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DEVELOPING RESEARCH PRIORITIES AT DHS'S SCIENCE AND TECHNOLOGY DIRECTORATE

HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY AND INNOVATION

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

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DEVELOPING RESEARCH PRIORITIES AT DHS'S SCIENCE AND TECHNOLOGY DIRECTORATE

TUESDAY, OCTOBER 27, 2009

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

The Subcommittee met, pursuant to call, at 2:08 p.m., in Room 2318 of the Rayburn House Office Building, Hon. David Wu [Chairman of the Subcommittee] presiding.

BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

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Subcommittee on Technology and Innovation's

Hearing on

DEVELOPING RESEARCH PRIORITIES AT DHS'S SCIENCE AND TECHNOLOGY DIRECTORATE

Thursday, October 27, 2009
2:00 p.m. – 4:00pm
2318 Rayburn House Office Building

Witness List

Mr. Brad Buswell
Acting Under Secretary of the Science and Technology Directorate,
Department of Homeland Security (DHS)

Dr. Phil Depoy
Chairman,
Homeland Security Science and Technology Advisory Committee (HSSTAC)

Mr. David Berteau
Senior Adviser and Director, Defense Industrial Initiatives Group,
Center for Strategic and International Studies

Dr. Cindy Williams
Chair, Committee on the DHS Science and Technology Directorate,
National Academy of Public Administration;
Shapiro Visiting Professor of International Affairs, The Elliott School of International Affairs,
George Washington University

HEARING CHARTER

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

Developing Research Priorities at DHS's Science and Technology Directorate

TUESDAY, OCTOBER 27, 2009
2:00 P.M.—4:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

1. Purpose

On Tuesday, October 27, 2009 the Subcommittee on Technology and Innovation of the Committee on Science and Technology will hold a hearing to review activities at the Science and Technology Directorate of the Department of Homeland Security (DHS S&T).

2. Witnesses

Mr. Brad Buswell is the Acting Under Secretary of the Science and Technology Directorate at the Department of Homeland Security.

Dr. Phil Depoy is the Chairman of the Homeland Security Science and Technology Advisory Committee.

Mr. David Berteau is the Senior Adviser and Director of the Defense Industrial Initiatives Group at the Center for Strategic and International Studies.

Dr. Cindy Williams is the Chair of the Committee on the DHS Science and Technology Directorate at the National Academy of Public Administration. She is also the Shapiro Visiting Professor of International Affairs at the Elliot School of International Affairs at George Washington University.

3. Brief Overview

The hearing will have witnesses assess and discuss various elements of DHS S&T including the strategic planning process, stakeholder involvement in setting research priorities, and the role of basic research in the DHS S&T portfolio. Many of the questions posed to witnesses are ongoing concerns that Members of the Technology and Innovation Subcommittee have expressed in past hearings. It is the goal of the Subcommittee to highlight these issues for the benefit of the incoming Under Secretary of the Science and Technology Directorate.

4. Background

The Department of Homeland Security's research and development portfolio is concentrated in the Science and Technology Directorate and the Domestic Nuclear Detection Office (DNDO). With an FY 2010 budget request of $968 million, DHS S&T is responsible for carrying out research on behalf of federal homeland security agencies and coordinating this research with other federal research entities. DNDO conducts research on the detection of nuclear devices and has a FY 2010 budget request of $366 million.

DHS S&T is currently organized in a matrix style management structure. There are three research directors that oversee portfolios containing long-term basic research, shorter-term applied research, and technology transition. These portfolios stretch across DHS S&T's six divisions:

Chemical and Biological: detection and mitigation of chemical and biological weapons threats

Explosives: detection of and response to conventional (non-nuclear) explosives

Human Factors: social science research to improve detection, analysis, and understanding of threats posed by individuals as well as how communities respond to disasters

Infrastructure and Geophysical: identifies and mitigates threats to critical infrastructure

Border and Maritime: develops technologies for monitoring land and maritime borders

Command, Control, and Inter-operability: research and development support for inter-operable communications and cyber security R&D

5. Issues and Concerns

Science and Technology Directorate Strategic Plan

Witnesses will discuss the methods and criteria used to develop research and development priorities at DHS S&T and how these may be improved. Witnesses were asked to discuss the need for a comprehensive threat assessment accounting for the impact and likelihood of potential threats. The concern is that the DHS S&T strategic plan does not provide a justified roadmap for future research, but only describes ongoing projects. Homeland security experts contend that a true strategic plan should be grounded in comprehensive threat assessments, detailed in how research priorities align with the needs of the customer, and coordinated with the research plans of other federal research entities.

Integrated Product Teams

There are thirteen Integrated Product Teams (IPTs) in DHS S&T that provide input into the research plans based on their needs in the field. The IPT members are almost entirely made up of representatives from the various operational divisions within DHS (Coast Guard, Transportation Security Administration, Immigration and Customs Enforcement, etc.). Some examples of the corresponding IPTs include: First Responder, Border Security, Cyber Security, and People Screening. In past hearings, the Members of the Technology and Innovation Subcommittee voiced concerns about the fact that the Nation's local first responders are a critical recipient of DHS S&T work, but were not represented in the research planning process. As a result, DHS S&T formed a First Responder IPT to address the needs of the police, firefighters, and rescue personnel.

For this hearing, witnesses will assess the IPT process and discuss whether the IPTs are fulfilling their intended role as vehicles for stakeholder input in research priorities. There are concerns over uneven levels of organization, representation, and impact of the IPTs.

Basic Research at the Centers of Excellence

DHS S&T allocates 20 percent of its spending to basic research and supports twelve university-based Centers of Excellence. The Subcommittee has asked witnesses to discuss the role of basic research in the S&T portfolio and how this research is executed at the Centers of Excellence. Homeland security experts have expressed concern that the basic research work is not properly integrated into later phases of DHS S&T's research. There is also concern over how basic research priorities are set without the guidance of a true strategic plan.

Chairman WU. This hearing will come to order this afternoon. I want to welcome everybody to this afternoon's hearing on the Department of Homeland Security's Science and Technology Directorate (DHS S&T). Research and development efforts at the Directorate are critical to supporting not just the missions of the agencies within DHS, but our country's first responders all over this Nation and the world. This subcommittee continues to do all it can to assist the Directorate in its mission to deliver quality technical solutions to all of its stakeholders.

In past hearings, this subcommittee has made many recommendations to the Directorate, and I am very pleased to see that some of these recommendations have been acted upon. In response to stakeholder and Subcommittee requests, the Directorate has added a 13th Integrated Product Team to give local fire, rescue, and police workers a direct voice in federal research priorities.

I am also pleased to see that funding for basic research is now 20 percent of the Directorate's portfolio. As you know, this subcommittee firmly believes that basic research plays a critical role in the R&D (research and development) process. By increasing the presence of basic research at the Directorate, it has shown a commitment to not only solve today's problems but also to position itself to meet future challenges.

While there have been many improvements at the Directorate, I continue to have some concerns. Although the Integrated Product Teams (IPTs) now include all of the major stakeholders, there seems to be some inconsistency with how efficiently and effectively the IPTs operate. I would like to hear from the witnesses about ways we can ensure that the IPTs are properly organized to enable the highest levels of collaboration between the Directorate and its stakeholders.

Finally, there is one area of great concern that has yet to be addressed by the Directorate. Over the course of multiple hearings, this subcommittee has expressed concern about the lack of a comprehensive threat assessment as a foundation for determining research priorities. The current strategic plan does little to define the direction of research activities and is not grounded in a formal threat assessment. I do not find it acceptable. I think this subcommittee has trouble with the thought that plans are made without reference to a proper analysis of threats and the dangers they pose, especially when considering that we rely on the Directorate's plans to protect our country from all future threats.

While I am encouraged by progress in many areas of the Science and Technology Directorate, I am somewhat frustrated at the lack of such a crucial element in the effectiveness of almost a $1 billion dollar research enterprise. I am eager to hear the witnesses' expert opinions on these concerns and moreover would strongly encourage the incoming Under Secretary to address these issues with utmost urgency.

And at this point, I would like to recognize my friend and colleague, the gentleman from Nebraska, for his opening statement.

[The prepared statement of Chairman Wu follows:]

PREPARED STATEMENT OF CHAIRMAN DAVID WU

I want to welcome everyone to this afternoon's hearing on the Department of Homeland Security Science and Technology Directorate. Research and development efforts at the Directorate are critical to supporting not just the missions of the agencies within DHS, but our country's first responders. This subcommittee continues to do all it can to assist the Directorate in its mission to deliver quality technical solutions to all stakeholders.

In past hearings, this subcommittee has made many recommendations to the Directorate and I am very pleased to see that some of these recommendations have been acted upon. In response to stakeholder and Subcommittee requests, the Directorate has added a 13th Integrated Product Team—the First Responder IPT—to give local fire, rescue, and police workers a direct voice into federal research priorities.

I am also pleased to see that funding for basic research is now 20 percent of the Directorate's portfolio. As you know, this subcommittee firmly believes that basic research plays a critical role in the R&D process. By increasing the presence of basic research at the Directorate, it has shown a commitment to not only solve today's problems, but position itself to meet future issues head-on.

While there have been many improvements at the Directorate, I continue to have many concerns. Although the Integrated Product Teams now include all of the major stakeholders, there seems to be an inconsistency with how efficiently and effectively the IPTs operate. I would like to hear from witnesses about ways we can ensure that the IPT process is properly organized to enable the highest levels of collaboration amongst the Directorate and its stakeholders.

Finally, there is one area of great concern that has yet to be addressed by the Directorate. Over the course of multiple hearings, this subcommittee has expressed the need for a comprehensive threat assessment to use as a foundation for determining research priorities. The current strategic plan does little to define the direction of research activities and is not grounded in any formal threat assessment. It is unacceptable that plans are made without a proper analysis of threats and the dangers they pose, especially when considering that we rely on the Directorate's plans to protect our country from future threats.

While I am encouraged by progress in many areas of the Science and Technology Directorate, I am increasingly frustrated at the lack of such a crucial element to the effectiveness of an almost one billion dollar research investment. I am eager to hear the witnesses' expert opinions on these concerns and more, and would strongly encourage the incoming Under Secretary to address these issues with the utmost urgency.

Mr. SMITH. Thank you, Mr. Chairman, for calling this hearing today to examine the activities of the Department of Homeland Security's Science and Technology Directorate.

In 2002, this committee played a key role in shaping the creation of DHS, specifically calling for the establishment an S&T Directorate within the new department to fund R&D and advised the Secretary on S&T related policies.

While agency growing pains always present a challenge, in the seven years since its creation, the Directorate has demonstrated respectable progress refining its roles and responsibilities in instituting a sound organizational structure and operating processes.

However, one of the critical policy challenges the Committee recognized in 2002 still remains, development of a true strategic plan to inform, prioritize and guide the work of the Directorate.

In one sense, the absence of a strategic plan reflects the magnitude of the challenge inherent in the Department's mission. From our transportation and infrastructure to our food and agricultural system to our land and seaports of entry, just to name a few, the diversity of potential terrorist threats and targets to the homeland is certainly endless. This makes the management and policy issues associated with quantifying and prioritizing risks and associated S&T activities a monumental task. But the high degree of difficulty doesn't make it any less important. Without an effective strategic

plan, the Directorate has no foundation from which to systematically guide development of priorities and measure performance toward objectives.

So I hope and expect the Directorate will expedite such a plan in the coming months. I also look forward to hearing from the Administration and other witnesses regarding a number of other, more specific issues which are important to the success of the Directorate and the Department going forward. Among these are the evolution of the S&T Directorate's integrated product teams and the balance of and focus on activities across the R&D pipeline from basic research to technology development.

I certainly thank the witnesses for taking your time today, and I do look forward to the discussion. Thank you.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF REPRESENTATIVE ADRIAN SMITH

Thank you, Mr. Chairman, for calling this hearing today to examine the activities of the Department of Homeland Security (DHS) Science and Technology (S&T) Directorate. In 2002, this committee played a key role in shaping the creation of DHS, specifically calling for establishment of an S&T Directorate within the new department to fund R&D and advise the Secretary of Homeland Security on S&T-related policies.

While agency "growing pains" always present a challenge, in the seven years since its creation, the S&T Directorate has demonstrated respectable progress, refining its roles and responsibilities and instituting a sound organizational structure and operating processes. However, one of the critical policy challenges the Committee recognized in 2002 still remains: development of a true strategic plan to inform, prioritize, and guide the work of the Directorate.

In one sense, the absence of a strategic plan reflects the magnitude of the challenge inherent in the Department's mission. From our transportation and infrastructure to our food and agricultural system to our land and sea ports of entry—to name a few—the diversity of potential terrorist threats and targets to the homeland is seemingly endless. This makes the management and policy issues associated with quantifying and prioritizing risks and associated S&T activities a monumental task.

But the high degree of difficulty doesn't make it any less important. Without an effective strategic plan, the Directorate has no foundation from which to systematically guide development of priorities and measure performance toward objectives. So I hope and expect the Directorate will expedite such a plan in the coming months.

I also look forward to hearing from the Administration and other witnesses regarding a number of other, more specific issues which are important to the success of the Directorate and the Department going forward. Among these are the evolution of the S&T Directorate's Integrated Product Teams (IPTs) and the balance of and focus on activities across the R&D pipeline, from basic research to technology development.

I thank the witnesses for being with us today, and I look forward to a productive discussion.

Chairman WU. Thank you very much, Mr. Smith. If there are any other Members who wish to submit opening statements, the statements will be added to the record at this point.

And now I would like to introduce our witnesses for this afternoon. First, Mr. Brad Buswell is the Acting Under Secretary of the Science and Technology Directorate at the Department of Homeland Security. Dr. Phil Depoy is the Chairman of the Homeland Security Science and Technology Advisory Committee (HSSTAC). Mr. David Berteau is the Senior Advisor and Director of the Defense Industrial Initiatives Group at the Center for Strategic and International Studies. And finally, Dr. Cindy Williams is the Chair of the Panel on the DHS Science and Technology Directorate of the National Academy of Public Administration, and she is also the

Shapiro Visiting Professor of International Affairs at the Elliott School of International Affairs at George Washington University and a principal research scientist at the Securities Studies Program at MIT.

Each of you will have five minutes for your spoken testimony. Your written testimony will be included in the record in their entirety, and when you complete all of your testimony, we will begin with questions, and each Member will have five minutes to question the panel.

Mr. Buswell, please proceed.

STATEMENT OF MR. BRADLEY I. BUSWELL, ACTING UNDER SECRETARY, SCIENCE AND TECHNOLOGY DIRECTORATE, U.S. DEPARTMENT OF HOMELAND SECURITY (DHS)

Mr. BUSWELL. Thank you very much, Chairman Wu, Ranking Member Smith, and other Members and staff. It is an honor to appear here before you here today, and it is an honor to appear with such a distinguished panel. I commend you on the assembly. I look forward to talking to you today about the progress that we have made in developing the Science and Technology Directorate and placing ourselves in a position to provide advanced technological solutions to protect the American people and to protect the critical infrastructures that we depend on. As you said, Mr. Chairman, the Directorate is charged with providing technical support and tools to the DHS operating components and as importantly or perhaps even more importantly, to our nation's first responders, those brave men and women who are on the front lines of homeland security every day.

Let me just start by saying I am grateful for the strong leadership of Secretary Napolitano. She has emphasized consistently the importance of science and technology and securing our nation and has also repeatedly underscored the importance of strengthening the relationships with the State, local, tribal and territorial agencies, and I think S&T is making significant inroads in that regard, as you mentioned in your opening statement. Also, I greatly appreciate the leadership of the Congress and this subcommittee's support. The informed counsel of both Members and staff has been invaluable to our efforts to position the Directorate for accountability and tangible results.

The Subcommittee is familiar with the S&T Directorate's efforts over the past three years to realign the structure, portfolio and business operations in an effort to expedite the delivery of advanced technological solutions to our customers, and I am pleased to report that that restructuring has been fully implemented, and we are wholly engaged in responding to the near- and the long-term technology capability needs of the components and other customers.

You specifically asked that I address three areas of interest to the Subcommittee. First of all, our priorities in developing the research and development portfolio, the role on the caps on integrated product teams in determining those priorities, and the role of basic research, both in the overall S&T portfolio and specifically at the university-based Centers of Excellence.

The first two are really closely intertwined. The research and development priorities of the Directorate are primarily customer driven through our Capstone integrated product teams, or IPTs. The IPTs provide direct stakeholder input into the selection and prioritization of our research investments, and our customers chair those IPTs. So they establish their capability priorities based on their assessment of risk in the mission areas for which they are responsible. This gets a little bit to your point of a comprehensive threat assessment. We rely on our customers to incorporate the threat as they see it into their overall risk assessment and identify technology gaps in a priority way to address those risks.

The customer-driven Capstone IPT process directly drives about 50 percent of our overall investment, but it also importantly informs the rest of the portfolio's basic research and innovation. What we learned from our stakeholders through the process about their operations and about their future capability needs help influencing those other investments that we also make with the innovation and the basic research portfolio.

For those reasons, all three of the portfolio members, basic research, innovation and transition, are participants in the IPT process. As I said, the more insight that we gain, the better we understand and the better we are positioned to identify promising areas of research and explore innovative solutions that are outside the development timeframe or risk tolerance of the near-term focused IPT process.

While there is room for improvement in any process, I am pleased with the progress we have made in implementing and institutionalizing the Capstone IPTs. As you said, I am especially proud of the addition this year of the 13th Capstone IPT in support of the first responders. I am happy to provide more information on that during the Q&A session if you are interested.

Let me talk quickly about, briefly, the basic research portfolio. Basic research really fulfills two very important roles in the S&T Directorate. First, it lays the foundation for future technology development. It is what we use to keep the technology pipeline full. We invest in projects that are addressing capability needs for which we have no near-term solution or with existing or near-existing technologies or the solutions are of too high a risk for the customers to be able to rely on. It also allows us to make investments based on what science has to offer. So with a small investment, we may be able to cultivate a promising technology that would yield a significant life-saving capability.

Secondly, our investment into basic research which is conducted primarily at our national laboratories and our university-based Centers of Excellence also serves to develop the scientific workforce that this country will need to continue developing scientific understanding and technology in the homeland security area, specifically as far as we are concerned but in all areas well into the future.

And given the broad spectrum of science and technology requirements associated with the Homeland Security mission, we value our relationship with the Department of Energy (DOE) National Laboratories and with their renowned interdisciplinary capabilities as well as the university-based Centers of Excellence.

Let me conclude by addressing the topic that Congressman Smith raised about the development of a strategic plan. The last strategic plan that we published was in June of 2007 following a major reorganization of the Directorate and the research portfolio. As was appropriate at that time, that plan was focused on establishing the business practices that were necessary to make the S&T Directorate relevant to the homeland security enterprise. Based upon the strategic goals and objectives that are being identified in the forthcoming Quadrennial Homeland Security Review, we will be updating that strategic plan over the next few months. And this update will be more in line with the guidance published by OMB (Office of Management and Budget) and GAO (Government Accountability Office) for effective strategic planning.

So again, Members of the Subcommittee, thank you for all you do in support of our mission, and thank you for the opportunity to meet with you today and I look forward to your questions.

[The prepared statement of Mr. Buswell follows:]

PREPARED STATEMENT OF BRADLEY I. BUSWELL

INTRODUCTION

Good afternoon, Chairman Wu, Congressman Smith, and distinguished Members of the Subcommittee. I am honored to appear before you today to report on the progress of the Department of Homeland Security's (DHS) Science and Technology Directorate (S&T Directorate) in advancing technological solutions to protect the American people and the critical infrastructures our society depends upon.

The S&T Directorate is charged with providing technical support and tools to the major DHS operating components and to our nation's first responders—the brave men and women who routinely face risk on the front lines of homeland security. I appreciate the Subcommittee's support of the S&T Directorate as it continues to mature and grow in areas critical to our mission of enabling technology applications to address critical gaps in homeland security. Toward this end, the Directorate provides technical support and tools to the major DHS operating components, and to our Nation's first responders—the brave men and women who routinely face risk on the front lines of homeland security.

I am very grateful for the strong leadership of Secretary Napolitano, who not only has emphasized the importance of science and technology in securing our nation, but has also repeatedly underscored the importance of strengthening relationships with State, local, tribal and territorial agencies—an area where the S&T Directorate continues to make significant inroads.

I greatly appreciate the Subcommittee's support of the S&T Directorate as it pursues its mission. I appreciate the leadership Congress has shown in supporting the S&T Directorate's endeavors. I am thankful for the engaged and non-partisan nature of our relationship. Our collaboration with both Congressional Members and their staffs has been invaluable to the Department's efforts to position the S&T Directorate for accountability, tangible results, and success.

The Subcommittee is familiar with the S&T Directorate's efforts over the past three years to realign its structure, research portfolio, and business operations in an effort to expedite the delivery of advanced technological solutions to our customers. I am pleased to report that the restructuring plan has been fully and successfully implemented. The S&T Directorate is now wholly engaged in responding to the near- and long-term technological capability needs of the DHS components and their customers.

This testimony will primarily address three areas of interest expressed by the Subcommittee: the S&T Directorate's research and development (R&D) priorities and planning; the role of Capstone Integrated Product Teams (IPTs) in determining research priorities; and the role of basic research, both in the overall S&T research portfolio and specifically at the Homeland Security Centers of Excellence. I will also discuss some of the S&T Directorate's recent accomplishments and ongoing activities in these and other significant areas.

S&T DIRECTORATE RESEARCH AND DEVELOPMENT PRIORITIES AND PLANNING

The research and development priorities of the S&T Directorate are primarily customer-driven through our Capstone IPTs, a process described in detail later in this testimony. The customers and stakeholders in this iterative process play an important role in the informing the S&T Directorate's decisions about its research and development investments.

The S&T Directorate's Basic Research projects are initiated in one of two ways. First, DHS components can express a technological need for which we have no near-term solutions with existing or near-existing technologies. Second, Basic Research projects may also originate from what science has to offer. With a small investment, DHS can help cultivate a promising technology that could ultimately yield a significant life-saving capability.

The S&T Directorate last published a Strategic Plan in June 2007. This plan focused on establishing the business practices by which the S&T Directorate would address the research and development needs of the homeland security enterprise. Based upon the forthcoming Quadrennial Homeland Security Review, we will be updating our strategic plan to support the strategic goals and objectives determined by the Review. This update will be in accordance with the guidance outlined in the OMB Circular A–11, Part 6.

The S&T Strategic Plan is a separate document from the *National Homeland Security Science and Technology Strategy* that the S&T Directorate is developing as directed by the *Homeland Security Act of 2002,* Section 302(2), which states that the Secretary of Homeland Security, through the Under Secretary for Science and Technology, shall develop "in consultation with other appropriate executive agencies, a national policy and strategic plan for, identifying priorities, goals, objectives and policies for, and coordinating the Federal Government's civilian efforts to identify and develop countermeasures to chemical, biological, radiological, nuclear, and other emerging terrorist threats, including the development of comprehensive, research-based definable goals for such efforts and development of annual measurable objectives and specific targets to accomplish and evaluate the goals for such efforts."

The S&T Directorate's 2008 report, "Coordination of Homeland Security Science and Technology," was an important step toward establishing a national strategy. The report laid out the role and responsibilities of federal agencies as well as the initiatives underway to counter threats to homeland security. The S&T Directorate is currently revising this 2008 effort in conjunction with the QHSR.

Strategic Coordination: External and Internal

The S&T Directorate's Strategic Plan provides the business framework that S&T uses to carry out its mission. A key aspect of the plan involves formal efforts to coordinate homeland security research and development with other federal agencies and the private sector. This coordination is extensive—for example, the S&T Directorate has 30 chairs and members of relevant National Science and Technology Council committees, subcommittees, and working groups.

Through the use of formal processes, the S&T Directorate limits unnecessary duplication of effort and leverages the valuable skills, experience and resources of other government agencies and the private sector. These formal processes include participation in interagency groups that work to coordinate research and development across Federal, State, local and tribal governments and in the private sector.

Inputs from the S&T Directorate's interagency and private sector coordination efforts are reflected in the Directorate's 2008–2013 Five-Year Research and Development Plan, which lays out the blueprint for its investment portfolio and outlines the S&T Directorate's research emphasis, programs, and key milestones.

The following table provides examples of participation by S&T Directorate divisions and offices in formal interagency coordination groups.

S&T Participation by Division/Office
Chemical/Biological Division
Federal
Public Health Emergency Medical Countermeasures (PHEMCE) Biological Working Group
Public Health Emergency Medical Countermeasures (PHEMCE) Enterprise Executive Committee
Public Health Emergency Medical Countermeasures (PHEMCE) Executive Governance Board
CB Defense Technical Coordination Work Group (DoD, EPA, DHS)
Chemical Security Analysis Center Interagency Steering Committee
Diagnostics Working Group
Domestic Chemical Defense Sub Interagency Policy Committee
Environmental Anthracis Validated Sampling Plan Technology Working Group
Environmental Chemical Laboratory Response Technical Working Group
First Responder-Anthrax Vaccine Policy Group
Integrated Consortium of Laboratory Networks
Joint Biological Point Detection System Working Group
Joint Science and Technology Office Proposal Review Panel
Non-Proliferation Arms Control Technical Working Group
NSTC Subcommittee on Decontamination Standards and Technology
NSTC Subcommittee on Foreign Animal Disease Threats
NSTC Task Force on Non-Traditional Chemical Agents
Response and Restoration Sub Policy Coordination Committee
Other
Laboratory Response Network-American Public Health Laboratories Advisory Group
Command, Control & Interoperability Division
Federal
Comprehensive National Cyber Initiative Senior Steering Group
Communications and Outreach Committee
Cyber Security and Information Assurance Working Group
Cyber Security Principal Investigators
Cyber Security Quarterly Agency Review
Domain Name System Security Working Group
Emergency Communications Preparedness Center Clearinghouse Working Group
Emergency Response Council
Health Information Technology Standards Panel Technical Committee
Information Security Research Council
Interagency Board for Equipment Standardization and Interoperability
Policy and Plans Steering Group

Project 25 Compliance Assessment Governing Board
Secure Protocols Working Group
Spectrum Working Group
Technical Support Working Group (project coordination)
Technology Policy Council
Wireless Working Group
State and Local
All Hazards Consortium
Emergency Response Council
International Association of Chiefs of Police Regional Information Sharing and Collaboration Working Group
Practitioner Steering Group
Strategic Resource Group
Human Factors/Behavioral Sciences Division
Analytic Methods and Technologies (AMT) Working Group
Behavioral Influence Analysis Working Group (Co-chair)
Biometrics and Identity Management Working Group
Biometrics Consortium
Center for Identification Technology Research (CITeR)
Countering Violent Extremism Interagency Coordination Group
DOD Human Factors Engineering Technical Advisory Group (Executive Board)
DOD Strategic Multilayer Assessment Group, Joint Integration and Preparation of the Operational Environment
Federal Alliance for Interdisciplinary Research
NSTC Subcommittee on Biometrics and Identity Management (Co-chair and DHS Lead
NSTC Subcommittee on Domestic Improvised Explosive Devices
NSTC Subcommittee on Forensic Science
NSTC Subcommittee on Human Factors (Co-chair)
NSTC Subcommittee on Social, Behavioral, and Economic (SBE) Research (Co-chair)
Radicalization and Violent Extremism Working Group (Co-Chair)
Inter-Agency and First Responder Programs Division (IAD)
Federal
Army Counter-IED Task Force
Capabilities Development Working Group
Capabilities Development Working Group Senior Steering Committee
Transportation Sector R&D Working Group
U.S. Joint Forces Command S&T Committee
U.S. Northern Command S&T Committee
U.S. Southern Command S&T Committee
State and Local
FEMA Region I Regional Advisory Committee
FEMA Region I Regional Interagency Steering Committee
FEMA Region II Managers' Meeting
FEMA Region II Regional Advisory Committee
FEMA Region II Regional Interagency Steering Committee
FEMA Region III Regional Advisory Committee
FEMA Region III Regional Interagency Steering Committee
FEMA Region IV Regional Interagency Steering Committee
FEMA Region V Regional Advisory Committee
FEMA Region V Regional Interagency Steering Committee

FEMA Region VI Regional Interagency Steering Committee
FEMA Region VII Radiological Assistance Meeting
FEMA Region VII Regional Interagency Steering Committee
First Responder RDT&E Working Group
Interagency Board for Equipment Standardization and Interoperability
New Jersey Center for Public Health Preparedness Advisory Council
New Jersey Regional Homeland Security Technology Committee
Urban Area Security Initiative Working Group (New York City metropolitan area, Sacramento, CA)
Urban Area Security Initiative Working Group (Northern New Jersey, Sacramento, CA)
Other
Adjutants General Association of the United States Homeland Security Committee
National Guard Association
Test & Evaluation/Standards Division
NSTC Subcommittee on Decontamination Standards and Technology
NSTC Subcommittee on Standards
Tri-Agency Working Group on Chemical and Biological Equipment Testing

In addition, the S&T Directorate facilitates coordination with customers and technology providers across its divisions and offices. For example:

- The S&T Directorate's Transition Office coordinates with all S&T divisions to minimize duplication and ensure that the S&T Directorate is leveraging technology available in both the government and private sectors. The Transition Office facilitates 13 customer-led Capstone Integrated Product Teams (IPTs) to ensure visibility into customers' capability gaps and technology needs. Two formal Capstone IPT reviews are conducted each year to provide customer visibility into the S&T Directorate's cross-functional programs and facilitate discussion on available DHS-external technologies/capabilities.
- S&T has an Interagency and First Responder Program Division (IAD) to leverage other government research and development efforts. IAD coordinates closely with the Transition Office and participates in the Capstone IPT reviews. With knowledge of customer technology needs identified through the Capstone IPT process, IAD coordinates with other government entities to explore and/or leverage alternative technologies available through other government entities.
- S&T's Commercialization Office is responsible for the identification, evaluation and rapid commercialization of technology directly from the private sector to meet the operational requirements of our customers. Since the Commercialization Office is part of the Transition effort, they have firsthand knowledge of customer technology needs identified through the Capstone IPT process and the supporting S&T Directorate efforts. The Commercialization Office works closely with S&T divisions to ensure there is no duplication of effort and that S&T Directorate efforts are focused only in areas where no rapid commercialization solution exists.
- The 1401 Technology Transfer Program, which is also housed in the Transition Office, identifies and transfers DOD technology, items and equipment of use to the federal, State, tribal, territorial and local first responder community. This program strengthens coordination.

International Research Coordination

In accordance with Title 6, United States Code, Section 195c ("Promoting anti-terrorism through international cooperation program"), the S&T Directorate's International Cooperative Programs Office facilitates and supports international cooperative activity through mechanisms such as formal agreements with nine partner nations: Canada, the United Kingdom, Australia, Singapore, Sweden, Mexico, Israel, France, and Germany. Under these agreements, the S&T Directorate is conducting coordinated and joint research projects, technical demonstrations, scientific workshops, and exchanges of scientific and technological information.

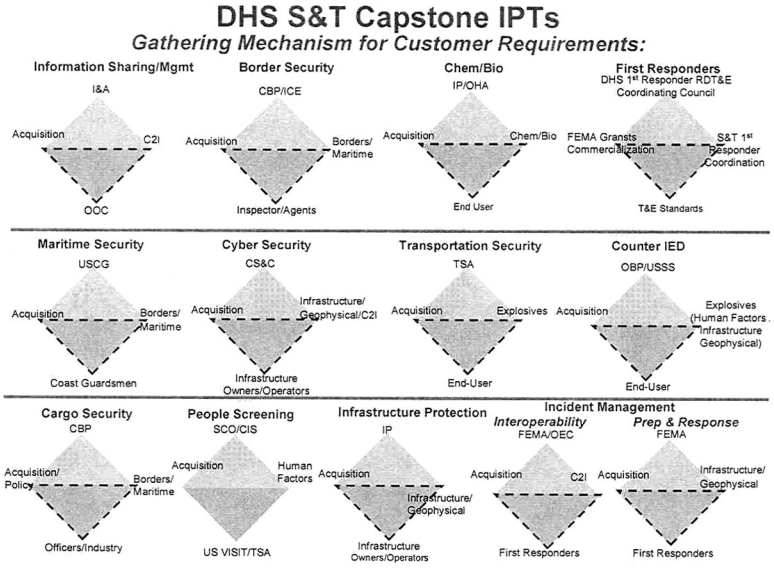
Through its academic grant program for International Research in Homeland Security Mission Areas, the S&T Directorate has sponsored 22 international research efforts since 2007. These efforts involve cooperation between U.S. academic institutions and those in each of the S&T Directorate's nine formal partners as well as Italy, Kenya, and Peru.

Each of these projects requires the participation of at least one U.S. and one foreign institution. To ensure relevance to DHS and S&T Directorate requirements, these institutions coordinate directly with S&T's technical divisions and, as appropriate, with customers. Customers include U.S. Customs and Border Protection (for tunnel detection), the Transportation Security Administration (for protection of mass transit infrastructure), and the U.S. Coast Guard (for improved maritime surveillance using teams of unmanned aerial vehicles).

During the past year, the S&T Directorate conducted numerous successful proofs-of-concept. One proof-of-concept, in cooperation with Australia, involved an entirely new form of blast-resistant glass. With Mexico, the S&T Directorate developed novel approaches to determine hurricane intensity using underwater acoustic sensors. The S&T Directorate also worked with Canada on a proof-of-concept for detection of clandestine tunnels using seismic waves.

ROLE OF INTEGRATED PRODUCT TEAMS IN DETERMINING PRIORITIES

The Capstone Integrated Product Teams (IPTs) are designed to, and have proven to fulfill, their intended purpose of providing direct stakeholder input into S&T Directorate research investments. The customer-driven Capstone IPT process informs research across the entire S&T Directorate and directly guides approximately 50 percent of our investment. DHS customers chair the Capstone IPTs and establish their desired capability priorities based on their assessment of risk in the mission areas for which they are responsible.



Within the S&T Directorate's Transition portfolio, the stakeholders directly drive investment based upon their needs and solutions recommended by the S&T Directorate. In addition, what we learn from our stakeholders about their operations and future capability gaps helps influence our own investment decisions in our longer-range Basic Research and Innovation/Homeland Security Advanced Research Projects Agency (HSARPA) portfolios. The more insight we gain regarding current and future threats and the capability gaps of our stakeholders, the better positioned we are to identify promising areas of research and explore innovative solutions that are outside the development timeframe for the nearer-term-focused Transition portfolio.

Within the S&T Directorate, we need to continue our efforts to put stakeholders at the head of the table—they are the experts on their operations and capability gap priorities. We also need to continue to mature our internal processes for delivering

the technology to our stakeholders. This includes developing program manager tools, the execution of Technology Transition Agreements to ensure we are synchronized with the end-users, and continued dialogue with stakeholders to ensure that the S&T Directorate's effort remains aligned to their needs.

Externally, the S&T Directorate needs to work with the stakeholders to develop a more uniform methodology across DHS for identifying and prioritizing capability gaps. We will work with stakeholders to arrive at a consistent, analytic approach to identifying capability gaps and developing operational requirements documents. This will help further ensure that our scientists and technologists develop solutions that meet the highest-priority needs of the stakeholders.

All three S&T portfolios participate in the IPT process. While the IPT members drive the selection of Transition projects, the needs expressed at the IPTs also inform the selection of projects in our Basic Research portfolio and similarly inform the higher-risk/high pay-off initiatives undertaken by our Innovation/HSARPA portfolio.

IPT Example: Working Group Deliberations Inform First Responder IPT

The First Responder Research, Development, Testing, and Evaluation (RDT&E) Working Group is composed of 38 voting positions that encompass major first responder associations and practitioners that include firefighters, emergency managers, law enforcement officers and emergency medical services providers. The Working Group practitioners represent State, local and tribal first responders from across the country. The S&T Directorate is seeking a territorial representative to ensure the full complement of governmental voices is represented.

The First Responder RDT&E Working Group convened most recently at the S&T Directorate offices on September 22, 2009. Members of the DHS First Responder Integrated Product Team were invited to observe and contribute to the Working Group deliberations.

During the meeting, the Working Group identified four major cross-cutting capability gaps that were deemed to affect all first responder disciplines while Working Group subgroups identified sector-specific capability gaps. For example, major cross-cutting capability gaps were identified as the lack of a standard common operating platform to link communication and data systems across the country; improved respiratory safety/protection; and the need for better tools for end-to-end incident management.

The Working Group has completed its initial task of identifying current capability gaps. Next, its members will develop detailed operational requirements to ensure the gaps are clearly defined. The First Responder IPT will meet as well to prioritize the capability gaps and begin to review potential RDT&E programs designed to solve existing problems and field solutions.

The overarching goal of the First Responder IPT is to use the process to close the capability gaps that exist in this community by putting viable solutions into the hands of our responders.

S&T's IPT process is new to the first responder community. Members of the First Responder RDT&E Working Group have expressed support for the process and a willingness to help the S&T Directorate develop it in the first responder community. The process will mature as the IPT, the S&T Directorate and the Working Group continue our collaboration to refine identified capability gaps and develop concrete operational requirements to drive new science and technology development or applications.

ROLE OF BASIC RESEARCH: CENTERS OF EXCELLENCE AND DHS S&T

In September 2009, the S&T Directorate issued its Basic Research Strategy to guide long-term homeland security research investments. This will inform the development of the next iteration of the S&T Directorate Strategic Plan.

The overall basic research vision for the S&T Directorate is:

> *Developing and accessing an internationally recognized scientific workforce creating new knowledge and scientific understanding in focus areas of enduring relevance to the homeland security enterprise.*

Given the broad spectrum of science and technology requirements associated with the homeland security mission, the Department of Energy (DOE) National Laboratories provide unique, renowned interdisciplinary capabilities, as well as world-class research facilities. In FY 2009, eight DHS components and offices, including S&T, utilized the DOE National Laboratories and the in-house S&T labs for homeland security-related research and development as well as technology transition. This R&D includes developing advanced screening and detection technologies; designing multi-

scale and simulation capabilities in the event of a biological attack or a disease outbreak; and designing resilient electrical grid technologies to ensure better protection of our nation's critical infrastructures. We anticipate the continued use of the DOE laboratories to address the cross-cutting, long-term basic research challenges of the S&T mission.

In addition to our laboratories, the S&T Directorate sponsors 11 university Centers of Excellence (COE). While these COEs are managed by our Office of University Programs, the key to their success has been the close involvement with each of the S&T Directorate's six divisions. Through their active engagement in the selection and management of the COEs, divisions are well positioned to ensure that their research initiatives are closely aligned with the S&T Directorate's overall research strategy.

DHS S&T-Sponsored Research at the COEs: From Research to Reality

The DHS COEs, with over 350 current projects, deliver results along the entire research and development spectrum, from basic research results published in prestigious scientific journals to practical research-driven tools that DHS components and local and State first responders are already using. Even looking at a single COE program proves the benefit of this cost-effective model. For example, a single project at the National Center for Food Protection and Defense identified the source of a Salmonella St. Paul outbreak as jalapeno peppers from Mexico, and may have saved Florida tomato growers up to the equivalent of six years of S&T's COE budget.

Now five years old, the COEs are increasingly producing usable results for S&T Directorate customers. As evidence, the COEs have generated over $50 million in additional funds for customer-directed research. As planned by the S&T Directorate, the COEs are well on their way to being self-sufficient within a decade. The COE customer base has grown rapidly over the last couple of years—so rapidly, in fact, that we have had to develop more efficient financial mechanisms for our customers to access the COEs expertise, facilities and products. Additionally, now that some of the COE projects are ready, we are piloting "research-to-reality" university research transition approaches in several law enforcement venues. These approaches will disseminate applicable research results to many law enforcement agencies. Below is a sampling of the S&T Directorate's successful transition of COE results to our federal, State and local partners.

National Consortium for the Study of Terrorism and Responses to Terrorism (START) (University of Maryland)

- START developed the Global Terrorism Database (GTD), the most comprehensive unclassified database on terrorist events in the world. The GTD includes more than 80,000 events stretching from 1970 through 2007 and is continuously being updated. START has provided GTD data and access on request to several different offices within DHS alone (e.g., S&T Human Factors/Behavioral Sciences Division, Office of Intelligence and Analysis and the Transportation Security Administration).
- START is studying how communities can enhance their resilience to a potential terrorist threat in the United States through two additional products: (1) the Community Assessment of Resilience Tool (CART), which is a tool for communities to conduct self-assessments on core components of community resilience; and (2) the Social Vulnerability Index (SoVI)—a county-level mapping of the United States and its infrastructure and potential vulnerabilities to all types of catastrophic events. Local planners throughout the country are using CART and SoVI to set priorities for enhancing resilience.

Command, Control and Inter-operability (CCI) COE (Rutgers and Purdue universities)

- The CCI COE has transitioned several visual and data analytics technologies to end-users in partnership with the Pacific Northwest National Laboratory, START and a vendor partner. This COE-led team developed and deployed law enforcement information analysis tools to the Port Authority of New York and New Jersey Police Department, enabling analysis of crime incident data in conjunction with other sources, including START's GTD. A similar visual and data analytics system is being deployed to the New Jersey State Police.
- The Command, Control and Inter-operability Division's "Research to Reality" technology transition model, which engages directly with industry partners to commercialize research results, is bringing visual and data analytics technologies to a wider group of law enforcement agencies. The specific tech-

nologies involved are known as LEIF (Law Enforcement Information Framework) and FADE (Fused Analytic Desktop Environment). Both involve upgraded features first made available in the ComStat II application developed specifically for the Port Authority and described directly above. The agencies include the Port Authority of New York and New Jersey, San Diego's Automated Regional Justice Information System, the Seattle area police departments, the New Jersey State Police, and the Lehigh Valley (PA) Police. New efforts are being initiated with in the Baltimore-Washington area including the Maryland State Police, Baltimore County Police, Baltimore City Police and several other agencies in the region.

Foreign Animal and Zoonotic Disease (FAZD) COE (Texas A&M University) and the National Center for Food Protection and Defense (NCFPD) (University of Southern Mississippi)

These two COEs develop, advance and share customizable technologies with DHS and customers working to protect our food and agriculture lifelines.

- FAZD worked with the CCI COE to develop the Dynamic Preparedness System (DPS) and Biosurveillance Common Operating Picture (BCOP) technologies that will serve as decision support tools for incident commanders for health emergencies across the country. DPS and BCOP also act as customizable training programs for users. Following rigorous testing, the DHS National Biological Information Center is transitioning BCOP into an operational environment where it will provide critical and up-to-date health emergency information to thousands of DHS' federal, State and local partners, hospitals and medical and veterinary practitioners.
- FAZD's Rift Valley Fever candidate vaccine, derived from the MP12 antigen developed for human use, is currently moving to commercial production trials in sheep. This product is being enhanced in further research with a genetic marker that allows the immunity resulting from vaccination to be distinguished from that associated with active disease, thereby allowing immunized animals to safely move through interstate commerce.
- NCFPD has established itself as a nationally and internationally renowned R&D center for food protection and defense. The Center is developing expertise and tools to identify and reduce vulnerabilities to the Nation's food system from terrorist or natural causes.
- NCFPD has provided over 25 congressional testimonies, responded to over 700 requests for assistance or advice from DHS, Federal, State and local government agencies, and matriculated over 100 students in relevant disciplines.
- NCFPD's FoodShield is a research-based communication-sharing portal for use by DHS, FDA, and USDA during food related incidents. FoodShield is linking agencies to improve communication during food events, and enabling all levels of government to share resources during food recall and response events.
- NCFPD's and BT Safety's Consequence Management System (CMS) serves as an integrative tool across the breadth of NCFPD projects to provide an advanced visual model for predicting, tracking, and assessing the public health and economic impact of a catastrophic food system incident.
- NCFPD has provided expert advice to both food importing and exporting nations in order to keep commerce moving and food supplies safe. The Center is working with Chinese officials to restructure the country's food export system and with Chilean officials to obtain data on production chain models. NCFPD hosted an exercise on food supply protection for G8 nation participants from Japan, Canada, France Germany, the United Kingdom and the United States. The exercise aimed to strengthen coordination, cooperation, and communication between G8 nations in the event of an intentional contamination of the food supply.

Center for Risk and Economic Analysis of Terrorism Events (CREATE) COE (University of Southern California)

- The HS–ANALISER (Homeland Security-Analytical, Modeling, Integrated and Secured Environment and Repository) is a software tool for policy decision-makers and risk analysts.
- Assistant for Randomized Monitoring Over Routes (ARMOR) software provides a methodology and tool for creating randomized plans and schedules for monitoring, inspecting, and patrolling, so that even if an attacker observes

the plans, they cannot predict its progression, thus providing risk reduction via deterrence while guaranteeing a specified level of protection quality. ARMOR was deployed at the Los Angeles International Airport (LAX) in August 2007 to randomize checkpoint deployment and canine unit allocation. Police officers attending the six-month evaluation of ARMOR declared it a success, leading to its permanent deployment at LAX.

- In coordination with the S&T Command, Control and Inter-operability Division and the Federal Air Marshal Service (FAMS), CREATE developed the Intelligent Randomization in Scheduling (IRIS) software which builds upon the ARMOR concept and was adapted for use in the FAMS operational domain. Drawing upon the principles of game theory, which analyzes behavioral decisions, IRIS will systematically prevent observers from recognizing patterns in FAMS security procedures—with a goal of interrupting terrorist planning cycles. IRIS allows for randomization of international flight coverage while limiting or eliminating predictability and will place FAMs in locations where they will prove most effective. IRIS was transitioned to the FAMS in September 2009 and is being operationally tested on a select subset of international flights. An additional adaptation of the ARMOR program, called GUARDS, is being piloted by TSA in the coming weeks.

CONCLUSION

I am pleased to report that the Science and Technology Directorate has made significant strides during the past year in establishing our research priorities and enabling technological capabilities for those on the front lines of homeland security.

Members of the Subcommittee, thank you for all you do in support of our mission. I thank you for the opportunity to meet with you today, and I look forward to answering your questions.

BIOGRAPHY FOR BRADLEY I. BUSWELL

A native of Durango, Colorado and a graduate of the United States Naval Academy, Bradley Buswell is a retired submarine officer who has served in numerous posts at sea and in Washington, DC.

His Washington assignments have included serving as Congressional Liaison for Navy Research and Development Programs in the Navy Office of Legislative Affairs; Assistant to the Chief of Naval Operations for Force Transformation; and Executive Assistant to the Chief of Naval Research, among other positions on the Navy staff.

Mr. Buswell joined the private sector following his retirement from the U.S. Navy, working for General Electric as Manager of Government Relations for GE Global Research in Washington, DC.

He joined the Department of Homeland Security's Science & Technology Directorate in October 2006.

Mr. Buswell holds a Bachelors of Science in Systems Engineering from the U.S. Naval Academy and a Masters of Business Administration from The George Washington University.

Chairman WU. Thank you very much, Mr. Buswell. Dr. Depoy, please proceed.

STATEMENT OF DR. PHIL E. DEPOY, VICE CHAIRMAN, HOMELAND SECURITY SCIENCE AND TECHNOLOGY ADVISORY COMMITTEE (HSSTAC) ASSESSMENT PANEL

Dr. DEPOY. Thank you, Mr. Chairman, Mr. Smith. In 2008, HSSTAC, as we call the Homeland Security Science and Technology Advisory Committee—I don't know how that pronunciation comes from that acronym—but established an assessment panel in response to tasking from the Under Secretary, and in the initial tasking, the panel was asked to review the S&T programs, especially as related to the successful transition of technologies into the ultimate user communities.

Consequently, the panel concentrated its review on the S&T transition projects and the newly introduced Capstone IPT structure for management of these efforts. The panel completed its re-

view in the fall of 2008 and published its findings in a report to the Under Secretary. Briefly, the panel concluded among other things that during the previous two years, the S&T Directorate had done a very commendable job of providing structure and direction, had developed processes to define and collect capability gaps, and established an organization to enable a customer interface, that is, the Capstone IPT structure.

The panel also commended the Directorate for the expansion of the University Centers of Excellence Program which performs basic research and trains students in research areas of interest to Homeland Security.

Among its findings, the panel reported that although DHS S&T had promulgated a strategy in 2007, it was very broad and was not adequate for establishing priorities among the many projects and programs within the S&T Directorate. The Capstone IPT structure had made improvements but was still immature and untested, and at that time only one IPT, the chem bio IPT had actually completed the entire cycle of the process. Contact with first responders was very limited among the S&T projects. Further integration of the university Centers of Excellence into the overall work of S&T was inconsistent among the divisions, and the Directorate had only made a limited review of the legacy projects, that is, projects that were initiated before the Capstone IPT structure was adopted. They had not made reviews to ensure that they were still relevant and still had a customer.

After the completion of the initial review, the panel was tasked to conduct a broader review of the Directorate's programs to include basic and applied research and to again examine the IPT process since another cycle of collection, prioritization and funding had occurred after the first review was completed. The panel has not completed its work on this tasking, so the remainder of my observations are not the observations of the panel but my own opinions based on our discussions with many members of the Directorate, customers within the operating components of DHS, and some scientists in other agencies who have been members of working groups supporting these IPTs.

In the year between our two reviews, very significant progress was made in the Directorate. The Centers of Excellence were aligned with divisions within the Directorate and are now kept much better informed as to the existing projects and issues. And as stated, the 13th Capstone IPT was established to bring first responders into the system. A systems engineering FFRDC (Federally Funded Research and Development Centers) was added to the Directorate which will be a great asset in the determination of requirements, system design and in development testing and evaluation. And all the Capstone IPTs have completed at least one complete cycle of the process at this time and have made a lot of recommendations for further improvements.

It is my opinion that first there is continued strong support for the Capstone IPT structure, both within the Directorate and among most of the IPT customers. However, there are still significant differences in processes for the prioritization of capability gaps among the IPTs and even among different working groups within each IPT. The lack of an adequate S&T strategy results in each working

group making its own rules for determining the relative importance of capability gaps.

Secondly, although the major advantage of the IPT structure is that it brings customers into the process, some of the customers still do not fully understand their roles in the prioritization of the gaps.

And third, one of the major irritants for customers is the continued existence of legacy projects. These projects consume a significant fraction of the resources allocated to the IPTs. The panel was given an estimate of 30 to 40 percent of the total resources, and they are not part of the annual prioritization process. The Acting Under Secretary has recently tasked the panel to add a review of these legacy projects to its current tasking.

And finally, it is my opinion that the Capstone IPT structure and processes have resulted in major improvements in the work of the Directorate, and further improvements will be made as the structure and processes are refined.

Thank you.

[The prepared statement of Dr. Depoy follows:]

PREPARED STATEMENT OF PHIL E. DEPOY

Good afternoon, Mr. Chairman and Members of the Subcommittee. My name is Phil DePoy, and I have been a member of the Homeland Security Science and Technology Advisory Committee (HSSTAC) since August 2007. In 2008, the HSSTAC established an Assessment Panel in response to tasking from the DHS Under Secretary for Science and Technology (S&T), and I was appointed as the Vice Chairman of the Panel. In the initial tasking, the Panel was asked to review the DHS S&T programs, especially as related to the successful transition of technologies into the ultimate user community. Consequently, the Panel concentrated its review on the S&T transition projects and the newly introduced Capstone Integrated Process Team (IPT) structure for management of these efforts.

The Panel completed its review in the fall of 2008 and published its findings in a HSSTAC report ("Program Assessment—1" of 1 December 2008). Briefly, the Panel concluded that during the previous two years the S&T Directorate had done a commendable job of

— Improving morale
— Providing structure and direction
— Developing processes to define and prioritize capability gaps
— Establishing organizations and methodologies for customer interface, principally by adopting the Capstone IPT structure
— Expanding basic research through the establishment of University Centers of Excellence (COE)
— Creating international outreach and
— Improving relationships with Congress.

Among its findings, the Panel also reported that:

— Although DHS S&T had promulgated a strategy, it was very broad and was not adequate for establishing priorities among the many projects and programs within the S&T Directorate.
— The Capstone IPT structure had made improvements but was still immature and untested.
— Contact with first responders was very uneven among the S&T Divisions.
— DHS S&T did not have adequate systems engineering or Developmental Test and Evaluation (DT&E) capabilities and had no Operational Test and Evaluation (OT&E) capability.
— Integration of the University Centers of Excellence into the overall work of S&T was inconsistent.

— The Directorate had made only limited reviews of legacy projects (i.e., projects that were initiated before the Capstone IPT structure was adopted) to ensure that they were still relevant and had a customer.

After the completion of the initial review, the Panel was tasked to conduct a broader review of the Directorate's projects, to include basic and applied research, and to again examine the IPT process since another cycle of collection of capability gaps, prioritization, and funding had occurred after the first review was completed. The Panel has completed about half the work on this tasking, so the remainder of my observations are not the observations of the Panel, but are my own opinions based on our discussions with many members of the S&T Directorate, customers within the operating components of DHS, and some scientists in other agencies who have been members of working groups supporting the IPTs.

Prioritization Process: There is continuing strong support for the Capstone IPT structure, both within the Directorate and among most of the IPT customers. However, there does not appear to be convergence on the standardization of processes for the definition or prioritization of capability gaps among the IPTs. Prioritization is obviously a very difficult process, especially in those IPTs which are large and have a long list of capability gaps to be considered. In most cases, this process is carried out by working groups, and it is not clear that some of the working group members have the experience or vision to determine priorities. The lack of an overall S&T strategy results in each IPT forming its own rules for determining the relative importance of capability gaps. At this time, there appears to have been only limited consideration given to prioritization across IPTs.

Customers' Role: Although the major advantage of the IPT structure is that it brings customers into the process, many of the customers do not fully understand their roles. Some customers feel that they do not have any control over prioritization of capability gaps and that they have to accept the priorities established by the working groups. Obviously, the establishment of priorities should be one of the major roles of customers.

Legacy Projects: One of the major irritants for customers, as well as for many members of the S&T Directorate, is the continued existence of legacy projects. These projects consume a significant fraction of the resources allocated to the IPTs (the Panel was given an estimate of 30 to 40 percent), and they are not part of the annual prioritization process. One working group participant offered the opinion that twenty percent of the projects in the transition portfolio "relate to things we would like to know as opposed to things we need" and further stated that in their opinion, many of those "are not knowable."

Centers of Excellence: Obviously, the early strategy of the Directorate was, first, to fund technologies that could be transitioned rapidly into the hands of responders, and secondly, to create University Centers of Excellence, not only to perform basic research but also to train students in areas that were important to DHS. This strategy has created a 'valley' between basic research and transition projects, and fewer resources are being allocated to applied research than is desirable in the longer-term. Although the Panel has not reached a definite conclusion, it appears that some of the transition projects might have benefited from more applied research before the transition decision was made.

Requirements Process: Partially due to the lack of direct communication with responders, the requirements and specifications for some transition projects are considered by many to be inadequate. The establishment of requirements and specifications is very difficult (e.g., DOD has tried many techniques for the determination of requirements over many decades and has never found the perfect solution), but it is so critical that it deserves more study. The Panel was told that the Technical Support Working Group (TSWG) has developed a field panel of users to assist in the determination of specifications for their programs. This approach should be investigated further for possible DHS S&T application.

Since the first review was completed in 2008, it appears that interaction between the Centers of Excellence and the S&T Divisions has improved a great deal. The Centers were aligned with the Divisions, i.e., each Division was given the responsibility to communicate with one or more of the Centers. It is important that there be good communications, not to over-control the work of the COEs, but to keep the COEs informed of areas in which new technologies are needed.

Overall, it is my opinion that the adoption of the Capstone IPT structure within the S&T Directorate has been very beneficial, principally by bringing the customers from the operating components into the decision processes. Although the IPT proc-

esses are still immature, they are improving rapidly. In the year between the two HSSTAC Panel reviews, there was very noticeable improvement. A thirteenth Capstone IPT was established to bring first responders into the S&T system, a deficiency reported in the Panel's first review. A systems engineering FFRDC was added to the S&T Directorate, which will be a great asset in the determination of requirements, in the design of systems and systems-of-systems, and in Development Testing and Evaluation. The Centers of Excellence were aligned with the Divisions within S&T, and already the communications have improved markedly. All the Capstone IPTs have completed one complete cycle of the process and one IPT (Chem/Bio) has completed two cycles, so there have been many recommendations for improving the processes for the determination of capability gaps, prioritization of the gaps, and the improvement of communications among the projects, divisions, and customers.

In response to the Chairman's specific questions:

Discuss the methods and criteria used to develop research and development priorities at DHS S&T and how these may be improved. How should comprehensive threat assessments help set research and development priorities and does DHS S&T utilize this resource? Does DHS S&T coordinate its research and development strategic plan with other federal research entities and private industry?

We have not completed our review, and I can provide only partial responses to these questions. It appears that each IPT uses a somewhat different process to develop priorities. For the most part, the priorities are established by working groups with participation by members from S&T, the operating components of DHS, and other agencies. As the Capstone IPT process matures, I expect that the process will be more standardized among divisions. Certainly, the development of an overall S&T strategy would be a major improvement to this process.

I cannot respond to the question of whether all the Capstone IPTs utilize comprehensive threat assessments in establishing priorities. Threat assessment should obviously play a role in setting priorities, but since the Panel has not yet met with the working groups, we do not know how each working group assigns priorities to the individual capability gaps. In some of the S&T Divisions, we have seen excellent coordination with other agencies. The Chem/Bio Division, for example, holds an annual three-day meeting in which they review all their projects with stakeholders from many agencies.

Are the IPTs fulfilling their intended role as vehicles for stakeholder input in research priorities? If not, what are the barriers keeping the IPTs from operating at their full potential?

I do not believe that the stakeholders have yet achieved their intended role, but based on the progress within the past year, I believe that they will be able to acquire this role in the near future. I believe the major barriers are the lack of a strategy and the continued existence of legacy projects, which consume a significant part of the resources. If an S&T strategy is developed, I would hope that the stakeholders play a major role in its evolution.

What role does basic research currently play in the DHS S&T portfolio? What is the role of the Centers of Excellence in performing this research? Ideally, how should basic research and the Centers of Excellence be integrated into the research portfolio and strategic plan?

It is gratifying to see that basic research is a significant part of the DHS S&T portfolio. As you are aware, there must be a delicate balance between basic research and research involved with the transition of programs. On one hand, it is easy to absorb the basic research resources into the later development processes. On the other hand, the basic researchers need to know the areas in which new technologies are needed. On our first review, the Panel felt that the Centers of Excellence were too isolated from the Divisions. With the recent changes, it appears that the Centers are receiving more information from the Divisions, but it is probably too early to determine if they are in a reasonable balance.

BIOGRAPHY FOR PHIL E. DEPOY

Dr. Phil E. DePoy retired from the Naval Postgraduate School in 2005, where he served as the founding director of the Meyer Institute of Systems Engineering. From 1992 to 2000, Dr. DePoy was the President and CEO of the National Opinion Research Center at the University of Chicago. From 1959 to 1992, he was employed by the Center for Naval Analyses (CNA) and its predecessor organization, the M.I.T.

Operations Evaluation Group. He held many positions at CNA including President and CEO from 1984 to 1990.

Dr. DePoy holds a BS degree in Chemical Engineering from Purdue University, an MS degree in Nuclear Engineering from M.I.T., and a Ph.D. in Chemical Engineering from Stanford University. He presently serves on the CNA Board and is Chairman of the Board of Wolf Park (a research and education organization) and a member of the Advisory Board of the Applied Physics Laboratory (University of Washington) and the Council on Foreign Relations.

Chairman WU. Thank you very much, Dr. Depoy. Mr. Berteau, please proceed.

STATEMENT OF MR. DAVID J. BERTEAU, SENIOR ADVISOR AND DIRECTOR, DEFENSE–INDUSTRIAL INITIATIVES, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES, WASHINGTON, DC

Mr. BERTEAU. Thank you, Mr. Chairman, and Congressman Smith. It is a great privilege to be here today, and I echo Mr. Buswell's comments. I feel honored to be in the company of the panel that I am sitting with here, so I am extremely grateful to you.

I note that my statement today and my responses to any questions you may have are my own views and do not necessarily reflect the views of the institution for which I work. I would also note that I am not sure that they don't reflect those views, either, but that is neither here nor there.

This committee, of course, as has been noted, played a key role from the beginning in S&T, and I note in my statement the dichotomy that apparently exists inside the enabling statute to this day, that on the one hand, the S&T Directorate is responsible for R&D that supports any and all elements of the Department, and on the other hand, they are to have a focus both from a strategic planning point of view and a prioritization point of view on chemical, biological, radiological and nuclear, "CBRN" elements. I say that not because I think there is actually confusion in the Department in this regard. I don't actually think there is. What I think that shows is it reflects still a very strong emphasis on the terrorist threat as the driver behind R&D when, in fact, a legitimate assessment of all threats and risk would say that there are risks that are much broader than, and in some cases overlap significantly with, what we would define as terrorist threats. And I think I come from a background that says an all-hazards, an all-risks, an all-threats assessment process is inherently important to any strategic plan, not just simply that which is defined in the statute.

We know from the history of management that strategic plans do set agendas for agencies but only if they are actually incorporated into the budget. Resources drive policy way more than policy drives resources, and as a result of that, I think it is important to pay attention not only to the plan but to look at the execution of that plan as it is reflected in the budget and in the implementation of that budget.

There is one problem that I would note that is a little bit of an example in that regard of the difficulty of integrating across the Department. Since the creation of the Domestic Nuclear Detection Office (DNDO), there is a little bit of a potential dichotomy with responsibility for S&T funding in the Department with radiological

and nuclear being dictated more by DNDO than by S&T, and that I think makes it harder to have an integrated S&T plan. I believe actually DHS itself can fix this problem, but it is something that I would note that may be worthy of the Committee's attention down the road.

I have three comments on your three questions, first from a strategic planning perspective. It is really critical that a strategic plan be connected to the larger homeland security enterprise. It is impossible for an S&T strategic plan by itself to have the validity necessary to say that we are spending our money on the most important priorities. I think it has to flow from a broader homeland security enterprise-wide strategic plan linked in turn to a DHS-level strategic plan because there is so much of Homeland Security that is outside DHS or even outside the Federal Government.

But there are two other elements that have to come into play. One is those plans have to be assessed against current capability in order to identify capability gaps and capability shortfalls and be able to prioritize what you need to do to fill those gaps. And then in turn, the budgets have to be built reflecting some kind of a judgment of where the risks are and where the benefits are of filling those gaps or addressing those gaps in the budget. This is not only prudent management, it is essential for risk reduction and threat reduction. And I think this committee can encourage DHS toward that broader planning process tied to capability assessments.

With regard to the IPTs, I certainly echo what my colleague to the right has said. They are playing a very useful role. They are not a substitute for a formal prioritization and strategic planning process, however. I think they augment it rather than replace it.

With respect to basic research, I think there are two important questions. One is how much is done, but the second is how do you manage that so it eventually leads to useful homeland security applications that tie to threats, that tie to risks and that tie to first responder needs? My own view is that it needs to be linked to solving some kind of a capability gap that has been identified or some kind of a strategic shortfall. And so far, that is difficult in part because the DHS process for determining requirements is fragmented and in some cases nonexistent with most DHS components unable to execute a rigorous requirements process.

And then finally, I think it is important to focus on the transition from research into programs or into outcomes and results, whether that be incorporation and production of hardware or systems that are fielded or the provision of standards or intellectual property or even technical assistance that makes people smarter buyers, whether in DHS or in the broader community. And I think that kind of planning for transition needs to occur up front.

The process that I lay out here, of course, is not easy. It is hard to develop broad plans. It is hard to have a structured planning process. It is hard to do the capability assessments. It is hard to show how they reflect in the budget, but I think it is important for you to lay that out as what your desired outcome is and try to get that from the government.

With that, sir, I will conclude my remarks and will stand ready for your questions.

[The prepared statement of Mr. Berteau follows:]

PREPARED STATEMENT OF DAVID J. BERTEAU

Mr. Chairman, Congressman Smith, and Members of the Committee, thank you for the opportunity to appear before you today in the company of my distinguished fellow panel members. My statement addresses the overall question of establishing research priorities in the Science and Technology Directorate (S&T) of the U.S. Department of Homeland Security (DHS). It also responds to each of your three specific questions, as noted in the invitation letter.

My Background

It may be useful for the Committee to know a bit about my background in order to gauge the value of the comments I make today. As shown on the attached biographical statement, most of my career in national security and homeland security issues has been here in Washington. However, in my younger days, I was also a firefighter and an emergency medical technician volunteer, and I still maintain ties to those communities, so I try to apply the first responder perspective as well as the Washington perspective to these questions.

Overall Role of S&T

It is also useful to review the legislative history of the creation of the Science & Technology Directorate. As I recall, this committee played a key role in ensuring that the role of Science and Technology was properly incorporated into the final *Homeland Security Act of 2002.* Initial legislative proposals included a narrow focus on research and development, tied most closely to requirements in the areas of chemical, biological, radiological, and nuclear, or CBRN. This committee appropriately supported a broader definition of homeland security R&D, and ultimately the Act (Section 302 (4)) stated that the Under Secretary for Science and Technology would be responsible for "conducting basic and applied research, development, demonstration, testing, and evaluation activities that are relevant to **any or all elements of the Department**" (emphasis added).

However, with respect to the establishment of priorities both within DHS and for the Nation, the enabling legislation was more specific. It states in Section 302 (2) and again in Section 302 (5) that the Under Secretary shall be responsible for "developing, in consultation with other appropriate executive agencies, a national policy and strategic plan for, identifying priorities, goals, objectives and policies for, and coordinating the Federal Government's civilian efforts to identify and develop countermeasures to **chemical, biological, radiological, nuclear, and other emerging terrorist threats** (emphasis added), including the development of comprehensive, research-based definable goals for such efforts and development of annual measurable objectives and specific targets to accomplish and evaluate the goals of such efforts."

Thus, the originating Act for DHS set up two parallel responsibilities for S&T. The first was to conduct R&D for all elements of the Department. The second was to support a national strategy that focused on terrorist threats, primarily in the areas of CBRN. In addition, the legislation includes a requirement for "annual measurable objectives," but that requirement focuses on CBRN. These parallel responsibilities, in my opinion, set up a competition for emphasis in the DHS S&T program. That competition is at the heart of today's hearing questions.

Strategic Planning in the Homeland Security Enterprise, DHS, and S&T

The critical question for the S&T budget in DHS is the matter of the priorities that are used to develop and execute that budget. As noted above, the *Homeland Security Act of 2002* requires the S&T Directorate to develop a plan for prioritizing S&T research on CBRN. Such a plan requires a clear link to DHS S&T budgets and spending. There have been a number of plans developed and released in accordance with this requirement, most recently in 2007 and 2008. In keeping with the S&T responsibilities for "all elements of the Department," the plans to date have been broader than CBRN, and I believe that is appropriate and necessary. Such plans are worthwhile for guiding funding and justifying budgets.

However, from a strategic planning perspective, this process to date has been insufficient and inadequate. The ongoing Quadrennial Homeland Security Review, mandated by Congress, includes the charge to examine the homeland security strategic planning process. In fact, the DHS web site refers specifically to QHSR studies on Strategic Management and on Planning and Capabilities, and the questions submitted for the "National Dialogue" related to those studies can be found in links at *http://www.dhs.gov/xabout/gc_1208534155450.shtm#0.* I cannot speculate on the results of the QHSR, but I would like to share with the Committee some of my per-

sonal observations about strategic planning and its relationship to the DHS S&T budget.

First, strategic planning needs to be the result of a rigorous *planning process.* This process would incorporate risk and threat assessment, the Administration's priorities, legislation, existing strategies, and involvement of stakeholders into strategic guidance. Such guidance needs to encompass more than DHS—it needs to span the homeland security enterprise, beyond DHS to include the rest of the Federal Government as well as State and local levels, including first responders.

Second, strategic plans need to be *assessed against existing capabilities* to determine where there are gaps in capabilities and how those gaps can be addressed. In some cases, capability gaps can be met by changes in procedures or training or policy. In other cases, resources will need to be allocated to fill capability gaps. In still other cases, new technology or new applications of existing technology will fix those gaps.

Third, *budgets need to address capability gaps* or shortfalls. Some of this could be in the DHS budget, some elsewhere in the federal budget, and some in State and local budgets.

Ultimately, the S&T strategic planning process should have the following attributes:

— it needs to flow from a broader Homeland Security Enterprise-wide Strategic Plan, linked in turn to a DHS-level Strategic Plan

— plans at each level (enterprise, DHS, and S&T) need to be assessed against current and projected capabilities, with the resulting identification of capability gaps and shortfalls

— those capability gaps and shortfalls need to be linked to the budget and to risk assessments of the consequences of failing to address the shortfalls.

Such an S&T strategic plan would have significantly more value to DHS and homeland security than today's process. A broad strategic planning process and capability assessment will illuminate *real priorities* that reduce risk to America and produce more robust responses to catastrophic threats and events. It is important to recognize, though, that S&T cannot create these attributes; that can only be done at the DHS level.

IPTs and First Responders

The use of Integrated Process Teams or IPTs in the Federal Government has grown substantially in the past two decades. Such teams provide a mechanism for providing input to and assessing the status of government actions across an array of organizations and institutions. In the S&T process, they provide useful input, but they are not a substitute for the results of prioritization that the strategic planning and capability assessment process described above. In addition, IPTs can create a false sense of a rigorous process when in reality there is only rigorous involvement.

Basic Research

As the Members of this committee know well, the role of research in DHS was debated long and hard at the time the Act was passed in 2002. A review of the legislative history shows diverse views over the types of research appropriate for DHS and who should conduct them. While the legislation settled some of this debate, there are still two important questions that need further resolution.

One is the issue of how much basic research should be done by DHS. The second is how to manage that research so that it eventually leads to useful homeland security applications. My own view is that the answers to these two questions need to tie back to the original point of a broader strategic plan and capability assessment process. If research cannot be linked to solving some strategic shortfall or capability gap, then we need to keep working before we assign it a high priority. Basic research sponsored by other Federal Government agencies can be the feeding ground for DHS S&T programs, but basic research in DHS should, in my judgment, be tied to identified requirements and shortfalls and not be driven by any quota or budget target.

Transition from Research to Programs

One additional question warrants this committee's attention, in my view. The first responder community cares about research to the extent that it produces results that help them do their jobs or prepare for contingencies. This means that DHS S&T needs to pay close attention to the transition from research into programs that will produce results. In some cases, this would mean the production of hardware or systems incorporating research results. In other cases, it might be the provision of

standards or intellectual property to a broad array of vendors or suppliers. In still other cases, it might produce assistance to internal DHS components or first responders at the State or local level.

Across the board in S&T research, therefore, there needs to be planning for transition as part of the initial prioritization process. That planning has to include funding in the budget. This planning is easier for some activities than for others, particularly when the ultimate customer or user of the research is inside DHS. It's harder when the end-user is outside DHS or even the Federal Government. Decades of experience at DARPA in DOD shows, however, that research dollars have more value and produce better results when consideration is given up front to plans for transitioning research into real, funded programs. This is a feature of the S&T strategic planning process that other homeland security strategic plans will not have, and it makes the S&T planning and budgeting challenge more complex, but it has high payoff for return on investment.

Closing

Chairman Wu, Congressman Smith, I would like to conclude by noting that the process I have advocated here is not easy. It is hard to develop broad strategic plans, hard to conduct such a planning process, and hard to do the capability assessments that lead to priorities in the budget. Failure to undertake an enterprise-wide strategic planning process will, however, ensure that we don't spend our scarce budget dollars where they will do the most good. I recommend that this committee endorse the creation and support for a broad strategic plan across the Homeland Security Enterprise and the clear linkage of S&T strategic plans to that larger enterprise-level work.

Sir, this concludes my remarks, and I stand ready for your questions.

BIOGRAPHY FOR DAVID J. BERTEAU

David J. Berteau is Senior Adviser and Director, Defense–Industrial Initiatives, at the Center for Strategic and International Studies in Washington, DC, where he is a resident scholar on acquisition, industrial base, programs, budget, and management for national security and homeland security. Recent and ongoing studies include projects on interagency resource management, federal services contracts, defense acquisition reform, transatlantic defense trade, and complex program management.

Mr. Berteau is a Fellow of the National Academy of Public Administration and chaired their panel on Joint Land Use Studies for the Defense Department. He is a member of the Defense Acquisition University Board of Visitors, a Director of the Procurement Round Table, and an Adjunct Professor at Georgetown University. He chaired the National Research Council's 2005 study of printed circuit boards for national security. Mr. Berteau served on the Secretary of the Army's Commission on Army Acquisition and Program Management in Expeditionary Operations and on two recent Defense Science Board task forces, on the defense industrial structure and on integrating commercial systems into defense.

Prior to coming to CSIS, he was Director of National Defense and Homeland Security for Clark & Weinstock, where he still consults. He was the Director of Syracuse University's National Security Studies Program and served as a Professor of Practice at the Maxwell School of Citizenship and Public Affairs. Mr. Berteau was a Senior Vice President for Science Applications International Corporation (SAIC) until early 2001.

Mr. Berteau served in the Defense Department for 12 years under four Defense Secretaries, including four years as Principal Deputy Assistant Secretary of Defense for Production and Logistics. He was responsible for weapons production readiness, the defense industrial base, military base closures, defense logistics, installations and military construction, defense procurement, and environmental matters. He testified before Congress more than 100 times, led numerous defense management reform initiatives, oversaw the Defense Logistics Agency, and was instrumental in creating two new agencies, the Defense Contract Management Agency and the Defense Commissary Agency. He twice was acting Assistant Secretary of Defense for nearly a year, in 1990 and 1993. As Chairman of the 1992 government-wide Defense Conversion Commission, Mr. Berteau's report to the Secretary of Defense, *Adjusting to the Drawdown,* developed ways to address the impact of defense reductions on the U.S. economy, on military and civilian defense personnel, and on communities. Nearly all of the commission's recommendations were implemented.

In the late 1980s, Mr. Berteau was the Deputy Assistant Secretary of Defense for Resource Management & Support, responsible for all defense military and civilian

manpower and personnel requirements. He chaired the Federal Economic Adjustment Committee. He was acting Assistant Secretary of Defense for Force Management and Personnel for eight months in 1989.

Mr. Berteau was the Packard Commission's Executive Secretary in 1985–86 (President's Blue Ribbon Commission on Defense Management). Earlier, he was Assistant to the Deputy Secretary of Defense, Executive Secretary of the DOD Council on Integrity and Management Improvement and the Defense Resources Board, and Special Assistant to the DOD Comptroller. He entered DOD in 1981 as a Presidential Management Intern.

Mr. Berteau graduated from Tulane University in 1971 and received his Master's degree in 1981 from the LBJ School of Public Affairs at the University of Texas. Mr. Berteau received the Secretary of the Army Exceptional Public Service Medal in 2007 and the Secretary of Defense Medals for Distinguished Public Service in 1991 and Outstanding Public Service in 1987 and 1989. A native of Louisiana, he lives in Derwood, Maryland, with his wife, Jane Berteau; they have two grown children.

Chairman WU. Thank you very much, Mr. Berteau. Dr. Williams, please proceed.

STATEMENT OF DR. CINDY WILLIAMS, CHAIR, PANEL ON THE DHS SCIENCE AND TECHNOLOGY DIRECTORATE, NATIONAL ACADEMY OF PUBLIC ADMINISTRATION; SHAPIRO VISITING PROFESSOR OF INTERNATIONAL AFFAIRS, THE ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS, GEORGE WASHINGTON UNIVERSITY; PRINCIPAL RESEARCH SCIENTIST, SECURITY STUDIES PROGRAM, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dr. WILLIAMS. Thank you, Mr. Chairman, Congressman Smith. It is a real pleasure to appear before you today to discuss the research priorities in the S&T Directorate of the Department of Homeland Security.

Between June 2008 and June 2009 I chaired a panel of the National Academy of Public Administration, or NAPA, that conducted a study of the S&T Directorate. I am joined today by Rick Cinquegrana and Laurie Ekstrand, who led the work of NAPA's staff on the study. Some copies of the panel's report have been provided to your staff, and the report is also available online.

The Academy panel offered findings and recommendations in several areas. My remarks today focus on three of them: strategic plans, the establishment of research priorities in the Directorate's transition portfolio and the Directorate's role in basic research.

Let me start with strategic plans. The S&T Directorate is responsible for two distinct strategic plans: an internal plan to guide its own work and a federal-wide plan for civilian efforts to counter chemical, biological and other emerging terrorist threats. The Directorate published an internal strategic plan, as Mr. Buswell mentioned, in June 2002. That plan describes the Directorate's structure, the roles of its integrated product teams, or IPTs, its mechanisms for reaching out to other organizations, and its plans for workforce development. But it does not meet the criteria of the strategic plan as the term is generally applied today across Federal Government.

Among other things, the plan's mission statement understates the Directorate's range of responsibility, the plan itself lacks a statement of long-term goals, and it does not discuss key external factors that could affect progress.

We also found process weaknesses with regard to strategic planning, including a lack of involvement by key external stakeholders and the lack of a systematic scan of the environment. The panel recommended that S&T follow a strategic planning process outlined by the Government Accountability Office and OMB to develop a plan that can guide its work toward a set of specified goals.

We found that the Directorate has not made progress on the strategic plan for the wider federal effort at all. To be fair, among federal departments, DHS has only the third-largest budget for homeland security research and development, after the Department of Health and Human Services and the Department of Defense. To produce a federal research strategy with any teeth, S&T would need White House support. We recommended that S&T work with the White House Office of Science and Technology Policy and other federal departments to develop that broader plan.

Let me turn now to the establishment of priorities in the transition portfolio. S&T's IPTs bring the Directorate's staff together with customers to establish priorities for projects. The IPTs appear to be useful vehicles for involving DHS's internal stakeholders in setting research priorities and for stimulating information exchange across the Department. Nevertheless, we identified several problems. As an example, it appears that when the IPTs were formed, little guidance was provided on how to operate them. Each IPT devised its own structure and processes through trial and error. Earlier this year, S&T was beginning to develop some standardized practices, but we still found substantial variation in structure, processes, customer satisfaction and accomplishments among the IPTs.

And finally, let me turn to S&T's role in basic research. Basic research is the seed corn for the development of future technologies, and no other organization in Federal Government has the mandate or the wherewithal to sponsor basic research in key areas related to homeland security such as border protection, immigration, and aviation security. That said, our panel found several potential weaknesses in this area. I will highlight just one, that is, many of the Directorate's basic research projects are awarded without competition and without external scientific peer review. Other federal research organizations routinely use competitive processes, including external peer review to good effect. Our panel recommended that DHS S&T follow suit.

Mr. Chairman, that concludes my prepared remarks, and I look forward to any questions.

[The prepared statement of Dr. Williams follows:]

PREPARED STATEMENT OF CINDY WILLIAMS

Mr. Chairman, Congressman Smith, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the development of strategic plans and research priorities and the role of basic research in the Department of Homeland Security (DHS). Advances in science and technology and the deliberate transition of those advances into usable systems are crucial to the Nation's efforts to prevent and disrupt future terrorist attacks, protect people and critical infrastructure in the event of an attack or a naturally occurring disaster, and prepare to respond and recover should such events occur. The Directorate of Science and Technology (S&T) is charged with implementing the science and technology effort for much of DHS as well as orchestrating the planning for key S&T activities across the many federal departments and agencies involved in homeland security.

Under mandate from the *DHS Appropriations Act* for fiscal year (FY) 2008, the National Academy of Public Administration (NAPA) conducted a study of DHS S&T between June 2008 and June 2009.[1] I served as Chair of the expert panel that guided the study. I am joined today by Rick Cinquegrana and Laurie Ekstrand, the Program Area Director and Project Director who led the work of NAPA's staff on the study.

The panel's report, *Department of Homeland Security Science and Technology Directorate: Developing Technology to Protect America,* was published by NAPA in June 2009. Some copies of the report have been made available to your staff. The report is also available on-line at *http://www.napawash.org/pc_management_studies/DHS_ST/DHS_ST_Directorate_June_2009.pdf.*

In addition to serving as chair of the NAPA panel, I am a member of the research staff of the Security Studies Program at the Massachusetts Institute of Technology (MIT) and, for the current academic semester, the J.B. and Maurice C. Shapiro Visiting Professor of International Affairs at the Elliott School of the George Washington University. At MIT, I have conducted independent research over a four-year period on the state of strategic planning and resource allocation for homeland security within the DHS and other federal departments, in the Executive Office of the President, and in the Congress. Today I will discuss findings and recommendations of the NAPA study in my capacity as Chair of the Academy Panel. My views are also informed by my experience in the context of my own research.

Findings and Recommendations of the NAPA Panel

The NAPA panel offered findings and recommendations in eight areas:

- The organization of and communications within DHS S&T;
- The customer focus of S&T's transition portfolio;[2]
- The allocation of funds and selection of research projects across S&T's basic research portfolio;
- S&T's exercise of its statutory role in guiding federal-wide science and technology efforts in homeland security;
- S&T's internal strategic planning effort;
- The practice of performance measurement in S&T;
- The question of unnecessary duplication in the activities of the federal departments and agencies engaged in homeland security-related science and technology; and
- The question of opportunity costs: whether increases in homeland security-related research during this decade have resulted in reduced funding for other significant science and technology endeavors.

Before turning to the specific questions posed by the Subcommittee for this hearing, let me summarize briefly the panel's findings and recommendations in each of these areas.

Organization and communications. The panel found that DHS S&T is better organized than it was during its early years, but that today's matrix organization and the large number of direct reports to the Under Secretary for S&T pose communications challenges across the management team and between management and staff. We recommended that S&T management engage staff in a process of identifying communications problems and implementing solutions. We also suggested that web-based technology would be a valuable tool to initiate that process. We also recommended that S&T's leadership reconsider the structure of the Directorate to ensure a reasonable number of direct reports and a cohesive structure for managing first responder interaction.

Customer focus of the transition portfolio. We found that through the Integrated Product Team (IPT) approach that S&T now uses for the transition portfolio, the Directorate has made strides in engaging its customers within DHS. Progress is un-

[1] The *Department of Homeland Security Appropriations Act,* 2008, is Division E of the *Consolidated Appropriations Act,* FY 2008 (P.L. 110–161). The report of the Committee on Appropriations of the U.S. House of Representatives (H.R. 110–181) accompanying the House version of the Act directed DHS to contract with NAPA to conduct the study.

[2] S&T has grouped its projects into three portfolios: transition, research, and innovation. The transition portfolio is meant to deliver technologies to DHS components or first responders within three years; it makes up about one-half of the organization's budget. The research portfolio, aimed at basic research, accounts for roughly 20 percent of S&T's budget. The innovation portfolio is meant to identify and fund potential "game changing" technologies—long shots that could lead to "leap-ahead results." Innovation constitutes roughly five percent of S&T's budget.

even across the various IPTs, however. We also found that first responders at the State and local levels often feel left out, but that the addition of a new first responder IPT is unlikely to prove an effective solution. We recommended that S&T refine and institutionalize the structures and procedures across the IPTs and that including first responders into existing IPTs as appropriate is likely to be more effective than adding the new first responder IPT.

Allocation of funds and selection of research projects. The broad allocation of funds across the basic research portfolio appears to rest on the budget shares that were extant among DHS's legacy components before they were brought into the consolidated department in 2003, and many basic research projects are awarded without competition or peer review. We recommended that S&T take steps to rationalize decision-making about the broad allocation of basic research funds, and that funds be awarded on a competitive basis based on scientific peer review except in cases when that is clearly not feasible.

Guiding federal-wide science and technology efforts. Although S&T is charged by statute to take a leadership role in guiding federal efforts in homeland security-related research, other federal organizations enjoy wider roles in and have larger budgets for homeland security research than does DHS S&T. Thus S&T is in a relatively weak position to carry out its leadership role. S&T officials are active participants in many interagency task forces and committees, and they coordinate with other agencies on numerous projects. Nevertheless, in the nearly seven years since DHS was created, S&T has not been successful in guiding the development of a federal strategic plan for homeland security S&T. The panel recommended that S&T work with the White House Office of Science and Technology Policy and the array of federal agencies engaged in homeland security-related research to develop a comprehensive national strategic plan for such research.

S&T's internal strategic planning. The NAPA panel found that the strategic plan that S&T issued in June 2007 is a useful document in describing the "what" of S&T's programs, but it fails to describe the "why." We recommended that S&T follow the guidance provided by the Office of Management and Budget (OMB) and the Government Accountability Office (GAO) to formulate a strategic plan that will effectively guide its work toward specified goals.[3]

Performance measurement. S&T uses milestones to measure progress, but those milestones may not be meaningful indicators of progress. There also appears to be little or no consequence for missing milestones. The panel recommended that S&T systematically collect and analyze information about milestones met and missed, adopt appropriate consequences, and provide clear guidance for setting valid initial and subsequent milestones. We also recommended that S&T adopt peer review of their overall portfolio, as is the practice of other federal science and technology organizations.

Unnecessary duplication. The panel found no instances of unnecessary duplication within S&T or among the other agencies engaged in homeland security research. Nevertheless, the panel was concerned that the weaknesses in strategic planning and the lack of systematic mechanisms to evaluate the relative merits of competing priorities for science and technology efforts related to homeland security put the community at risk for such duplication.

Opportunity costs. The panel surfaced no evidence to indicate that the increases in spending for homeland security-related research has led to reduced funding for other significant research areas.

The remainder of my statement addresses in more detail the issues related to the development of strategic plans, stakeholder involvement in setting research priorities, and the role of basic research in the DHS S&T portfolio.

The Development of Strategic Plans

Like other federal organizations, DHS S&T bears a responsibility for developing a strategic plan to guide its own work. In addition, the *Homeland Security Act of 2002* requires the Directorate to develop, "in consultation with other appropriate executive agencies, a national policy and strategic plan" for federal civilian efforts to identify and develop countermeasures to chemical, biological, radiological, nuclear, and other emerging terrorist threats.[4]

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[3] OMB Circular No. A–11, Part 2; GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act* (GAO/GGD–96–119, June 1996).

[4] P.L. 107–296, November 25, 2002, Title III Sec. 302.

S&T internal strategic planning

In June 2007, the Directorate published an internal Strategic Plan, *Science & Technology Strategy to Make the Nation Safer.* The plan describes the structure of the organization and the roles of the IPTs, its mechanisms for reaching out to other organizations and players, and its plans for workforce development. It does not adhere to the criteria of a strategic plan as generally applied across the Federal Government. Simply put, the plan can be said to detail the "what" of S&T, but it lacks the focus on the "why" that is the hallmark of successful strategic planning. The NAPA panel also found weaknesses in the process through which the plan was developed.

GAO's guide to strategic planning recommends that strategic plans include six components.[5] The table on the next page assesses the content of S&T's strategic plan in the context of GAO's required components. The table reveals several weaknesses of the June 2007 document: a mission statement that understates the range of responsibilities assigned to the organization, including those related to coordinating and collaborating with other federal agencies; the lack of specific long-term goals and objectives; the lack of discussion of key external factors that could affect the achievement of goals; and the lack of a foundation to establish annual performance goals and metrics to assess progress toward goals.

One challenge confronting DHS S&T is that DHS itself and the wider federal homeland security community are generally lacking the clear assessments of threats, vulnerabilities, and risks and the prioritized goals from which S&T might derive its own statement of goals and objectives. Better assessments of threats, risks, and vulnerabilities and a clearer consensus on homeland security goals, objectives, and priorities at the national, federal, and departmental levels would indeed provide a foundation on which S&T could build its next strategic plan. Nevertheless, the NAPA panel felt that the DHS Strategic Plan released in September 2008 offers the department-level perspective that can guide the Directorate's planning efforts. We recommended that S&T move forward to develop a strategic plan that more closely reflects the GAO guidance.

[5] GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act* (GAO/GGD–96–119, June 1996.

Content of the S&T Strategic Plan	
GAO Guide Required Component	**Content of S&T Strategic Plan**
A comprehensive mission statement	Although the plan includes a mission statement, it is not comprehensive, because portions of S&T's mandated roles are not included.
Long-term goals for all major functions and operations	Long-term goals and objectives are not specifically stated.
Approaches and strategies to achieve the goals and objectives and obtain the various resources needed	Approaches to organizing, staffing, and conducting S&T's work are discussed in some detail, but activities cannot be linked to goals, because the long-term goals are not articulated.
A relationship between long-term goals/objectives and annual performance goals	The absence of clearly articulated long-term goals and the lack of performance measures makes it impossible to draw these linkages.
An identification of key external factors that could significantly affect achievement of the strategic goals	The plan does not discuss key external factors that could affect goal achievement.
A description of how program evaluations have been used to establish or revise strategic goals, and a schedule of future program evaluations	The plan indicates that the Director of Research is evaluating approaches to measure performance: customer satisfaction surveys to gather feedback from DHS components are to be used as part of a measure of outcome-based performance; peer-reviewed papers, patents, conferences and workshops attended, and prizes awarded are potential measures. Because S&T is a new organization, prior program evaluations that apply do not exist. Evaluations of similar government organizations that may be relevant are not mentioned.

In strategic planning, the process is often as important as the product. The GAO guide highlights three practices that are critical to successful strategic planning:

- Stakeholder involvement, including Congress and the Administration, State and local governments, third-party providers, interest groups, agency employees, fee-paying customers, and the public;
- Assessment of the internal and external environment continuously and systematically to anticipate future challenges and make future adjustments so that potential problems do not become crises; and
- Alignment of activities, core processes, and resources to support mission-related outcomes.

Stakeholders were not specifically involved in drafting the S&T strategic plan. In addition, a systematic environmental scan was not conducted to inform the plan. The NAPA panel recommended that S&T follow the process as outlined by GAO, and particularly that it involve stakeholders in the development of its next plan. Other federal science and technology organizations have engaged in sound strategic planning, and their practices provide models that could inform an improved process in DHS S&T.

Development of a federal strategic plan

DHS S&T has not made progress in developing a strategic plan for the overall federal civilian effort to identify and develop countermeasures to emerging terrorist threats. To be fair, S&T may not be in the best position to lead that development, because it is a relatively small player within the federal homeland security research community.

Even within DHS, the S&T Directorate is not the only player in S&T. When the Department was formed, the Coast Guard and Secret Service both retained jurisdic-

tion over their own science and technology work. The Department's Domestic Nuclear Detection Office (DNDO) now holds separate responsibility for research and development related to nuclear detection.

Moreover, among federal departments, DHS has only the third-largest budget for homeland security-related research and development, after the Department of Health and Human Services (HHS) and the Department of Defense (DOD).[6] The National Science Foundation, NASA, Department of Energy, Department of Commerce, Environmental Protection Agency, and Department of Agriculture also play significant roles.

DHS S&T has little direct authority to direct or influence the research agendas of the science and technology organizations in those other departments and agencies. To produce a comprehensive research strategy that would be supported across the Federal Government, S&T would have to seek and rely on White House support to obtain active participation from the other federal research organizations, some of which are far stronger players by virtue of their own budgets as well as the institutional heft of their respective departments and agencies. I believe that it makes more sense for the White House Executive Office of the President to orchestrate this interagency effort.

Within the Executive Office of the President, there are two organizations that could take charge of an overall federal strategic plan for homeland security-related science and technology. One is the newly merged National Security Staff, which integrates the former National Security Council Staff with the Homeland Security Council Staff that was established shortly after 9/11.[7] That staff carries out the day-to-day coordination of domestic and international security activities across the interagency and is in a good position to work with all the departments and agencies involved in homeland security to pull together a coherent strategic plan and ensure its implementation. The National Security Staff lacks budgetary responsibility, however. To ensure budgetary realism of the strategic plan, the National Security Staff should work closely with budget experts from the national security division and the homeland security branch of the Office of Management and Budget.

Another choice is the White House Office of Science and Technology (OSTP). OSTP holds responsibility for leading the interagency effort with regard to science and technology policies and budgets. The NAPA panel recommended this option. Specifically the panel recommended that DHS S&T work with OSTP and the other federal departments engaged in homeland security-related research to develop a comprehensive strategic research plan.

Stakeholder Involvement in Setting Research Priorities

DHS S&T groups its projects into three portfolios: transition, research, and innovation. The transition portfolio is meant to deliver technologies to DHS components or first responders within three years. The research portfolio is aimed at longer-term basic research endeavors, expected to take five to eight years or more. The innovation portfolio is meant to identify and fund potential "game changing" technologies—long shots that could lead to "leap-ahead results."

In recent years S&T organized IPTs that bring the Directorate's staff together with its customers to establish priorities for projects in the transition portfolio. During 2008, there were twelve "capstone IPTs," each of which focused on one of twelve areas of science and technology: border security, cargo security, maritime security, chemical/biological defense, cyber security, information sharing and management, inter-operability, counter-IED, transportation, people screening, infrastructure protection, and incident management. Each capstone IPT is co-led by member of the S&T staff and a representative from one of DHS's other components, and includes participants from S&T and its customers inside DHS. Each sets priorities for projects within its purview.

It appears that when the IPTs were initiated, little guidance was provided on how to operate them. Lacking such guidance, members of each IPT devised their own structure and processes through trial and error. At the time our study was conducted, S&T was beginning to develop some standardized practices, but we still found great variation in structure and processes among the IPTs.

Priorities and projects established through the IPT process are reviewed by a Technical Oversight Group (TOG), which exercises oversight of the transition port-

[6] FY 2008 funding for homeland security-related research and development in HHS was $1.9 billion; in DOD, $1.3 billion; in DHS, including R&D funds for the DNDO, $1.0 billion.

[7] President Obama decided to merge the two staffs in accordance with recommendations made under his first Presidential Study Directive. See the White House Office of the Press Secretary, "Statement by the President on the White House Organization for Homeland Security and Counterterrorism," May 26, 2009.

folio. The TOG is chaired by the Deputy Secretary of Homeland Security and includes the Under Secretaries for National Protection and Programs, Management, and S&T. To ensure that S&T's transition projects are aligned with DHS priorities, the TOG makes the final decisions on the list of transition projects. Although customers are invited to TOG meetings, some of them told the NAPA staff that last-minute invitations prevented them from attending, and that they did not understand the basis of the TOG's decisions.

Projects in the transition portfolio are meant to fill gaps in a customer's capability and to be integrated into an acquisition program or commercialized after the S&T work is completed. To that end, the Directorate asks customers to enter into a Technology Transition Agreement (TTA) for each project. TTAs are intended to describe the capability gap that the S&T project will fill, the project deliverable, the technical requirements and parameters, and the project plan, including schedule, funding, and transition approach. At the time the NAPA study was conducted, however, few TTAs had been signed, thus calling into question their usefulness.

The IPTs appear to be useful vehicles for involving DHS's internal stakeholders in setting research priorities. The NAPA study found that customers generally characterized the S&T staff as accessible and responsive to their concerns. We also found the IPT process to be flexible enough to accommodate any changes needed to respond to new threats or other circumstances, and to encourage information exchange among DHS's components.

Nevertheless, the NAPA study identified several factors that keep the IPTs from fulfilling their intended role. These include:

- The IPTs are not adequately institutionalized, and may not be able to withstand changes in leadership.
- The customer focus of the IPT process may obscure important opportunities inherent in innovation, gaps in knowledge, or opportunities that cut across S&T's divisions.
- The roles and responsibilities of participants are not explicitly defined, and the lack of clear definition has caused confusion among customers and frustration among some S&T staff.
- TTA agreements largely go unsigned, and since IPT budgets are fixed separately from the TTA process, there is no incentive for customers to sign them.
- Customers do not fully understand the TOG process.
- There is no standard mechanism for collecting input from non-DHS customers, including first responders at the State and local levels.
- Processes and procedures for running the IPTs are not adequately standardized.
- Customers lack incentives for investing the time and effort needed to make the IPTs maximally effective.

Two other factors stand in the way of rational priority-setting across S&T. First, the process of allocating budgets among the various IPTs is not transparent, but seems to be based broadly on the share of homeland security-related science and technology funding held by the components before they were consolidated into the department in 2003. Thus, the broad allocation of money among the IPTs does not necessarily reflect DHS-wide priorities or allow for taking advantage of the most promising opportunities. Second, the transition portfolio managed through the IPTs accounts for only about one-half of Directorate funding. The mechanisms for establishing priorities for a substantial share of its work, particularly those for the basic research portfolio, are less clear.

The Role of Basic Research in the DHS S&T Portfolio

Basic research accounts for a bit more than 20 percent of S&T's budget. Of that, some 31 percent is performed by universities; 31 percent by industry; 26 percent by the National Laboratories; ten percent by other federal laboratories; one percent by federally funded research and development centers; and one percent by other not-for-profit enterprises.

Basic research is the seed corn for the development of future technologies that could ultimately protect the Nation more effectively and at lower cost, and no other organization in Federal Government has the mandate or the wherewithal to sponsor basic research in key homeland security-related areas such as border protection, immigration, or aviation security. The budget share that S&T devotes to basic research appears generally consistent with the practice in other security agencies, particularly the DOD.

That said, the NAPA panel found potential weaknesses in DHS's allocation of basic research funds among projects, the integration of research among its various research performers, and the processes used to select research projects and monitor their performance. We thus offered the following recommendations:

- Develop and implement clear and transparent processes and criteria for identifying basic research needs, prioritizing projects, and selecting performers.
- Ensure S&T builds on current efforts to integrate research across the National Laboratories, Centers of Excellence, and other performers.
- Make competitive processes that include external scientific peer review the norm for basic research.

Concluding Remarks

When the panel report was released in June 2009, the leadership of the DHS S&T Directorate readily accepted the panels recommendations and agreed that these issues require attention. The absence of a confirmed Under Secretary to head the Directorate has no doubt limited the ability of the Directorate to respond fully to the recommendations. The Academy and the panel believe that their implementation would significantly improve the effectiveness of S&T, and are ready to assist the organization as appropriate.

BIOGRAPHY FOR CINDY WILLIAMS

Cindy Williams is serving as the J.B. and Maurice C. Shapiro Visiting Professor of International Affairs at the Elliott School of International Affairs of the George Washington University for the fall 2009 semester. She is currently on leave from the Massachusetts Institute of Technology, where she is a Principal Research Scientist of the MIT Security Studies Program. Her work at MIT includes an examination of the processes by which the U.S. Government plans for and allocates resources among the activities and programs related to national security and international affairs and an examination of the transition to all-volunteer forces in the militaries of European countries.

Previously, Dr. Williams was an Assistant Director of the Congressional Budget Office, where she led the National Security Division in studies of budgetary and policy choices related to defense and international security. She has also served as a Director and in other capacities at the MITRE Corporation in Bedford, Massachusetts; as a member of the Senior Executive Service in the Office of the Secretary of Defense at the Pentagon; and as a mathematician at RAND in Santa Monica, California.

Dr. Williams holds a Ph.D. in mathematics from the University of California, Irvine. She is a co-author, with Gordon Adams, of *Buying National Security: How America Plans and Pays for Its Global Role and Safety at Home* (Taylor and Francis, forthcoming December 2009). She is the editor of two books: *Holding the Line: U.S. Defense Alternatives for the Early 21st Century* (MIT Press 2001) and *Filling the Ranks: Transforming the U.S. Military Personnel System* (MIT Press, 2004), and the co-editor, with Curtis L. Gilroy, of *Service to Country: Personnel Policy and the Transformation of Western Militaries* (MIT Press 2006). She is a member of the board and an elected fellow of the National Academy of Public Administration and a former member of the Naval Studies Board of the National Academies. She is a member of the Council on Foreign Relations and of the International Institute of Strategic Studies. She serves on the editorial board of *International Security* and the advisory board of the Scowcroft Institute of International Affairs at the Bush School of Government and Public Service of Texas A&M University, and is on the advisory committee of Women in International Security (WIIS).

DISCUSSION

Chairman WU. Thank you very much, Dr. Williams. And now it is in order for Members of the Committee to ask questions, and the Chair recognizes himself for five minutes.

Mr. Buswell, I want to commend you and Vice Admiral Cohen for the job that you all have done. I believe that Admiral Cohen's goal was to increase basic research to 20 or 21 percent, and you have hit that metric. I think that on the basic research front, there may be some further discussion about how well that research is linked

to the missions of DHS, but I think that overall, it is very, very important and commendable that you all have achieved that metric.

I also think that it is very commendable that you have improved the IPT process significantly, and this panel may want to return to that topic. But there has been dramatic improvement on that front.

The area of concern which I would like to discuss with you and the panel is whether a systematic risk assessment and a strategic plan based on at least in part on that risk assessment would be helpful to the S&T Directorate and helpful to DHS? I think that there was some concern from outside that perhaps the Vice President's Office drove priorities by a tremendous amount. I am gratified to hear that it has become a more customer-driven process, and I think that is commendable, but a completely customer-driven process may not hit the risks that you want to hit. And I would like you to tell this subcommittee what has prevented the S&T Directorate in engaging in a more systematic risk assessment, and then I would like to encourage the rest of the panel to address what a more systematic, strategic plan and also use of risk assessment, particularly an all-hazards approach, how that might benefit the S&T Directorate and DHS overall. Mr. Buswell, would you like to start this?

Mr. BUSWELL. Yes, sir, Mr. Chairman. Thanks very much. The answer to your question, you know, does a systematic or comprehensive risk assessment help us in prioritizing our technology development is absolutely. And the way that I think that it helps us do that is it helps the components whom we serve to identify their priorities in a more systematic way. Let me just say that as I am part of the QHSR (Quadrennial Homeland Security Review) steering committee. I don't want to get out in front of the headlights and usurp the Secretary's prerogative on the QHSR, but there is a substantial effort within that organization to address this risk assessment process and to define the scope with which the Department ought to address that. And I think we will be hearing more about that over the coming months, and S&T is delighted to provide input to that risk assessment, whether it be scientific modeling input or other kinds of capability gap identification processes that we have in place. And I think that over the long-term, that will be a very valuable tool for the Department at large in identifying the operational requirements that it needs to address, both with technology and other ways. As Mr. Berteau said, though, this is a difficult thing to do, but we are committed to doing it because it is the right thing to do and it is the only way to get the best return for the investment.

Chairman WU. Well, prior hearings on this topic have been somewhat contentious. It is rewarding to see that there has been progress made on the basic research front, on the IPT front, and I look forward to a report a year or two down the pike that we will be making—that we have made progress on systematic risk assessment and a strategic plan.

Mr. Berteau, Dr. Depoy, Dr. Williams, would you care to add to this discussion about the strategic plan and about risk analysis?

Dr. WILLIAMS. I would like to.

Chairman WU. Please.

Dr. WILLIAMS. It strikes me that the assessment or threats, risks and vulnerabilities is crucial to the development of goals and priorities, and that has to be the thing that starts the ball rolling on any strategic plan. Only with a firm strategic plan will the organization be able to decide on whether it should prefer this over that, this transition work over some other transition work, possibly in a completely separate part of the Department of Homeland Security.

Now, one of the problems the S&T Directorate has faced in the past was that it didn't have that threat and risk assessment coming down from the top of the Department, or even from across the Federal Government. And I can understand that that is an issue for them, and they are hoping that the Quadrennial Homeland Security Review will produce a threat and risk assessment that they will be able to work with to establish their own internal goals. If that should not happen, if for some reason the threat and risk assessment that comes down from the top appears to be lacking, it strikes me that they still need to do something on their own to establish the threats and risks that they believe they are working to, even if it is dead wrong over the long-term, even if it is not what they want five years from now. They need something internally to start the ball rolling and to be part of their strategic planning.

Chairman WU. Mr. Buswell, are you waiting for the Quadrennial Review to supply you with a plan from on high or risk assessment also?

Mr. BUSWELL. We are working in parallel with the Quadrennial Review on our own S&T strategic plan. What I want to emphasize though is we are not the tail wagging the dog here. We want to make sure that we are providing the technologies that are of the highest importance to the Department, and that is the way we intend to approach this. I am confident that the Department will be able to establish strategic goals and objectives out of this strategic review, this Quadrennial Review. The risk assessment is a longer-term effort, and the risk assessment part of that will take—and will be iterative over a number of years and really will never be an ending effort because the threat constantly changes.

So I am confident that we will have some input into our strategic plan. Now, keep in mind, you know, from my perspective, science and technology should be not the end of the whip but the handle of the whip, and as the strategy changes, we ought to—our long-term focus ought to result in smaller changes within the S&T portfolio assuming that we are investing in things that are relevant to homeland security, then maybe some other things, some other strategic initiatives might that can offer near-term solutions, you know, policy changes and tactics changes and those kinds of things that can be implemented more quickly than technology can be developed.

Chairman WU. Before we move onto Mr. Smith, if either you, Dr. Depoy, or you, Mr. Berteau, have something to say about risk assessment, threat assessment and this strategic plan, I want to open it up to you all.

Mr. BERTEAU. Thank you, Mr. Chairman. I would note two things that I think are in addition to the comments that my colleagues have made here today. One is that we have a tendency to

evaluate the efficacy of planning by how well it predicts the future, and that is the wrong metric to determine whether or not planning was of any value to us. Its real value is in how well it prepares us to deal with the future that we can't predict.

And so it is possible under that kind of a rubric to look like you are fully compliant with OMB circular A-11's requirements for strategic plans and you give GAO something that they can check or not check everything that you have or have not done, and yet it has done nothing to actually prepare you better to deal with a future that you can't predict. So we need to be careful that we don't get caught up into a checklist mentality for the value of strategic planning.

The second is that a big element of that value comes from the process itself, and threat assessment and risk assessment as well as incorporating existing legislation and existing strategies and stakeholder input, all of that comes into play. But what that process needs to produce is something that looks like strategic guidance, something that says to everybody involved in the homeland security enterprise, this is what is important. This is what you need to spend your time and effort on. This is where you spend your marginal dollars when they become available. This is how you know how to prioritize. That strategic guidance is a clear and important element of this process, and if it is not present, people have to make assumptions, and the assumptions may not be consistent, either across the enterprise or over time.

Chairman WU. Thank you, Mr. Berteau.

Dr. DEPOY. I would just emphasize the point that Mr. Berteau made earlier that this does have to be an enterprise-wide effort, and certainly the operating components must be a part of this plan. It can't be produced in the Directorate by itself.

Chairman WU. Thank you very much. Mr. Smith.

Mr. SMITH. Thank you, Mr. Chairman. Dr. Williams notes in her testimony that the NAPA review of DHS Science and Technology found that many basic research projects funded by Science and Technology are done so without competition or peer review and that the Directorate should work to make peer review and competition standard unless it is clearly not feasible.

Mr. Buswell, do you agree with the finding and recommendation, and if so, how would you say it is being addressed?

Mr. BUSWELL. Well, thank you, sir. I generally agree that competition is good and that peer review is certainly one means of selecting—ensuring that we are selecting high-quality projects and that those projects are being executed in a high-quality way.

Peer review using both internal and external reviewers as I said is a valuable way to do that. As Dr. Williams' panel noted, we have had quite a bit of success in the Centers of Excellence selection process which fundamentally does select some of the projects, a good number of the projects, that are conducted in the basic research portfolio through both internal and external review in series. And I think, you know, as I said the goal is to make sure we are getting out of the investment what we think we should.

Let me also say that all proposals that come in through the broad agency announcement process are in effect peer reviewed. Those proposals are reviewed by a panel of experts, subject matter,

and perhaps stakeholder kinds of—you know, practitioner kinds of review to make sure that the proposal is sound and that it is executable and scientifically feasible. So in general, yes, I think that more competition is good. We establish a lot of that competition through the selection of the Centers of Excellence, university-based Centers of Excellence, and we intend to continue to do that. We have been very successful in that realm. And then the other part of this, you know, as I said, the two pillars of basic research are the Centers of Excellence and the DOE National Laboratories, and we have started a renewed effort within the Directorate to ensure that the investments that are going to the national laboratories are being done to the best effect of the taxpayer dollars, or you know, in the best interest of the government.

And I look forward to strengthening that process with the national laboratories over the coming year. I think that is one of the things that we can improve Directorate-wide.

So short answer to your question, yes, I agree with their recommendation, and to the extent feasible, we should encourage competition to make sure that we get the most benefit for the taxpayer dollar.

Mr. SMITH. Thank you. And Dr. Williams, you noted in your testimony about milestones to track programs and that they may not be meaningful indicators of progress, and there appears to be little or no consequence for missing them. Could you elaborate on the finding and certainly your recommendation, and then Mr. Buswell, if you could provide reaction from the Department's perspective?

Dr. WILLIAMS. One of the things the panel looked at was whether the Directorate has processes in place to know what is going on inside of its projects. Have they established milestones? Are the projects meeting their milestones? And we noticed that there are milestones established, but it seemed as though the majority of projects were missing their milestones, and there was very little consequence—at the time that we looked at the Directorate—for missing a milestone. In fact, the main consequence seemed to be to renegotiate the milestone and start fresh with a new milestone on the same project.

We found that, for one thing, there wasn't a good record of what is going on that is causing so many projects to miss their milestones? Is there one thing that is happening continually? Are the milestones just not realistic from the beginning? And so we suggested that DHS S&T do some systematic effort within the Directorate to pull together what is known about the milestones and why projects are missing them, and see if they can start to identify any patterns in that regard.

Mr. SMITH. Mr. Buswell.

Mr. BUSWELL. That was an excellent observation by the panel, and we appreciated their input on that. We have done a number of things. First of all, let me say that the milestone—using milestones as a metric of success and program management is only as good as the milestones that you establish. So we have taken a two-pronged approach to this. One, we are looking at milestone development. You know, what is a meaningful milestone and what isn't a meaningful milestone? What are we actually using to decide at some point in the process whether a project should go forward or

not? I mean, is this actually going to result in a technology that will be of benefit to the Department or of benefit to the first responder community? And so what are the key decision points? What are the key phase gates that we want to meet in managing those projects? So that is the first area that we focused on is in establishing good milestones.

Second, you know, in response largely to the review that NAPA did and some input that we had gotten from the Department, program analysis and evaluation, I have tied the six division heads' performance evaluations to their division's meeting of milestones. And so it is tracked very carefully. They watch their program managers. Their program managers are evaluated on meeting those milestones, and that is an effective tool I think to making sure that that happens.

Now, there is always unintended consequences. Our goal is to get technological capabilities to our customers. Our goal is not to properly manage projects. So I need to make sure that I am not disincentivizing the program managers who may come across a technology that leaps their program of record, you know. They would have no incentive to abandon the program of record because they are getting measured on whether they are meeting the milestones in that program or not in order to adopt this leap-ahead technology.

So there is a balance here that I need to make sure I keep which is, you know, maybe meeting 75 percent of the milestones is a reasonable number. I don't know. That is where we started. We started with setting the goal of 75 percent of milestone completion. We achieved that metric this year. So if those are good milestones, then maybe we are there, but at the same time, I want to continue to reward those program managers who abandoned their program of record because they found something that will actually deliver a capability sooner than their program would have.

Mr. SMITH. Okay. Thank you. Thank you, Mr. Chairman.

Chairman WU. Thank you very much, Mr. Smith. Mr. Tonko, would you prefer to defer your questions right now?

Mr. TONKO. Yes.

Chairman WU. Ms. Biggert, you are recognized for five minutes.

Ms. BIGGERT. Thank you, Mr. Chairman. I would direct this question to Mr. Buswell. Anthrax has been mentioned as DHS's number one terrorist threat, a threat supported by the findings of the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism's recent progress report titled The Clock is Ticking. Could you tell us about or explain for us the role of the Directorate in addressing this threat and the focus of science and technology in bio preparedness?

Mr. BUSWELL. Yes, ma'am. Let me start by saying that the principle role of the Directorate in the National bio defense effort has to do with the threat assessment and determination process. So what are the highest threats, what are the threats that we have to worry about above all others, whether that is due to the likelihood that a terrorist could get a hold of this material, whether it is due to the consequences of a successful attack using the particular pathogen, and there are a lot of things that go into that threat assessment. So one of our major efforts is this bi-annual,

bioterrorism risk assessment that has been delivered to the Federal community and drives the investment priorities across the Federal Government in bio defense, whether those investment priorities are in surveillance, bio surveillance, environmental, or other kinds of surveillance, whether that is in the prioritization of vaccine development within DHS enterprise, or other kinds of, you know, intelligence community activities that might occur. So the threat assessment is fundamental to the activities of biodefense across the government.

The second thing that we do within the S&T Directorate that really isn't done anywhere else in the government and so is a unique mission that we have has to do with the bio forensics aspect of things. What if there should be a successful attack such as happened in 2001? We now have the National Bio forensics Laboratory at Fort Detrick that DHS S&T operates in order to attribute the attack in a way that is meaningful from a law enforcement standpoint. In other words, we have got—we have partnered with the FBI such that we maintain chain of evidence, we do those kinds of things that will eventually result in successful attribution and prosecution of folks who do that kind of thing.

Ms. BIGGERT. Thank you. Then just one other question on cybersecurity research. It seems like the bulk of the activities are operational focused and are in the national protection and programs, their Directorate. However, our Committee has consistently emphasized the importance of R&D to successfully addressing cybersecurity over the long-term. With that in mind, could you talk about the Directorate's cybersecurity R&D portfolio and if there is any new technologies like the SmartGrid that are being included in research assessments?

Mr. BUSWELL. Yes, ma'am. Our investment in cybersecurity over the last three years has essentially tripled, much to the credit of highlighting the importance by committees such as this subcommittee and then the identification within the President's own agenda. So the input function, if you look at funding that way, is going the right direction in my opinion. And we are about where we should be for the near-term. The key then becomes how do you link the priorities of that research to the overall priorities of both the Department and the Nation? And that is an area that we can improve significantly, and I am working closely with the folks over at NPPD (National Protection and Programs Directorate), Phil Reitinger who is the Deputy Under Secretary at NPPD and is really responsible for the Department's cybersecurity effort. We meet biweekly in a steering group that identifies not just the R&D priorities but what are the cybersecurity priorities for the Department and how, from a collective effort within the Department, can we best advance those priorities?

So I will tell you that there is a lot of work to be done in cybersecurity, but there is a lot of people doing work as well. So the integration of all the efforts going on, both in the public and the private sector, is fundamental to the success of cybersecurity. Dr. Depoy's panel did an excellent report for us on cybersecurity and has established a number of recommendations. I don't know if you have time to expand upon that, but we do have a number of priorities, and SmartGrid technology, for example, to the extent

that we can prevent attacks on the grid from cyberspace fundamental to the continuity of those systems which are important to the security and the stability of the country. We will invest in those, in cooperation with the Department of Energy who also has responsibility for the reliability of the electric grid.

Ms. BIGGERT. Thank you. Thank you very much. I yield back.

Chairman WU. Thank you. Mr. Tonko.

Mr. TONKO. Yes. Thank you. Thank you, Mr. Chair. Perhaps to Mr. Buswell but anyone on the panel might have some input here. I do understand that at DHS you have to some degree on a limited basis resorted to that turnaround of program managers in your S&T operation, and it seems to be a practice that is resorted to by DARPA (Defense Advanced Research Projects Agency) and NSF (National Science Foundation) quite frequently. Is there a way to stretch that concept over a greater number of programs? How would you expand that practice within DHS to perhaps utilize that rotation more frequently?

Mr. BUSWELL. Thank you. That is a great concept. The Congress in its wisdom in the *Homeland Security Act of 2002* gave S&T specifically the Homeland Security Advanced Research Projects Agency, HSARPA, the authority, same authority as that DARPA has, to hire technical experts out of the private sector or other civil service on a term basis, and that term is five years. It can be extended up to two more years under certain circumstances. We have the authorization to hire 20 such of these folks. We currently have 11. They are tied to the HSARPA portfolio primarily. It is about a $44 million a year portfolio, 11 is about the right number to manage programs in that funding area. You know, to stretch that beyond what we are doing right now, we would need to increase the innovation portfolio funding level which I would be delighted to do. But for right now, we are about at the right place I think with that. And you are right, it is a valuable tool. It gives us special hiring authority, special compensation authority so that we can get really top-quality people out of the private sector and out of other areas of government to manage these kind of programs. It is paying off very well for us.

Mr. TONKO. Any particular way to expand that program, there would be certain focus to where you would use these three- to four- to five-year assignments?

Mr. BUSWELL. The focus that I would use on is in the highly innovative kinds of research, in the things that are very high risk, higher risk than we typically address in the Capstone IPT process. But that is what the innovation portion of the portfolio is for. It addresses the high-risk prototypical demonstrations that again, because they are high risk with a significant probability of failure, customers can't rely on us to provide that solution in the time that they might need it. So the analogy that is sometimes used is the Capstone IPTs provide the three megapixel camera to the five megapixel camera to the ten megapixel camera while we are looking in the innovation portfolio at the gigapixel camera. What can we do with a gigapixel camera that we can't do with the incremental improvement that would tend to pursue lower risk in the Capstone IPT process?

So that is the area I think that those—and that is the area that we have the authorization to do that kind of hiring, and to me that makes the most sense because you want to get people in that are fresh out of the technology development arena, you know, to manage those kinds of cutting-edge programs.

Mr. TONKO. Thank you. Mr. Berteau.

Mr. BERTEAU. Yes, sir. I would like to add one additional thought to your question of opportunities for expanding what I think is a very useful potential to augment and enhance the capability of the government workforce here.

When the S&T Directorate was originally established, I think it was envisioned that it would have a more substantial and more powerful role in the acquisition side of the Department of Homeland Security than has evolved over time. I think we have an opportunity with a new Administration to reevaluate and reconsider that. When I go back to the point I made about there needs to be better planning for transition of research into programs, that is one of the areas where I think not only could the S&T Directorate play a better role across the Department but where in fact the opportunity for the term appointments and the capability that they bring both at the individual and the collective level would offer tremendous new capability for the entire homeland security enterprise.

Mr. TONKO. Anyone else? Mr. Chair, I yield back.

Chairman WU. Thank you very much, Mr. Tonko. I want to follow up on Mr. Tonko's inquiry because you know, this has become a topic of great interest to me that some federal agencies do a very good job of rotating people in and out of Washington, D.C., whether it is for a multi-week internship or for a few months or in some instances for a few years for positions as significant as being a program manager. DARPA does this, NSF does this, NIH (National Institutes of Health) does this and integrates scientists from, in the NIH instance, integrates scientists from around the country into the grant review and peer review process. And I would like the panel to comment on how useful this might be. And Mr. Buswell, I would like you to respond. You know, outside of the formal program of 20, what impediments do you see to DHS and the S&T Director implementing a broader program of linkages to academic centers, think tanks, the private sector for bringing people in and out? Because it is not just for the benefit of the S&T Directorate. I think the residual benefit for the rest of the country is an appreciation for how the agency works and indeed how Washington works in some respects. And I would like to the extent any of you are interested in commenting on this, all of you to comment on it. Mr. Buswell, would you like to start?

Mr. BUSWELL. I would love to, yes, sir. Thank you, Mr. Chairman. There are a number of other opportunities besides the—we call it the 1101s because it comes from the *Defense Authorization Act,* Section 1101. So these 11 employees that we have are affectionately termed 1101s. There are also a number of fellowship opportunities that we taken advantage of, Presidential Management Fellows, AAAS (American Association for the Advancement of Science) Fellows, those kinds of things that I think are very valuable in getting people into the understanding of the Federal Government research and development community.

Our scholars and fellows program within the Centers of Excellence is also one of the fundamental things that I think we are doing to improve that understanding and to get that rotation. We have funded over the last six years over 400 of these scholars and fellows across the country in areas of academic development that we think are fundamental to homeland security. They do internships in the summertime with the national laboratories and other federal research and development entities, and we think that that is really valuable. We don't have enough statistical information yet on the graduates to understand whether or not they are pursuing careers in the Federal Government at least to start with, but we are hopeful that it will result in, you know, a 10 to 20 percent perhaps participation of our scholars and fellows graduates in long-term federal employment.

The other area that we can utilize and we do utilize to a certain extent is the *Intergovernmental Personnel Act* authorities where we are able to bring on folks from State and local governments or from non-profit organizations that can then work—they have really all the authorities of a federal employee with certain limitations dealing with their parent organization, you know, conflict of interest limitations as you would expect. But to a large extent, they are able to gain a great understanding of the way that we work within DHS, and they can take that back to their parent organization at the end of a two-year period and utilize that to the benefit of their organization and to the benefit of our organization as well.

Chairman WU. Thank you very much, Mr. Buswell. Comments from the rest of the panel in general or specifically, whether DHS is sufficiently linked to the relevant research community. Dr. Williams.

Dr. WILLIAMS. We used the word insularity in our report, and that may have changed over the past few months. But we were concerned that the Directorate wasn't reaching out enough to the outside world and that that caused two potential problems. One is that that limits the access to the ideas and innovations that are going on on the outside for those who are working inside the Directorate. But secondly as you pointed out, it limits the ability of the community, the wider community, to learn what is going on inside the Department of Homeland Security and to start thinking about the problems that that department has.

We noticed it particularly in our discussions of the need for a peer review process. In several interviews we were told explicitly by members of the staff in the Directorate that peer review from outsiders wasn't needed because the program managers themselves were the world's experts in the area where they were reviewing projects.

Now, I doubt that they are the only world's experts, but if they are the only world's experts, it tells you that we are desperately in need as a Nation of getting their thinking, their expertise out to a wider community, so that they won't be the world's only experts in the future. And that thought built value for us into the notion of having much more external peer review.

Chairman WU. Thank you, Dr. Williams. Dr. Depoy.

Dr. DEPOY. Yes, I saw one very good example of this kind of connectivity last summer and the summer before. The chem bio

IPT annually holds a three-day meeting in which they invite a lot of people from throughout government and academia, and they review nearly all their projects each year and ask for their comments and certainly suggestions, as well as where similar projects are going on in other agencies. And it was one of the best meetings like that I have attended anywhere in the government. But I believe that is the only IPT that has done that as far as I know. But I think they have done it now for several years.

Chairman WU. So a model for emulation?

Dr. DEPOY. Yes, absolutely.

Chairman WU. Mr. Berteau.

Mr. BERTEAU. Thank you, sir. I think there is one other potential advantage to an expansion such as Mr. Tonko has offered and you have continued in the discussion here and that is the benefit back to the user community. I think one of the real challenges in homeland security S&T is that the users often do not know the art of the possible. They are trying to set a request or a requirement based on what they think they need without having really defined the problem and without knowing the art of the possible. And I think one of the downstream benefits of expanding this kind of involvement with people is the benefit upon return and going back to where they have come from. And if we build that into the process there could be some additional advantages downstream.

Chairman WU. Thank you very much. I think this will be a topic of continuing interest to the Subcommittee.

Do we have any further inquiries on this side? Mr. Tonko? I understand that you all have worked very hard on your testimony. I would like to offer you a moment to comment on any other aspects of the topics that we have been delving into that we have not covered in Q&A or in your written testimony. I want to offer you an opportunity to expand on any thoughts that you think would be helpful for this subcommittee's inquiry. Mr. Berteau.

Mr. BERTEAU. I do have one final thought for you to keep in mind as you are evaluating DHS's performance in this regard. It has been my observation from my time in Washington that much of the Federal Government tends to do its research work, and the beneficiary or the customer is outside the government. It is the general population or some subset of the general population. They may not know who they are at the time the research is done, but that is the goal of those programs.

In some agencies, the Defense Department being perhaps being the primary one here, the beneficiary of the research is actually internal. Most of the research that the Defense Department does it does for itself. It is the ultimate consumer of that research, and that tends to have a different focus, a different validation process, maybe even a different peer review process.

DHS is a hybrid of the two, and in some cases, that makes it much more complex and much more difficult for all of those elements to be welded together. And I think it is useful as you set your bar of how DHS is performing to keep that in mind, that it really is a hybrid. Much of what it does it does for itself or at least for the broader first responder community. Much of what it does it also does for the external community. And sometimes those are

two different processes and two different standards. So I would leave that just for your thought.

Chairman WU. Thank you very much, Mr. Berteau. Dr. Williams.

Dr. WILLIAMS. If I could bring up one other point. We talked about how important the internal process is once you are inside an IPT, for making sure that the priorities that are set within an IPT have something to do with the customer's needs and what the customer is asking for. But one of the astonishing things we found was that there is no transparent mechanism at all to compare priorities and reallocate the transition funds among the various IPTs. And that means the broad allocation of money across the Directorate doesn't necessarily reflect key priorities or allow for taking advantage of emerging opportunities that may happen in one area as opposed to the other. It also means that the bottom of the funded projects in one IPT may be significantly less important to DHS as a whole than something that is close to the top of the unfunded projects, again because there is no comparison and work across the IPTs for setting priorities.

Now, some of this goes back to the fact that there is no strategic plan. With no genuine strategic plan, there is no established goals that everybody agrees to, and that makes it hard to try to divide the money up any different way among the IPTs than the way it was divided last year. But it struck us that something needs to be done about that. They need an explicit mechanism within the Directorate for dividing money among the IPTs.

Chairman WU. Thank you very much, Dr. Williams, and thank you all very much for contributing to our consideration and contributing to Mr. Buswell and the Department's consideration. I think it is fair to summarize that much progress has been made since this series of hearings began. We will continue this series of hearings, and we look forward to making additional progress with the S&T Directorate and with DNDO. We do face some different challenges as Mr. Berteau pointed out that this is a hybrid organization with significant consumption within the Department but also a large customer base for its products outside the Department, and that presents some special challenges.

I want to thank all the witnesses for appearing this afternoon. The record will remain open for two weeks. I expect that there will be some submitted questions about the IPTs and consistency. And Members and the staff may seek answers to any follow-up questions that the Committee may ask.

Again, I want to thank you for your testimony and your presence here today. The witnesses are excused, and the hearing is adjourned.

[Whereupon, at 3:20 p.m., the Subcommittee was adjourned.]

Appendix:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Bradley I. Buswell, Acting Under Secretary, Science and Technology Directorate, U.S. Department of Homeland Security (DHS)

Questions submitted by Chairman David Wu

Q1. Currently the roles and responsibilities of IPT participants are not explicitly defined. What effect has this had on DHS customers and DHS S&T staff? How can DHS S&T better define these roles and communicate them to the participants?

A1. I agree with the need to formalize the Capstone IPT process roles and responsibilities. The S&T Directorate now has the experience to recommend standardized best practices based on its work with the Capstone IPT Process over the past two years. The timing is right to develop a Management Directive that formalizes the Capstone IPT alignment to DHS enterprise goals, priorities, and processes, and formalizes Capstone IPT roles and responsibilities. As with the initiation of the Capstone IPT process, we will brief all components and participants on the roles and responsibilities being formalized in the Management Directive.

Capstone IPT roles and responsibilities will also be re-enforced during Technology Oversight Group (TOG) meetings, which are chaired by the Department's Deputy Secretary, and during the semi-annual Under Secretary for Science and Technology Technology's Capstone IPT Review.

Internal to the S&T Directorate, we are developing a phase gate process. The phase gate process provides program managers with a program management roadmap for project execution. Various gates are established for project review to ensure all documents are complete and on schedule. We are also developing program manager training to further instill the process. Additionally, we hold weekly meetings with the transition managers embedded in each of the six S&T Directorate technical divisions. During these meetings, the IPT process is refined and discussed for further dissemination to the program managers in the divisions.

Question submitted by Representative Ben R. Luján

Q1. National Laboratories, such as the two Department of Energy National Labs in New Mexico, conduct a substantial amount of basic research. Can you elaborate on how the National Laboratories can stay tied into the basic research that is a part of the DHS S&T portfolio?

A1. The Department of Energy (DOE) national laboratories provide a unique, world-renowned, interdisciplinary research capability that is of tremendous value to the Nation in general and to the Department of Homeland Security Science and Technology Directorate (S&T) specifically. S&T, through both the DHS Office of National Laboratories (ONL) and S&T's technical divisions, works closely with DOE and its national laboratories to identify opportunities for DHS to harness the capabilities of the national laboratories to address the near- and long-term technological needs in homeland security research. In addition, DHS and DOE work together closely to develop and streamline processes for collaboration and placement of work at the laboratories once the work is identified, given DHS's special access to DOE's national laboratories.

The Office of National Laboratories, established by the *Homeland Security Act of 2002,* routinely leads and participates in meetings and teleconferences with representatives of DOE and its national laboratories to discuss S&T research priorities and laboratory capabilities to meet those needs. ONL also holds and participates in workshops and other events that provide opportunities for basic research leads within each S&T technical division to discuss their research portfolios with representatives of the research community, including representatives of the DOE laboratories. ONL is planning additional workshops that will focus on specific research areas of interest. The DOE labs will be important participants in those workshops, which are also intended to help form a research community for homeland security technologies and maximize opportunities for the application of capabilities, resources, and technologies, including those of DOE's national laboratories, in addressing DHS's homeland security mission.

One specific instance of collaboration of benefit to both agencies and the national laboratories is DOE's invitation to representatives of ONL and S&T's program divisions to participate in the DOE meetings relating to its review of the national laboratories' Laboratory Directed Research and Development (LDRD) activities. This collaboration provides the opportunity for DHS to leverage the outcomes of LDRD

efforts by the national laboratories and offers the laboratories opportunities to align portions of their LDRD portfolios to research and development activities that can satisfy DHS homeland security needs.

The Science and Technology Directorate also collaborates with DOE and its national laboratories in aligning the best capabilities of the laboratories to the needs of S&T's six program divisions. This alignment provides S&T program managers a high quality resource in leveraging the S&T research mission.

In its commitment to find the best technologies available to address homeland security research and development needs, the S&T publishes a brochure, Basic Research Focus Areas, which identifies gaps in homeland security technologies that, if solved, could result in scientific breakthroughs for the benefit of the Nation. The brochure is provided directly to the DOE national laboratories and is available at *http://www.dhs.gov/xlibrary/assets/st_basic_research_focus_areas_may_2009.pdf*

ANSWERS TO POST-HEARING QUESTIONS

Responses by Phil E. Depoy, Vice Chairman, Homeland Security Science and Technology Advisory Committee (HSSTAC) Assessment Panel

Questions submitted by Chairman David Wu

Q1. Currently the roles and responsibilities of IPT participants are not explicitly defined. What effect has this had on DHS customers and DHS S&T staff? How can DHS S&T better define these roles and communicate them to the participants?

A1. In response to your question about the effect of the lack of definition of roles and responsibilities of IPT participants, I mentioned in my testimony that each of the IPT working groups has developed their own processes for reviewing and prioritizing capability gaps. Each of the processes which the HSSTAC has reviewed have their own advantages and disadvantages, but I believe that it now time to review the processes developed by all the working groups, select the best practices, and document and standardize them across all IPTs. Each of the six Divisions within S&T has its own Transition Lead who works directly with the IPTs. These Leads should be responsible for communicating the standardized processes to the IPT participants and insuring that they are properly applied.

Question submitted by Representative Ben R. Luján

Q1. National Laboratories, such as the two Department of Energy National Labs in New Mexico, conduct a substantial amount of basic research. Can you elaborate on how the National Laboratories can stay tied into the basic research that is a part of the DHS S&T portfolio?

A1. In response to Vice Chairman Luján's question about the National Laboratories being tied into the S&T basic research portfolio, the National Laboratories do receive basic research projects, but I understand that they are given more specific tasking than that which is given to the University Centers of Excellence. I mentioned in my testimony that within the past year, the Directorate has taken steps to increase the interaction of the Divisions with the COEs. The Directorate has accomplished this by aligning the COEs with individual Divisions and giving the Division Directors responsibility for communicating with the Directors of the COEs on a regular basis. The Division Directors are expected to keep the COEs informed about the work of the Divisions and in particular, about capability gaps for which no existing technologies are adequate. This appears to be working reasonably well with some of the University COEs, but to my knowledge, it has not been practiced with the National Laboratories, even though they are already aligned with specific Divisions. If my understanding is correct, it would seem to be relatively straightforward to extend this practice to include the National Laboratories. Also, the FFRDCs sponsored by the S&T Directorate are responsible for identifying requirements that no available technologies can fill. Perhaps a more direct tie can be made between the National Laboratories and the FFRDCs so that this information is available to them.

ANSWERS TO POST-HEARING QUESTIONS

Responses by David J. Berteau, Senior Advisor and Director, Defense–Industrial Initiatives, Center for Strategic and International Studies, Washington, DC

Questions submitted by Chairman David Wu

Q1. Currently the roles and responsibilities of IPT participants are not explicitly defined. What effect has this had on DHS customers and DHS S&T staff? How can DHS S&T better define these roles and communicate them to the participants?

A1. The breadth of topic areas covered by the S&T IPTs dictate against a single set of roles and responsibilities across all IPTs. I believe that DHS S&T should have each IPT, as part of its participant determination process, lay out participant roles and responsibilities at that time.

Question submitted by Representative Ben R. Luján

Q1. National Laboratories, such as the two Department of Energy National Labs in New Mexico, conduct a substantial amount of basic research. Can you elaborate on how the National Laboratories can stay tied into the basic research that is a part of the DHS S&T portfolio?

A1. As I noted in both my statement and in my responses to questions during the hearing, basic research is most valuable when it targets specific capability shortfalls. I believe that the DOE labs need to tie their research proposals to those specific shortfalls. This of course requires DHS to specify those shortfalls, which in turn depends upon a better strategic planning process and abetter capabilities assessment process within DHS.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Cindy Williams, Chair, Panel on the DHS Science and Technology Directorate, National Academy of Public Administration; Shapiro Visiting Professor of International Affairs, The Elliott School of International Affairs, George Washington University; Principal Research Scientist, Security Studies Program, Massachusetts Institute of Technology

Questions submitted by Chairman David Wu

Q1. Currently the roles and responsibilities of IPT participants are not explicitly defined. What effect has this had on DHS customers and DHS S&T staff? How can DHS S&T better define these roles and communicate them to the participants?

A1. The roles and responsibilities of IPT participants are not explicitly defined. As a result, they vary substantially from one IPT to another. In some instances, the customers believe that their role should be to dictate the solution, instead of working with S&T to clarify their needs and letting S&T identify appropriate solutions. In other cases, S&T is overly involved in prioritizing the capability gaps for the customer. This lack of a clear, shared understanding of the roles and responsibilities of the various participants causes confusion among customers and frustration among the DHS S&T staff. It also means that some IPTs work far better than others.

Because the work of the IPTs is a shared responsibility between DHS S&T and its customers, DHS S&T cannot define the IPT roles and responsibilities on its own. The National Academy of Public Administration (NAPA) Panel that I chaired found that some components took their work with S&T more seriously than others, and that the success of the IPTs correlated with the commitment of the customers to the IPT process. Defining roles and responsibilities jointly with the component customers could improve the components' levels of commitment to the process and the projects undertaken, thus strengthening the IPT process and improving S&T outcomes. The NAPA Panel recommended that the S&T Directorate work with its stakeholders to develop an IPT charter that delineates roles and responsibilities of participants, and establishes common terminology and standard operating procedures.

At a minimum, I personally believe that such a charter should include descriptions of the roles and responsibilities of S&T staff and customer participants in identifying and prioritizing capability gaps, identifying potential solutions and estimating their costs, selecting solutions to pursue, developing transition plans for those solutions, developing schedules, milestones, and metrics for evaluating projects undertaken, evaluating and reporting on projects, and deciding when projects should be terminated.

Question submitted by Representative Ben R. Luján

Q1. National Laboratories, such as the two Department of Energy National Labs in New Mexico, conduct a substantial amount of basic research. Can you elaborate on how the National Laboratories can stay tied into the basic research that is apart of the DHS S&T portfolio?

A1. In FY 2009, 26 percent of DHS S&T's basic research was conducted by the Department of Energy (DOE) National Laboratories. (DOE's National Laboratories also play a significant, but separate role in the work of DHS's Domestic Nuclear Detection Office (DNDO)). The *Homeland Security Act of 2002* authorizes DHS to draw on the expertise of all government laboratories, and particularly on DOE's National Laboratories, to achieve its mission.

The NAPA Panel that I chaired found that whenever possible, funds for basic research should be awarded through competitive processes that include external scientific peer review. Evaluating the impact of basic research is not possible over the short-term, so ensuring quality in design and execution of the work is critical. Additionally, competition for funding is a major factor in expanding the pool of researchers interested in working in certain areas—in this case homeland security—and consequently, expanding the Nation's capacity for that research.

The extent to which competition is used in S&T's award of projects to the National Laboratories is unclear. Division research leads and others in the S&T Directorate told NAPA staff that funding is often directed to a specific laboratory without competition. On the other hand, they indicated that at times the National Laboratories do compete for S&T funding.

The NAPA Panel found a climate of insularity in the DHS S&T community. Such insularity can hamper the identification of fresh approaches and stifle innovation. The Panel found that the practice of designating a specific laboratory to carry out work may reduce competition, thereby fostering that insularity. The Panel recommended that the Directorate make competitive processes that include external scientific peer review the norm for basic research. Such processes will help to increase S&T's confidence and that of its clients that the extent and nature of its basic research is thoroughly vetted and that the research being conducted—whether in one of the National Laboratories or elsewhere—is of the highest standards of excellence.

The National Laboratories have recognized expertise, and partnering with the Laboratories can help DHS capitalize on the Laboratories' substantial funding from other sources. In 2008, the Directorate began to align the National Laboratories with its six technical divisions, based on matches between the mission requirements of the divisions and the technical capabilities of the various Laboratories. The intent is for individual technical divisions in S&T to learn more about what the individual Laboratories have to offer and for the Laboratories to learn more about the technical divisions' needs, to inform future project development and performer selection. The NAPA Panel that I chaired found that such alignments have the potential to support more productive relationships, increase S&T's success in leveraging National Laboratory work related to homeland security, and increase efficiency. We also found, however, that such alignments, along with the practice of designating an individual laboratory to do work, may further reduce competition and foster insularity. I personally expect that this tension between the expedience of exclusive ties with individual laboratories and the benefits of greater openness and competition will persist into the future.