facilities in the fields of aviation security, biodefense analysis, chemical security analysis and technologies to detect nuclear and radiological threats. The DOE National Laboratories provide distinctive, powerful research facilities across a multitude of disciplines that include neutron scattering facilities, accelerators for nuclear and high energy physics research, large-scale field sites for investigating the effects of atmospherics and structures on radiation, chemical plumes, and other airborne hazards, and highest-end computing facilities.

S&T collaborates closely with the DOE National Laboratories in pursuit of technologies supporting the operational needs of DHS. DHS's Office of National Laboratories (ONL) coordinates the efforts of both the DHS and DOE National Laboratories to maximize how DHS leverages their respective capabilities and minimizes potential duplication of effort. DHS also encourages partnerships among the laboratories to complement each other's core competencies while leveraging R&D investments made by others. For example, in December 2009, DHS and DOE agreed to create the Aviation Security Enhancement Partnership (ASEP) to extend and leverage this relationship with a focus on improving aviation security. The role of the National Laboratories is more research oriented and includes introduction of the basic science behind explosives, including Homemade Explosives (HME). S&T's Transportation Security Laboratory (TSL) also works collaboratively with the National Laboratories and will incorporate the HME research into its explosives detection testing program, specifically certification testing.

Q4. Question: You have identified international cooperation as a priority, yet some have criticized the Directorate as having limited success working with our international partners. What do you see as the challenges in working with our international partners?

A4. The Science and Technology Directorate (S&T) conducts international joint research projects, technical demonstrations, scientific workshops, and exchanges of scientific and technological information and personnel. S&T has several established, formal international partnerships with Canada, the United Kingdom, Australia, Singapore, Sweden, Mexico, Israel, France, Germany, New Zealand, and the European Commission. Although S&T's international outreach has met with some success, challenges remain.

The initial challenge has been in identifying international counterparts with complementary science and technology programs. Not all governments have an equivalent or single counterpart to S&T. Science and technology programs for some governments can span more than one ministry or government agency, requiring DHS S&T to rely heavily on briefings to the new and potential partners, fact-finding visits and program planning at both the leadership and programmatic levels. Once contacts have been established with the appropriate counterparts, S&T must undertake a series of steps in order to begin joint collaboration. These include work-planning sessions; negotiations of the terms and conditions to implement arrangements of mutual benefit, and establishing a model of practice for bilateral project monitoring. Furthermore, maintaining continuity with foreign governments that undergo significant changes in staff, re-organization, or policy more frequently than the U.S. can also slow down the process of engagement and implementation. A key factor in the strategic development of joint collaborations is conducting periodic reviews of each country's portfolio's interests/priorities and gaps to determine leveraging opportunities that can be addressed in the current or upcoming S&T fiscal year. Finally, another challenge to building international collaborations can stem from differences between the domestic laws and practices, restrictions, or standards of foreign countries and the U.S., such as in the case of procurement, intellectual property rights, export controls, government fiscal cycles, and currency fluctuations.

Q5. Question: How can this cooperation be improved?

A5. International cooperation requires regular outreach for new collaborations, partnership engagement, and leveraging programs and investment. The Science and Technology Directorate has successfully advanced its relationships with its international partners through its bilateral agreements and international research program. Ongoing efforts by the Administration to reform export controls are anticipated to facilitate new and ongoing international cooperation. Further, improvements will be made as relationships grow with both our longstanding and newer partners, not simply in terms of numbers of collaborations, but in moving towards

increased returns on investment and in advancing science and technology innovations that meet global security needs.

Q6. What are other countries doing with homeland security research and development funding?

A6. Some of the Science and Technology Directorate's international partnerships have resulted in foreign investment in science and technology innovations to expand or accelerate programs that are serving DHS mission needs. Such foreign investment has included test and evaluation of x-ray systems for aviation checked baggage, development of a hybrid composite container for maritime cargo security, and an assessment of violent extremist incidents. S&T plans to invest internationally in the test and evaluation of x-ray systems for aviation checked baggage; research to develop a technological capability for standoff detection of explosives in a mass transit environment; and sequencing and characterization of unique strains of select agents which are high-priority biological threats and are otherwise unavailable to U.S. researchers. S&T also plans to invest internationally in the test and evaluation of x-ray systems for aviation checked baggage; research to develop a technological capability for standoff detection of explosives in a mass transit environment; and sequencing and characterization of unique strains of select agents which are high-priority biological threats and are otherwise unavailable to U.S. researchers.

Q7. Are investments in other countries seen as a priority?

A7. Cooperative activity of mutual benefit with other countries is a priority if it meets DHS mission needs, S&Tprogram requirements, and augments or enhances S&T's ability to serve the Department. Such cooperative activities may or may not involve direct investments in other countries.

"International partners are critical to the effort to secure the homeland against threats that transcend jurisdictional and geographic boundaries," according to the first Quadrennial Homeland Security Review, published in February 2010. "International engagement enhances the transparency of threat trajectories and increases our capacity to understand, investigate, and interdict threats at the earliest possible point, ideally before they become manifest, reach our shores, or disrupt the critical networks on which we depend. The United States must work with its international partners to increase global security against terrorism and violent extremism, the spread of infectious diseases, and the consequences of natural disasters." By acting together with a shared vision, collaborations that lead to improved or major security accomplishments in each country are a collective achievement of mutual interest towards global security.

Q8. What is your view on the state U.S.-Israel Homeland Security cooperation?

A8. Since signing the Memorandum of Agreement between the U.S. and the Government of the State of Israel on Cooperation in Science and Technology for Homeland Security Matters on May 29, 2008, the Science and Technology Directorate has worked with the Israeli government on a variety of programs and projects. DHS S&T is actively engaged with Israeli science and technology offices within a multitude of Israeli government ministries and agencies including the Ministry of Public Security, Bureau of the Chief Scientist (MOPS/BCS), the Israeli National Security Council, the Israeli Security Agency (ISA), the Israeli National Police (INP), and the Israeli Home Front Command (HFC), a regional command with homeland security responsibilities within the Israeli Defense Forces (IDF). DHS S&T has also engaged several top researchers in Israel and has awarded grants and invited them to speak at DHS S&T sponsored events. During our last University Summit (March 30—April 1, 2011), Israel was one of two countries invited to speak. Dr. Boaz Ganor, founder and Executive Director of the International Institute for Counter-Terrorism (ICT), and the Head of the Homeland Security Studies Programs at the Interdisciplinary Center (IDC), Herzliya, Israel, presented his work on the threat of suicide bombers on mass transportation.

DHS S&T is also actively engaged with the DOD's Combating Terrorism Technology Support Office (CTTSO) and Technical Support Working Group (TSWG) bilateral cooperation activities with Israel. DHS S&T and CTTSO/TSWG work closely to ensure synergy and prevent duplication of effort and resources by participating in each other's regularly scheduled meetings and bilateral conferences.

DHS S&T and MOPS/BCS held the second U.S.-Israel Homeland Security Science and Technology Bilateral Conference on November 9–11, 2010 in Jerusalem to discuss and report on bilateral cooperative activities. This meeting included working level meetings and presentations on planned and proposed activities within common areas of interests, including the Explosives, Human Factors and Behavioral Sciences, Cyber Security, and the Infrastructure Protection and Disaster Manage-

ment domains. It also included site visits to several locations with the following themes: Aviation Security; Community Resilience; Explosive Device Testing; and Command, Control, and Interoperability.

DHS S&T finds the collaboration with Israel extremely beneficial and is encouraged by the progress that has already been made. We look forward to continuing and expanding upon thechannels of cooperation and engagement under our Agreement that have been successfully built over the past three years.

Questions submitted by Representative David Wu

Q1. The Science and Technology Directorate last published a strategic plan in June of 2007. In October of 2009, in testimony before the Technology and Innovation Subcommittee, the Acting Under Secretary for Science and Technology noted that the Science and Technology Directorate was updating its strategic plan to support the strategic goals and objectives determined by the Quadrennial Homeland Security Review. In your written testimony, you state that the Directorate has instituted an inclusive and comprehensive strategic planning process. When can we expect to see an updated strategic plan that reflects the goals and objectives of the Quadrennial Homeland Security Review?

A1. The Science and Technology Directorate (S&T) plans to issue its strategic plan in May 2011. As soon as it is issued, S&T will provide copies to the Subcommittee.

Q2. Can you please describe the strategic planning process that the Directorate undertook after you were confirmed as Under Secretary?

A2. In February of 2010, the Science and Technology Directorate (S&T) began the process of developing its new five-year strategic plan. The process involved careful analysis of the Quadrennial Homeland Security Review (QHSR) and DHS priorities; review of past and current S&T planning documents and external evaluations; and extensive input from internal and external stakeholders. In addition, S&T leadership set forth four principles—inclusivity, transparency, open-mindedness to change, and responsiveness—to guide the process.

S&T established an internal steering committee to manage an extensive outreach effort that included external stakeholder interviews, a staff questionnaire, and two retreats comprised of differing S&T staff groups.

S&T sought input from the DHS components and their federal, state, and local partners regarding how S&T could improve its effectiveness over the next five years. On behalf of S&T, the Homeland Security Studies and Analysis Institute (HSSAI) conducted 20 interviews with external stakeholders. In addition, S&T senior staff conducted a series of external interviews with key stakeholders including congressional staff. Interviews captured information on stakeholder perceptions of S&T service and performance; effectiveness of S&T outreach and communication; and how well S&T priorities aligned with its customers.

S&T conducted an online employee questionnaire to provide leadership with an understanding of employee priorities and concerns. Questionnaire results helped leadership identify areas of both strong and variable performance as well as gain insight about future S&T priorities and employee reaction to proposed S&T goals. HSSAI supported the effort by conducting and analyzing the results of the employee questionnaire.

S&T conducted two offsite retreats (referred to as Forum One and Forum Two) to further harness the breadth of perspectives and expertise at S&T. Forum One convened managers from across S&T divisions and office units. Over the course of two days, participants engaged in lively plenary discussions and worked within small breakout groups to generate input on potential S&T mission, vision, goals and strategies. The group also provided a baseline understanding of organizational strengths and weaknesses, as well as internal and external forces likely to shape the current and future homeland security environment.

Forum Two gathered senior management and leadership in a two-day engagement. To open this discussion, representatives from Forum One debriefed senior management on Forum One findings and recommendations for action. Taking into account Forum One input, the Forum Two participants further refined S&T's mission, goals, and key strategies. S&T leadership reviewed Forum Two findings for final agreement and a detailed final report summarized and assessed both Forum results.

The collective contribution of staff, external stakeholders and DHS guidance, taken together has resulted in a five-year strategy that frames the priorities for achieving the S&T mission and ensures that S&T resources are aligned to efficiently attain plan goals.

Q3. The FY 2012 budget includes $19 million for the Science and Technology Directorate's natural disaster resiliency program to help respond to and recover from large-scale natural disasters. To what extent are these natural disaster-related efforts being coordinated with other agencies working in this area, including agencies such as the National Institute of Standards and Technology, the National Science Foundation, the U.S. Geological Survey, and the Federal Emergency Management Agency which make up the National Earthquake Hazards Reduction Program?

A3. The Science and Technology Directorate's (S&&) FY 2012 budget request for natural disaster resilience includes projects such as the National Critical Infrastructure Protection (CIP) Research and Development (R&D) Plan, Standard Unified Modeling Mapping Integrated Toolkit (SUMMIT), Resilient Electric Grid (REG), and Recovery Transformer. S&T works closely with the appropriate agencies to assure a coordinated approach to natural disaster resiliency. For example, the National CIP R&D Plan is coordinated primarily with DHS Office of Infrastructure Protection (OIP) National Protection and Programs Directorate (NPPD). To prepare the Plan, S&T annually invites the National Institute for Standards and Technology (NIST), Federal Emergency Management Agency (FEMA) and National Science Foundation (NSF) to participate in its development through the National Science and Technology Council (NSTC) Infrastructure Subcommittee.

As a second example, the Integrated Modeling Mapping Simulation (IMMS) Standard Unified Modeling Mapping Integrated Toolkit (SUMMIT) is an integrated modeling and simulation based exercise and analysis system in direct response to FEMA's requirements for an efficient, economic, repeatable, and science based capability to conduct National Level Exercises (NLE). IMMS/SUMMIT also supports state, local, and regional preparedness exercises and provides interoperability with the federal agencies. S&T works closely with FEMA as the source of requirements and the users of the IMMS system. FEMA participates in all program reviews and provides guidance on the direction of the program. Additionally, the IMMS/SUMMIT team works with the Department of Energy (DOE) National Laboratories and other agencies such as the Technical Support Working Group, National Interagency Research and Development Program for Combating Terrorism Requirements at Home and Abroad, to share and leverage technologies to stay up to date on the state of new technologies. For the NLE 2011 activities, the IMMS/SUMMIT Team has worked very closely with USGS to integrate earthquake models into SUMMIT.

S&T coordinates additional efforts, such as the Resilient Electric Grid and Recovery Programs, DOE, Electric Research Institute (EPRI), Edison Electric Institute (EEI), North American Electric Reliability Corporation (NERC) and Federal Energy Regulatory Commission (FERC). These efforts also participate with FEMA via meetings/conferences such as at the NERC Table Top Exercises and Space Weather Enterprise Forum.

Questions submitted by Representative Lamar Smith

Q1. Given the concerns raised about border security during the hearing, if one were to look at the entire $1.176 DHS S&T budget request approximately, how much is directed toward those efforts?

A1. Approximately $43 million of the Science and Technology Directorate's (S&T) FY 2012 Budget Request is directed to developing border security technologies. S&T is also developing technologies with multiple applications, which include use in border security. An example is S&T's work to improve biometric technology, an approximately $12.2 million planned investment in FY 2012.

Q2. In the strategic planning and goal setting discussions you described in your testimony, how did you set funding priorities for the seven HSARPA technical divisions?

A2. The Science and Technology Directorate (S&T) has implemented a process of portfolio assessment and balancing. S&T has unified the project evaluation and selection process so that it takes into account project characteristics, strengths, weaknesses and performance including measuring impact, transition, technical positioning, clarity of purpose, customer involvement, and innovation. S&T will use the portfolio assessment and balancing process each year to confirm priorities and make necessary adjustments.

Q3. Can you rank-order the seven technical areas for funding priorities through established criteria for cost-benefit/bang-for-the-buck? For example, if you had additional dollar to spend in only one of the seven HSARPA technical divisions,

where would you spend it? If you had one less dollar, where would you propose to cut spending?

A3. The Science and Technology Directorate (S&T) has implemented a portfolio assessment and balancing process. The process allows the application of objective, repeatable evaluation criteria across all S&T projects. S&T will use this process to identify projects with the greatest likelihood of success that meet DHS priorities and component mission requirements.

S&T is currently using its portfolio assessment process to assess S&T projects and identify projects with the most likelihood of success. Any increase in funding would first be applied those projects. Conversely, any project with a low likelihood of success would be the most likely to experience reduced funding.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Warren Stern, Director, Domestic Nuclear Detection Office, Department of Homeland Security

Questions submitted by Chairman Ben Quayle

Q1. How does DNDO prioritize and administer basic R&D activities? How is the balance between conducting basic and applied research, development, demonstration, testing, and evaluation decided?

A1. DNDO's research and development (R&D) activities for detection systems focuses on addressing gaps in the Global Nuclear Detection Architecture (GNDA); improving performance, cost, and operational ease of use of detectors and systems; and transitioning successful technologies to system development, acquisition, and deployment, or commercialization. Our approach includes working with industry, national laboratories, and academia, while encouraging teaming and coordination with intra/interagency organizations (e.g., DHS/S&T, DOE, DOD, DNI).

The GNDA gaps are identified in the GNDA Annual Report. These gaps are then integrated with strategic needs as part of the DNDO Solution Development Process (SDP) to develop a prioritized list of GNDA gaps that DNDO will address. Through the SDP, DNDO determines which gaps have technical or operational solutions and which gaps have no immediate solutions. For prioritized gaps with immediate (<2 year) solutions, DNDO defines and executes programs, within budgetary constraints, to fill these gaps. These programs may have engineering development, test and evaluation, and acquisition components. For prioritized gaps with no immediate solutions, DNDO defines and executes basic and applied R&D project to address these gaps. The balance between basic and applied research depends on how the gaps are prioritized and the technology readiness of potential solutions. In addition, it is important to maintain the proper balance between near-term and longer term research so that investment in basic (long-term) research today can feed future applied (near-term) research, which in turn can feed future engineering development and acquisition.

Q2. The President's FY 2012 budget request for the Domestic Nuclear Detection Office includes $27 million for the Securing the Cities Initiative. The request appears to be primarily for acquiring and deploying technologies and capabilities to the New York City Region, but the budget request also mentions that a funding opportunity will be announced for one additional USAI Tier I region. Can you please clarify how much of the fiscal year 2012 request would be allocated to other cities or regions?

A2. As stated in the FY 12 DHS Congressional Justification, up to $7,000,000 of the $27,000,000 requested is planned for allocation to an additional Urban Areas Security Initiative Tier I region. What criteria will be used to evaluate regions for Securing the Cities funding and will a particular threat area (chemical, biological, or radiological/nuclear) be prioritized?

The STC mission is to design and implement a layered architecture for coordinated and integrated detection and interdiction of illicit radiological and nuclear materials that may be used as a weapon within the highest threat metropolitan areas. This program deals exclusively with radiological/nuclear materials. Once FY 12 funding is appropriated, DHS will issue a competitive funding opportunity announcement detailing eligible applicants and the evaluation criteria for selection. A number of factors will be considered in the competition, including threat vulnerabilities, consequences to nation in the event of a successful attack, region's existing PRND capabilities, and region's proximity to existing STC implementations, extending the security benefits of multiple UASIs to form a more comprehensive security layer.

Q3. Additionally, how is the Directorate interacting with U.S. manufacturers to ensure that technologies being developed under the STC initiative as well as other Directorate programs results in U.S. jobs?

A3. The STC program office is not directly involved in technology development or equipment purchases with manufacturers. The program grants money to S&L government agencies that then contract with vendors to purchase commercial off-the-shelf equipment. Per 44 CFR 13, S&L grantees follow S&L procurement rules in determining whether equipment is purchased from a U.S. or foreign vendor. In addition, the STC grant authorizes S&L agencies to hire full- or part-time staff or con-

tract/consultants using grant funds to assist with planning activities associated with this program.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Marc Pearl President and Chief Executive Officer, Homeland Security and Defense Business Council

Questions submitted by Chairman Ben Quayle

Q1. "In your written testimony, you state that it can sometimes be challenging for the business community to comprehend the needs and goals of DHS, making it difficult for your members to make decisions about their own long-term business and technology investments. How can this be improved? What are some ways that greater coordination of communication can occur between DHS and the private sector? What do you see as the mutually beneficial role for R&D in both the private sector and DHS?"

A1. The Council and its members have a great interest in providing the technology, services and products—the 'solutions'—our nation needs and deserves to respond effectively and efficiently to our nation's homeland security needs. Unfortunately, due to a number of extenuating circumstances, it is difficult for the homeland security market to accurately predict and/or 'build-to' the needs and long-term goals of the Department. This, unfortunately, makes timely and proper business certainty decisions regarding long-term business strategy, research and development, and technology investments challenging.

As my testimony pointed out, while we recognize and very much appreciate the great strides the Department has made over the past few years in this area, the Council and its members continually hope for even more improvements. The Council believes greater coordination of communication between industry and government can mitigate this challenge and improve the private sector's ability to meet the needs, priorities and goals of the Department of Homeland Security.

The Council recommends multiple actions that could improve this engagement:

First and foremost, Congress must pass a comprehensive DHS Authorization Bill. We can no longer exist in an environment that is devoid of a strategic blueprint that provides guidance from Congress to the Department, and, in turn, gives those who provide the tools a clear idea on the needs, priorities and goals. We cannot build an effective and efficient homeland security foundation solely off an appropriating structure. The relevant and active authorizing committees in the House and Senate should, once and for all, work through their jurisdictional issues that have contributed to hampering the Department's ability to develop long-term strategies to match congressional policies. Without a *blueprint*, policies and priorities are diluted across multiple committees and agendas.

- The Council *recommends* that passage of a comprehensive DHS Authorization bill led through the U.S. House Committee on Homeland Security with consultation from other overlapping Committees, including this subcommittee. Once such legislation is passed, the Department and the private sector will have the information (and business certainty) they need to better approach appropriate and necessary research and development to effectively and efficiently meet the homeland security needs and goals of the Department and the nation.

Second, the Congress should increase and provide necessary enforcement tools to the Department's authority, specifically the Science and Technology Directorate, to direct and coordinate homeland security research and development efforts within the component parts of DHS and across the Federal government. Currently the funding and authority is spread across multiple operating components within DHS and other Federal agencies. This results in dilution and duplication, and equates to inefficiencies and waste that the government can ill afford. There must be a concerted effort to insure that there is an institutional system is in place—unaffected by whomever is currently occupying a given leadership or implementation position—to assist the private sector's need to know who to talk to at S&T in order to develop the needed solutions.

- The Council *recommends* the formation of a homeland security research and development advisory council across the government that could coordinate the consolidation of goals and requirements development, and encourage greater communication and identification of needs. This advisory council must include expert representation from relevant Federal agencies, state/local/tribal leaders and the private sector—led by the Under Secretary of the Science and Technology Directorate. The Under Secretary would be able to request homeland

security research and development funding from Congress, allocate funding according to a long-term strategy and report to Congress and the advisory council on progress. This process would ensure the necessary linkage between the policy requirements and the funding. This level of planning and visibility would significantly improve the private sector's ability to forecast the technology goals and needs of the Department.

Third, the Department should be encouraged by Congress to take the steps to improve the direct relationship with the private sector. The current level of engagement can best be described as "hands off." Homeland security solutions providers are generally viewed as merely 'contractors' and 'vendors' though a wealth of thought leadership and a desire to invest huge amounts of time and dollars in developing and having those solutions deployed and implemented is critical. Either because of ethical concerns (that can be easily taken care of with appropriate oversight) or a lack of appreciation for the thought leadership the private sector can contribute, not including this level of substantive engagement works against the Department's ability to have its needs and goals be met by the private sector in a timely, efficient and/or effective way.

- The Council *recommends* clear pronouncements of the long term technology goals linked to funding streams and points of contact, as mentioned above. In addition, "mission area conferences/forums" coordinated by the Department would allow experts and decision makers to discuss long term strategy and assist everyone in providing an effective strategic platform allowing the best and the brightest to focus on key mission areas such as aviation security, weapons of mass destruction, pandemics, etc., and allow the engagement of all the critical players in an iterative process to define, identify, develop and implement a process that meets the goals and needs of specific mission areas.
- The Council additionally recommends an innovative approach in research such as a public private partnership that brings together the universities, national laboratories, industry partners, and the Department.

We applaud your leadership in this area that will assist our nation become safer and more secure while ensuring the innovative thought leadership the Department needs to meet its goals are communicated.

Thank you again for the opportunity to provide you and the members of Committee our views. Please contact me if the Council can provide more information.

Appendix II:

Additional Material for the Record

TESTIMONY FROM DR. MICHAEL B. SILEVITCH, ROBERT D. PROFESSOR, DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING AND CO-DIRECTOR AWARENESS AND LOCALIZATION OF EXPLOSIVES RELATED THREATS (ALERT), A DEPT. OF HOMELAND SECURITY CENTER OF EXCELLENCE, NORTHEASTERN UNIVERSITY

Testimony for the Record of Michael B. Silevitch, Ph.D.

Robert D. Black Professor, Department of Electrical & Computer Engineering
and
Co-Director Awareness and Localization of Explosives Related Threats (ALERT)
A Dept. of Homeland Security Center of Excellence
Northeastern University
before the
Technology and Innovation Subcommittee
House Committee on Science
U.S. House of Representatives
March 15, 2011

Chairman Quayle and Ranking member Wu, my name is Michael Silevitch. I am the Robert D. Black Professor of Electrical & Computer Engineering at Northeastern University where I co-direct a Department of Homeland Security (DHS) Center of Excellence called Awareness and Localization of Explosives-Related Threats (ALERT). Thank you for the opportunity to provide written testimony for your hearing "*An Overview of Science and Technology Research and Development Programs and Priorities to Effectively Protect Homeland Security.*" I applaud you for looking at this matter given all the varied threats that our country faces with regard to homeland security. At the same time, I am very concerned about our future ability to prepare for such threats given the recent budget cuts in the Continuing Resolution to DHS that have resulted in substantial budget reductions for our center and the eleven other Centers of Excellence in the country.

The DHS Centers of Excellence: A key resource to help protect the nation

Since the creation of the DHS Centers of Excellence (COE) in the Office of University Programs (OUP) in the Science and Technology (S&T) Directorate in 2002, the program has grown to twelve Centers spread geographically across the country. These university-led centers help the nation protect against terrorist, chem-bio and cyber attacks including the safeguarding of its ports, coasts, transportation infrastructure and borders. Other important missions include assisting in the mitigation of both natural disasters and threats to our food and water supplies. In essence, these Centers of Excellence enable the academic community to help DHS prepare for and, if needed, respond to a variety of threats to our country in a collaborative and proactive fashion. New technologies and tools are being developed with the goal of rapidly providing innovations to the key stakeholders who protect our nation. The 12 Centers have also spawned a broad network of university collaborators and State Homeland Security agencies across almost all fifty states and all the Department of Energy National Laboratories.

Impact of DHS Center Funding Reduction

In addition to translational research in the area of national security, the Centers produce an essential workforce. The COEs support about 600 graduate students from all across

the country. This resource of trained students will be the core of those career professionals who will lead the homeland defense efforts well into the future. If funding for the Centers is severely curtailed, these students will be trained in disciplines other than national security or be left without any support. It is my strong belief that curtailing the activities of the COEs will severely impact the ability of DHS to accomplish its critical mission.

Despite the impact these centers have on behalf of the country's national security, they are anticipating devastating budget cuts. As amended, H.R.1, and the two-week-long CR passed by the House and Senate on March 2, would specifically target cuts to DHS that could result in a significant loss of support for OUP and the COEs. Any substantial cuts would cripple the Centers. Moreover, dramatically reducing the funding for the COEs would significantly jeopardize the ability of DHS to utilize the academic research innovations, scientific expertise and future workforce development that are critical assets for safeguarding the United States against terrorist attacks and disasters. Hopefully, the final FY 11 appropriations bill will enable our center and the others to continue their work effectively.

Northeastern University's DHS Center of Excellence

The Northeastern COE, entitled Awareness and Localization of Explosive-Related Threats (ALERT) was funded though a vigorously competed nation-wide peer review process in 2008 in partnership with Boston University, Tufts University, Massachusetts General Hospital, Woods Hole Oceanographic Institution and others (including co-lead URI) for $3 million annually over four years ($12 million total). ALERT is driven by challenges such as ultra-reliable screening of luggage, cargo and potential suicide bombers, explosives detection at a distance, and unequivocal pre-and post-blast mitigation. These challenges have defined the four core fundamental science research thrusts: Explosives Characterization, Explosive Detection Sensors, Explosive Detection Sensor Systems, and Blast Mitigation. With the collaboration of its industrial and national laboratory partners, ALERT focuses on transitioning research into fieldable systems such as a multi-mode suicide bomber detection system. The research that has begun in these areas was initiated with a four-year level funding horizon to complete the work. Cutting funding at this point could waste the investment to-date as work cannot be brought to a point where the results can be reaped.

ALERT Economic Impact

ALERT funds 138 personnel at last count, including 39 faculty, 8 technical staff and postdoctoral associates, 48 graduate students, 25 undergraduates, and 18 administrative staff, almost half of whom are located at MA-based institutions. Without continued funding, these individuals will not be able to continue their work in an area of national (and state) need. The ALERT research focus (principally explosives detection sensors, luggage screening and surveillance systems) touches on a primary source of Massachusetts homeland security and defense R&D spending, worth billions to the state each year. The ALERT-funded students mentioned above are key to the continued growth of this industry. Without the cutting-edge skills and techniques acquired at

ALERT, as well as the connections to local firms that will continue post-graduation through in-state employment, students will be forced to pursue non-homeland security careers or leave the state to pursue those interests elsewhere.

In addition to developing students whose expertise will further the local economy, ALERT actively works with industry collaborators to (a) improve the state-of-the-art in security systems and (b) increase the return to the state economy.

a. ALERT has developed a series of strategic studies meetings focused on improving luggage and terrorist screening techniques. These workshops, held at Northeastern over the past two years, have turned the COE into an honest broker among the players in the screening related industries (a role that only a university could occupy). There, high-level technologists and executives have come together to discuss how to further improve state-of-the-art screening technologies and make recommendations for future directions in both the research and policy domains. These meetings have proven invaluable to collecting insight into improving security screening and passenger/cargo safety worldwide.
b. ALERT has received $1.6 million in additional funding from the Massachusetts Technology Collaborative's John Adams Innovation Institute to fund partnerships with MA-based firms. To date joint initiatives have been funded with Textron Defense Systems (Wilmington), Raytheon NCS (Marlborough), American Science & Engineering (Billerica), Agiltron (Woburn), Reveal Imaging (Bedford), and Block Engineering (Marlborough), to enable next-generation advances in ALERT-related technology and increase state-based share of the Homeland Security market.

Above all, ALERT research itself is novel and will improve the lives and well-being of U.S. citizens through more effective and less-intrusive security methods. For instance, ALERT is developing suicide bomber detection technology, which can identify metal and explosives on the human body at up to 50 meters distance. Not only does this technology provide a revolutionary improvement over existing methods, it is currently poised for commercialization. This product will be of special interest to many federal agencies in the US, including but not limited to: the Department of Homeland Security, the Army, and the Navy, and could also be used by local law enforcement. Without support from the Department of Homeland Security, this work would not have occurred and without future support, similar advances cannot be made.

Conclusion

University contributions through the Centers of Excellence are important to the DHS mission. The Office of University Programs only receives a small percentage of the S&T budget, approximately $49 million in FY 2010. This supports much of the university-based research and development programs within DHS including the COEs. With this limited funding, OUP and the COEs have excelled in their critical role in marshaling academia to help enhance the US security infrastructure and related workforce development. Moreover, universities with DHS Centers, like Northeastern's, have focused on the security area as one of high strategic importance. If the funding is cut back

this decision to develop security oriented university programs will be curtailed or stopped completely. This negative trend will be a hard one to reverse. Unfortunately the threats won't be curtailed and because of the shift in funding and focus, our arsenal of university experts may not be up to dealing with these threats.

While I understand the tough fiscal decisions you must face in the 112th Congress, I urge you to support funding for research, science, and technology at DHS through S&T, OUP, and its COEs and reject the funding cuts contained in H.R 1. If this cut goes through it may result in an unacceptable weakening of the nation's security. Moreover, these cuts will clearly have a very negative impact on academic institutions and companies. The ALERT Center of Excellence at Northeastern University is the centerpiece of vital work that is having an impact on the safety of our soldiers in the field as well as protecting the public here at home. Given all the threats to our national security, now is not the time to be cutting university-based homeland security research. (Attached please find a letter to Senator John Kerry from our Northeastern University's President Joseph E. Aoun outlining his concern about these cuts)

Thank you again for the opportunity to provide written testimony for this hearing. I hope you will call on me if you have any follow-up questions.

Joseph E. Aoun, PhD
President

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March 7, 2011

The Honorable John Kerry
United States Senate
218 Russell Building
Washington, D.C. 20510

Dear Senator Kerry:

I am writing to urge you to protect funding for the Department of Homeland Security's Science and Technology Directorate. This funding directly supports the Office of University Programs and its DHS Centers of Excellence program. Northeastern University leads a DHS Center of Excellence that was funded in 2008 in partnership with other institutions in Massachusetts. The recently passed continuing resolution would eliminate support for this critical research. I ask that you contact DHS to oppose these cuts and any similar cuts in subsequent appropriations.

Eliminating the Centers would jeopardize the ability of DHS to safeguard the United States against terrorist attacks and other disasters. The 12 Centers funded by this legislation create greater capacity to safeguard our nation's ports, coasts, borders, and transportation infrastructure as well as protect against terrorist and cyber attacks.

For example, Northeastern's Center (ALERT) covers four fundamental areas of research: explosives characterization, explosive detection sensors, explosive detection sensor systems, and blast mitigation. Our goal is to take this research and partner with members of industry and national laboratories to ultimately help build practical systems to detect and prevent terrorist attacks. Finally, the economic impact of these cuts is significant in our state and region. Our partners in this endeavor include Raytheon NCS (Marlborough), American Science & Engineering (Billerica), and Reveal Imaging (Bedford) to name a few.

I understand the nation faces difficult budgetary constraints, but cutting the Department of Homeland Security and the Centers of Excellence program could jeopardize the nation's security infrastructure at a time we can ill afford such a move. The ALERT Center of Excellence at Northeastern is doing extremely important work that will help protect our soldiers and our citizens. Please do all you can to ensure this important work continues.

Sincerely,

Joseph E. Aoun
President

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