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NUCLEAR TERRORISM: STRENGTHENING OUR DOMESTIC DEFENSES

HEARINGS

BEFORE THE

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

PART I AND PART II

JUNE 30 AND SEPTEMBER 15, 2010

Available via the World Wide Web: http://www.fdsys.gov

Printed for the use of the Committee on Homeland Security and Governmental Affairs

U.S. GOVERNMENT PRINTING OFFICE

58–397 PDF WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

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NUCLEAR TERRORISM: STRENGTHENING OUR DOMESTIC DEFENSES—PART I

WEDNESDAY, JUNE 30, 2010

U.S. SENATE,
COMMITTEE ON HOMELAND SECURITY AND
GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 10:04 a.m., in room SD–342, Dirksen Senate Office Building, Hon. Joseph I. Lieberman, Chairman of the Committee, presiding.

Present: Senators Lieberman and Collins.

OPENING STATEMENT OF CHAIRMAN LIEBERMAN

Chairman LIEBERMAN. Good morning and welcome. This is the eighth in a series of hearings our Committee has held since 2007 to discuss how our Nation is confronting the real and dire threats posed by nuclear terrorism. And I must say that today it seems to me, as I look back and look at where we are now, that the threat of a nuclear terrorist attack on the United States is growing faster than our ability to prevent a nuclear terrorist attack on our homeland, and obviously as the Homeland Security Committee this is of great and growing concern to us.

I know that most people would prefer not to think about the unthinkable, but President Barack Obama, to his credit, has clearly recognized the threat that brings us together this morning. At the 47-nation nuclear summit held in April, the President outlined the dangers here quite clearly:

"Nuclear materials that could be sold . . . and fashioned into a nuclear weapon exist in dozens of nations. Just the smallest amount of plutonium—about the size of an apple—could kill and injure hundreds of thousands of innocent people.

"Terrorist networks such as al-Qaeda have tried to acquire the material for a nuclear weapon, and if they ever succeeded, they would surely use it." These are all continuing quotes from the President.

"Were they to do so, it would be a catastrophe for the world—causing extraordinary loss of life, and striking a major blow to global peace and stability.

"In short it is increasingly clear that the danger of nuclear terrorism is one of the greatest threats to global security—to our collective security."

Then, a month or so later, the National Security Strategy, released by the Administration added: "The American people face no greater or more urgent danger than a terrorist attack with a nu-

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clear weapon. . . . Black markets trade in nuclear secrets and materials. Terrorists are determined to buy, build, or steal a nuclear weapon."

The International Atomic Energy Agency's Illicit Trafficking Database, which tracks all reported cases of smuggling, theft, unexplained losses, or black market sales of nuclear materials, reports there have been 1,340 confirmed incidents of smuggling since 2007 that involve materials that could at least be used to make a so-called dirty bomb. And of those cases, 18 involved the smuggling of highly enriched uranium or plutonium—the material that is critical to the making of an actual atomic weapon.

In 2008, our Committee held hearings to examine the office created in our government to counter this threat—the little-known Domestic Nuclear Detection Office (DNDO), within the Department of Homeland Security (DHS).

At that time, the question was: How do we keep DNDO on track?

Today, I ask seriously whether DNDO has been on the right track and moving rapidly enough to achieve its critical mission.

Though most Americans have never heard of DNDO, its mission is clearly vital to our homeland security in the world in which we live in today.

President George W. Bush established the DNDO in 2005 to coordinate and oversee Federal efforts to protect the United States against nuclear terrorism. Homeland Security Presidential Directive 14 designated DNDO as the lead organization for domestic nuclear detection and charged it to work with the Departments of Defense, Energy, and State, and others to develop a Global Nuclear Detection Architecture (GNDA).

Though it has never been defined in statute, the GNDA seems to consist of programs across numerous agencies designed to stop terrorists from getting nuclear materials or weapons, and if they do get them, to stop them from bringing them into the United States, and if they do bring them into the United States, to stop them from successfully detonating them.

DNDO was given the critical job of coming up with an overall plan about how the different departments would work together to implement that plan and then to recommend what kind of investments in technology would be needed.

This was a big mission that they were given, and in fairness I should say that there have been some successes. For instance, DHS has deployed nearly two-thirds of the more than 2,100 radiation portal monitors identified in its deployment plan at established ports of entry on the Northern and Southern Borders.

Today nearly 100 percent of the seaport containerized cargo and 100 percent of vehicle traffic on the Southern and Northern Borders are scanned for nuclear material.

But there also have been omissions and failures, and they are serious. Cargo coming by rail from Canada or Mexico is still not scanned, only a small percentage of international air cargo is scanned, and DNDO apparently has no plans to scan commercial aviation aircraft or baggage.

Five years into its existence, based on its record, it is just inescapable to conclude that DNDO requires real retooling, and quickly.

It has made too little progress on its major mission, which is the development of the Global Nuclear Detection Architecture. Even DNDO seems to have concluded that its approach to this task is fundamentally flawed and now seeks an increase of $13 million in next year's budget for a new round of studies to produce yet another overarching strategic plan over the next several years.

The time for multi-year studies is over; the time for urgent action really is now.

We are going to hear today that DNDO has spent hundreds of millions of dollars trying to develop a new radiation detection technology that the Government Accountability Office (GAO) concludes is only marginally better than we have now.

Known as the Advanced Spectroscopic Portal (ASP), this program has clearly drained resources from other programs, including development and deployment of mobile, portable, or hand-held technologies that could screen other types of inbound cargo or bulk shipments, like those on international trains and commercial aviation.

I know that the Administration is reexamining DNDO. We hoped that DHS would come and testify today; they said that they were not ready. We have set down a hearing for July 21 to hear their response to what we are going to hear from this distinguished group of independent evaluators of DNDO, and I will say that it is certainly my expectation that what we need to hear from DNDO, from the Department of Homeland Security, is exactly what they intend to do with and to DNDO to make sure it gets its critical mission right, and quickly.

Senator Collins.

OPENING STATEMENT OF SENATOR COLLINS

Senator COLLINS. Thank you, Mr. Chairman.

Safeguarding our Nation against the threat of nuclear terrorism is one of the most important responsibilities of the Department of Homeland Security. The Weapons of Mass Destruction (WMD) Commission, in its 2008 report, predicted that "it is more likely than not that a weapon of mass destruction will be used in a terrorist attack somewhere in the world by the end of 2013."

Technological innovation is a critical element in our efforts to prevent nuclear terrorism. It is, therefore, troubling that the Department's efforts to develop a next-generation technology for scanning cargo for nuclear materials at ports of entry have been less than successful. As the Chairman has pointed out, the Advanced Spectroscopic Portal (ASP) program has repeatedly encountered problems since its inception in 2004.

As a result, the ASP has been relegated to being a potential secondary scanning tool, although that technology has yet to receive certification from DHS for even this limited function.

Given the unwavering ambitions of America's enemies, our Nation cannot afford to repeat the mistakes of the past.

The DHS office currently responsible for making decisions about the development, testing, evaluation, and acquisition of detection equipment is the Domestic Nuclear Detection Office, as the Chairman pointed out in his remarks. DNDO must make well-informed and threat-based investment decisions to meet the challenge of

interdicting illicit nuclear material not only at our Nation's borders but also within our country.

Given our Nation's significant investment in this critical area, it is disappointing that DNDO has not made more progress. DNDO must also serve as a responsible steward of taxpayer dollars. Again, the Department has fallen short in this area as well. As we navigate the road forward, the Department must have a clearer strategy for developing the next-generation of scanning technologies to detect and identify shielded and unshielded nuclear materials.

The three organizations represented at our hearing today, the Government Accountability Office, the Congressional Research Service (CRS), and the National Research Council, have all produced recent reports that have found significant problems with the ASP program. They can give us valuable insights into the challenges the Department confronts, and that Congress must consider, as we move beyond the ASP program.

It is surely significant that the Department is not represented here today. They are not represented because they are not prepared to give us that strategy forward and to respond to these reports. So the second hearing that the Chairman has announced for next month is also going to be extremely important.

Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thank you very much, Senator Collins.

We will go right to the witnesses with thanks for the considerable work you did in preparing your reports and your testimony, all of which will be entered by consent in the record in addition to the testimony you will deliver.

Our first witness is Gene Aloise, Director of the Natural Resources and Environment Division at the U.S. Government Accountability Office. Thanks, Mr. Aloise, and please proceed with your testimony.

TESTIMONY OF EUGENE E. ALOISE,[1] DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. ALOISE. Thank you, Mr. Chairman. Thank you, Ranking Member Collins.

Mr. Chairman and Members of the Committee, I am pleased to be here today to discuss the progress DHS has made in deploying radiation detection equipment to scan cargo and conveyances entering the United States by land, sea, and air for nuclear and radiological materials and the development of a strategic plan for the Global Nuclear Detection System. My testimony is based on our numerous issued reports as well as current work assessing U.S. Government efforts to deploy radiation detection at home and abroad.

On the positive side, and as you have just mentioned, Mr. Chairman, DHS has made progress and reports that it scans nearly 100 percent of the cargo and conveyances entering the United States through land borders and major seaports. On the down side, however, DHS has made little progress in scanning for radiation on rail

[1] The prepared statement of Mr. Aloise appears in the Appendix on page 43.

cars entering the United States from Canada and Mexico, international air cargo, and international commercial aircraft, passengers, and baggage.

Nationwide, about 1,400 radiation detection portal monitors have been deployed. That is about two-thirds of the 2,100 monitors planned for deployment, and another 700 monitors are needed.

Scanning for nuclear materials in international rail and air cargo are presenting DHS with unique challenges. For example, the length of trains presents a huge scanning problem because trains can be up to 2 miles long, and separating cars that trigger an alarm from other train cars for a closer look is very difficult.

Air cargo is a problem because, among other things, there is a lack of natural choke points in airports where fixed detection equipment can be deployed, and until solutions can be found, DHS goal of scanning 99 percent of air cargo at 33 international airports in the United States by 2014 is on hold. The only scanning for radiation that is now occurring for international rail and air cargo is being done with hand-held detectors, not portal monitors.

In addition, DHS efforts to plug the gaps in the nuclear detection system is just at the early stages of development. Current gaps include land borders between U.S. ports of entry, international general aviation, and small maritime craft such as recreational boats and fishing vessels.

It is important to close these gaps because dangerous quantities of nuclear materials can be portable enough to be carried across borders by vehicles or pedestrians and on most private aircraft or small boats. Closing the gaps is a major challenge because the United States has over 6,000 miles of land borders with many locations outside of established ports of entry where people and vehicles can enter. Also, according to the Coast Guard, small boats pose a greater threat for nuclear smuggling than shipping containers because, among other things, there are at least 13 million pleasure craft and 110,000 fishing vessels in the United States.

DHS is addressing these gaps by, among other things, developing, testing, and deploying radiation detection equipment and developing threat studies, but these efforts are all in the very early stages.

Regarding DHS strategic plan for the Global Nuclear Detection System, it has been 2 years since we testified before this Committee and recommended such a plan, but no such plan yet exists. DHS officials told us they are working on a plan and hope to complete it by this fall.

The lack of a strategic plan has limited DHS efforts to complete the Global Nuclear Detection System. Without a plan, it has been difficult for DHS to address the gaps in the system. Also, DNDO's failed 4-year effort to develop the next-generation portal monitor, the ASP, is a consequence of not reaching consensus on a strategic plan with other Federal agencies. We believe the proposed deployments of ASP has distracted DNDO from finishing the nuclear detection system and closing the gaps in it.

In short, Mr. Chairman, because it had no plan to follow, DNDO took its eye off the ball. Instead, DNDO focused on replacing current equipment with questionably performing ASPs in areas where a detection system was already in place.

At this moment DHS is at a crossroads. Because of the vast land borders, coastlines, and airspace to protect, addressing the gaps in the detection system is in many ways more challenging than preventing nuclear smuggling through fixed ports of entry. Now that the ports of entry are more secure, it makes the gaps in the system more attractive to would-be smugglers or terrorists.

With increasingly limited Federal resources, it is especially important for DHS to develop a strategic plan which prioritizes how it will address the gaps in the detection system and allocate resources accordingly.

Given the national security implications and urgency attached to combat and nuclear smuggling globally and that multiple Federal agencies are involved, we continue to stress that a plan needs to be developed as soon as possible.

Mr. Chairman, that concludes my remarks, and I would be happy to address any questions you and the Ranking Member may have.

Chairman LIEBERMAN. Thanks very much, Mr. Aloise. That was right to the point.

Our next witness is Dr. Micah Lowenthal, Director, Nuclear Security and Nuclear Facility Safety Program of the Nuclear and Radiation Studies Board at the National Research Council of the National Academies. That is a heck of a title. But we appreciate very much your expertise and your testimony this morning.

TESTIMONY OF MICAH D. LOWENTHAL, PH.D.,[1] DIRECTOR, NUCLEAR SECURITY AND NUCLEAR FACILITY SAFETY PROGRAM, NUCLEAR AND RADIATION STUDIES BOARD, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES

Mr. LOWENTHAL. I look forward to having a shorter title someday.

Good morning, Chairman Lieberman, Ranking Member Collins, and Members of the Committee. My name is Micah Lowenthal. As noted, I am on the staff of the Nuclear and Radiation Studies Board of the National Academies of Sciences. I am here to testify on a congressionally mandated study on testing and evaluation of ASPs for screening cargo as part of the Global Nuclear Detection Architecture. I am the study director supporting the Committee that wrote the study's interim report.

I will begin by providing background on the request for this study, and then I will describe the report's recommendations on evaluating costs and benefits.

Congress directed the Secretary of Homeland Security to request advice from the Academy on procuring ASPs, specifically on the testing approach, assessing the costs and benefits, and bringing scientific rigor to the procurement process.

Due to delays in the test and evaluation program, the Academy and DHS agreed that the study committee would issue an interim report to provide advice on how the Domestic Nuclear Detection Office (DNDO), could complete and make more rigorous its ASP evaluation. The interim report was issued in June 2009 and provided advice on the difficult task of analyzing costs and benefits of the ASPs.

[1] The prepared statement of Mr. Lowenthal appears in the Appendix on page 58.

To be effective, the Committee found, the cost/benefit analysis must include three key elements: One, a clear statement of the objectives of the screening program, including describing the ASP's role in the Global Nuclear Detection Architecture; two, an assessment of meaningful alternatives to deploying ASPs; and, three, a comprehensive, credible, and transparent analysis of benefits and costs.

Throughout the study, the Committee considered what information the Secretary would need to decide whether to procure ASPs. The Committee criticized DHS certification criteria and analyses as of June 2009 because even if the criteria were met and the analyses completed, DHS still would not know whether the benefits of the ASPs outweigh their additional costs, or whether the funds slated for procuring ASPs are more effectively spent on other technologies to meet the same need or on other elements of the Global Nuclear Detection Architecture.

The analyses focused on operational efficiencies but not on the security benefits, and the alternatives for cargo screening and the opportunity costs in the Global Nuclear Detention Architecture were not part of the analysis.

It is a complex task to evaluate the probability of an adversary attempting to smuggle nuclear material into the United States. In fact, that probability is impossible to know definitively. And the consequences of such smuggling are likewise uncertain for other reasons: The range of possible consequences is very broad. These uncertainties make it quite difficult to factor the benefits of preventing nuclear smuggling into a cost/benefit analysis. Despite that difficulty, however, it is important for analysts to understand what they can about the risks and also the benefits of reducing those risks.

The Committee offered several approaches for analyzing security benefits of different alternatives. A capability-based planning approach is a structured assessment of the options for how a program can meet specific operational goals and of the resources required for each option. This approach has been applied in a number of defense applications. It can provide a rich comparison of the security benefits emphasizing the circumstances under which each option might be preferred. Capability-based planning can, however, quickly lead to a large and complex analysis, and analysts have to balance the complexity against the need for simplicity to draw salient insights about the system's capabilities.

Game theory could provide insight into the deterrence or deflection benefits from different parts of the Global Nuclear Detention Architecture. Studies of other security applications have found that the simple presence of security can change criminals' behavior. For example, looking at theft statistics using game theory, Ian Ayres and Steven Levitt found that increases in the use of hidden radio transmitter devices for tracking stolen cars in a given area resulted in overall declines in car thefts. In contrast, use of observable car security measures just tended to shift or deflect the risk of theft to other vehicles, but not lower the overall theft rates. So having an effective defense in some cars, and no way for an adversary to determine which cars have it, reduced theft rates.

Likewise, the existence of some radiation monitoring at seaports and land border crossings may deflect adversaries, simply causing them to focus on easier paths through the Nation's security. Efforts to improve current screening technology have sometimes been described as fortifying the locks on the front door but leaving the windows open. For those reasons, improving detection for truck-borne cargo may have only a modest overall benefit as long as there are significant gaps in the Global Nuclear Detention Architecture. Improved detection should have more of an effect as those gaps are filled.

The difficulty with game theory is that analysts have to make assumptions about the adversaries' goals, resources, and reasoning. What constitutes success and what are the costs of being caught? But still, it can provide useful insights, including reasoning through what fraction of the containers entering the United States would need to be scanned or screened to deter smugglers.

Finally, cost-effectiveness analysis and break-even analysis are related approaches that have been used to assess costs and benefits when performing a complete cost/benefit analysis is difficult or impossible.

Because the goals of the ASP program may be difficult to value monetarily, comparing program alternatives using cost-effectiveness measures such as dollars per life saved or dollars per attack avoided could provide insights into their relative merits. Break-even analysis seeks the conditions that must be met for benefits to exceed costs. In security applications, these conditions could be a required reduction in overall risk. In cases where break-even analysis identifies meaningful bounds on decisions, that is, in cases where the threshold conditions for a decision clearly exist, this approach can simplify decisionmaking. The downfall of break-even analysis is that those conditions do not always exist.

These and other methods for evaluating security benefits can provide different insights based on their approach, and none is likely to provide fully quantitative and definitive results. But most policy decisions are made without fully quantitative and definitive results, so DNDO should provide the most informative cost/benefit analysis it can.

This concludes my testimony. Thank you for the opportunity to testify, and I would be happy to elaborate in the question-and-answer period.

Chairman LIEBERMAN. Thank you very much, Dr. Lowenthal.

Now we will go finally to Dr. Dana Shea, who is a Specialist in Science and Technology Policy in the Resources, Science, and Industry Division at the Congressional Research Service. Thank you very much for being here.

TESTIMONY OF DANA A. SHEA, PH.D.,[1] SPECIALIST IN SCIENCE AND TECHNOLOGY POLICY, RESOURCES, SCIENCE, AND INDUSTRY DIVISION, CONGRESSIONAL RESEARCH SERVICE, LIBRARY OF CONGRESS

Mr. SHEA. Thank you. Chairman Lieberman, Ranking Member Collins, and other Members of the Committee, thank you for the

[1] The prepared statement of Mr. Shea appears in the Appendix on page 68.

opportunity to testify before the Committee today. My name is Dana Shea, and I am a Specialist in Science and Technology Policy at the Congressional Research Service. At the Committee's request, I am here today to discuss efforts to strengthen nuclear detection.

My testimony today will address the Department of Homeland Security's Domestic Nuclear Detection Office, its coordination of nuclear detection activities, and the January 2010 report to Congress that describes them.

Homeland Security Presidential Directive 14 established the Domestic Nuclear Detection Office in 2005. The Security and Accountability For Every (SAFE) Port Act codified the office in 2006. The Domestic Nuclear Detection Office became responsible for developing an enhanced Global Nuclear Detection Architecture that multiple Federal agencies, including the Departments of Defense, Energy, Homeland Security, Justice, and State, would implement.

The Domestic Nuclear Detection Office developed an initial Global Nuclear Detection Architecture and reported its first budget cross-cut of Federal programs in 2006. Subsequently, Congress enacted the Implementing Recommendations of the 9/11 Commission Act of 2007, which directs the Secretaries of Homeland Security, State, Defense, and Energy, the Attorney General, and the Director of National Intelligence to conduct a joint annual interagency review of their activities and ensure that each agency assesses and evaluates its participation in the Global Nuclear Detection Architecture.

Additionally, the Secretary of Homeland Security is required to evaluate technologies implemented in the domestic portion of the architecture. The results of these reviews are to be reported to Congress by March 31 of each year. The Domestic Nuclear Detection Office issued reports in June 2008 and January 2010.

The January 2010 report has both strengths and weaknesses. The report is the most comprehensive and integrated source of information about the programs that make up the Global Nuclear Detection Architecture, the activities underway in those programs, and how the Domestic Nuclear Detection Office categorizes the budgets of the programs by architectural layer. The report discusses agency attempts at strategic planning and developing metrics for the Global Nuclear Detection Architecture.

The January 2010 report draws heavily on the previous report issued in 2008. The report does not address whether agencies have shaped the reported budgets to align with the priorities of the Global Nuclear Detection Architecture. And, finally, the report is retrospective in nature and was submitted after its statutory deadline. As such, the report's timeliness may be brought into question.

My analysis of this report and other documents raises a number of policy issues. I will highlight three.

First, a key question for policymakers is: What activities and programs should comprise a nuclear detection architecture? While detection technologies for identifying and interdicting smuggled nuclear materials have been a central focus of the architecture, other counterterrorism activities, such as law enforcement and intelligence collection, also impact nuclear smuggling.

Similarly, while the Departments of Defense, Energy, Homeland Security, and State are the main participants in the Global Nuclear

Detection Architecture, other entities, such as State and local law enforcement and agencies overseeing licensing of radiological materials, also have roles. Greater assessment and inclusion of these investments might lead to increased harmonization of nuclear detection efforts and, thus, a stronger domestic architecture, but might also complicate consensus planning activities.

A second policy issue is the adaptability of the architecture. How adaptable is it to new threats and capabilities? Periodic assessment of new nuclear detection technologies will likely play an important role in the government's ability to improve the architecture. The frequency and formality of such assessments will affect both the utility and the costs associated with this process. It is noteworthy that the January 2010 report repeated the language of the previous report's technology assessment.

Finally, a fundamental issue for policymakers is whether Federal investments appropriately support the needs of the Global Nuclear Detection Architecture. The architecture is a network of interrelated programs, and the ramifications of shifting funding between these programs may be understood best from a holistic architectural perspective. A single Global Nuclear Detection Architecture budget submitted annually as a budget supplement might provide policymakers with a more transparent correlation between agency funding and the Global Nuclear Detection Architecture. Alternatively, rather than directly increasing or decreasing program funding, policymakers might empower the Domestic Nuclear Detection Office Director or another official with the authority to review and assess other Department and agency investments in the Global Nuclear Detection Architecture and comment on or recommend alternative allocations.

Detection of nuclear smuggling and prevention of nuclear terrorism are high national and homeland security priorities. This multi-agency endeavor is complex and relies heavily on coordination among the participating agencies. The Department of Homeland Security and the Domestic Nuclear Detection Office face significant challenges in coordinating these activities.

Mr. Chairman, that concludes my prepared statement. I would be happy to answer any questions that you or other Members of the Committee may have.

Chairman LIEBERMAN. Thanks very much, Dr. Shea. We will go ahead with a 7-minute round of questions.

I must say overall the reports that the three of you have given I think represent a real alarm bell going off about DNDO, and we all acknowledge that it has done some things that are important to us, particularly with portals, both sea and the established land ports. But it has not done a lot that it should have done, and I want to explore a bit why.

Mr. Aloise, I was struck again by your testimony that the development of a strategic plan had been recommended almost 3 years ago, and DNDO now says in its congressional budget justification for fiscal year 2011 that it expects to complete the strategic plan during fiscal year 2010.

To the best of your knowledge—and then I will ask others if you have opinions—what happened here? Why didn't it do the strategic plan more quickly?

Mr. ALOISE. I am really not quite sure what the true answer is on that, but as I mentioned in my statement, almost 4 years ago now, they took their eye off the ball of what they were supposed to do, and that is, complete the architecture with existing equipment. And, of course, upgrading the equipment is something you always want to do, but the urgency of the situation we are facing now requires that this detection system be completed first with what we have now, and DNDO followed the path of pushing through the ASPs. It was an research and development (R&D) program, too early to be deployed, and we issued numerous reports and testified numerous times before the Congress and this Committee, warning them that they were falling into a trap, and they fell into that trap.

Chairman LIEBERMAN. Well, that is really important because you have said in that answer, I think, what is a critical problem here, which is that it is not just that we asked them to do a plan and were upset that they did not do the plan. What I take from your testimony is that there is an absence of a plan and clearly established priorities, particularly the priority to develop an overall architecture—which I take to mean how do you cover in some way all the points of vulnerability that we are trying to cover. Am I right about that?

Mr. ALOISE. You are correct, Mr. Chairman.

Chairman LIEBERMAN. And so they did not do that, and the absence of a plan certainly facilitated what it sounds to me like what you would say was the most significant mistake that DNDO has made, which was to focus on spending a lot of money improving their capacity to detect nuclear material coming in at ports of entry—where they already had some coverage—instead of covering areas such as you mentioned in your statement: International rail transportation, international cargo, passengers, and baggage. Right?

Mr. ALOISE. That is correct, sir.

Chairman LIEBERMAN. Now, I want to ask Dr. Lowenthal and Dr. Shea to respond to that, if you agree with what Mr. Aloise has said.

Mr. LOWENTHAL. Well, our study committee really was looking at the testing and evaluation of the ASPs, and not the rest of the Global Nuclear Detection Architecture.

Chairman LIEBERMAN. Right.

Mr. LOWENTHAL. The reason that the committee said something about the Global Nuclear Detection Architecture was because there was some ambiguity about the mission of the ASPs and the objectives that they were trying to accomplish with these devices. And the committee could not find an articulation of that in the context of the Global Nuclear Detection Architecture. And so, yes, the committee said that the justification has to be there somewhere. The committee said we would like to see it probably in the context of a cost/benefit analysis for the Global Nuclear Detection Architecture, some trade-off studies, which would help set priorities, as you have described. But because it did not exist there, the committee recommended that they do it in the context of the ASP cost/benefit analysis.

Chairman LIEBERMAN. Dr. Shea.

Mr. SHEA. To the question about the strategic plan, I would point out that the Global Nuclear Detection Architecture is implemented by many different agencies.

Chairman LIEBERMAN. Right.

Mr. SHEA. In DNDO's coordination role, I think that they are challenged to both consider the strategic purposes of those different programs in those different agencies and the goals of those programs and also have those programs align with the goals of the architecture. With the development of a strategic plan solely by DNDO it might be difficult for the agencies to fully adopt the purposes of that strategic plan, but also the development of a strategic plan by an interagency process is often a challenging activity. So that may be the source of some of the difficulties with respect to——

Chairman LIEBERMAN. So is part of this organizational? In other words, does DNDO not have adequate authority to coordinate across the various departments, even though the Homeland Security Presidential Directive 14 designated DNDO as the lead organization and charged it to work with the Departments of Defense, Energy, State, and others? Has it not been up to the task? And should this be raised up either to the departmental level or given to some centralized entity such as the White House or the Office of Management and Budget (OMB)?

Mr. SHEA. That certainly would be one approach to increase the ability of agencies to come together in an interagency process. I think that DNDO, of course, would be in the best position to answer whether or not it believes it has sufficient authority. But I would say also that the SAFE Port Act and Homeland Security Presidential Directive 14 do provide authority to the implementing agencies to establish policies in the areas that they are implementing their programs. So even though the Domestic Nuclear Detection Office does have the responsibility of developing the overarching architecture, those implementing agencies also have their own independent policy authorities in the areas where they are implementing programs.

Another approach might be to provide some authority to the implementing agencies to develop parts of the architecture in conjunction with DNDO, for example, and then give DNDO the responsibility of integrating the different architectural frameworks into one more coherent and integrated architecture.

Chairman LIEBERMAN. Mr. Aloise, let me come back to you just to set the predicate here. I am right, is it not so, that the Homeland Security Presidential Directive 14 made clear that DNDO had this authority to work with other agencies for the specific purpose of developing the Global Nuclear Detection Architecture?

Mr. ALOISE. Yes, that is correct. GAO has been in this area a long time. We had reported in the 1990s that each of the agencies had their own programs—Department of Defense, Department of Energy, and the State Department—and a major problem was coordination. And DNDO had the role of coordinating all those activities, not managing each of them, but coordinating so everybody is headed towards the same goal.

When we started our work on ASPs, what we found was a major management problem. DNDO was not even talking to these agen-

cies. They were not telling them what they were planning to do with the ASP. It was GAO going in there telling them what was going on, and it was not a pretty scene.

Chairman LIEBERMAN. Your answer to the question really puts on the record what we forget, which is that this attempt to set up an architecture to prevent a terrorist nuclear attack on the United States did not just begin on September 11, 2001.

Mr. ALOISE. No, it did not.

Chairman LIEBERMAN. There was a lot of background here before.

Mr. ALOISE. Right. The Department of Energy has been securing nuclear material for years, and even the second line of defense program, putting in portal monitors on other countries' borders, and our efforts here in the United States began in the late 1990s.

Chairman LIEBERMAN. Just a last question for you. Do you think DNDO can do this job based on its record? Or do we need to kick it upstairs somehow and give it to OMB or the White House? I hate to do that reflexively. We give too much to the White House, really. So I want to invite your reaction to the organizational structure here.

Mr. ALOISE. I think our view is DNDO ought to use the powers it has been given to coordinate effectively the creation of this plan. And what that means is they have to get the buy-in of the other Federal agencies, and then it is a consensus plan. You have your goal. You can move forward. And we need to move forward. So we think it can be done.

Chairman LIEBERMAN. Yes. Well, obviously, this is a critical matter of homeland security, and you hate to see either bureaucratic turf protection or just bureaucratic inertia standing in the way of getting this job done.

Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

Mr. Aloise, I want to go back to the issue of the strategic plan because, like the Chairman, I think that is a really critical issue that you have brought to the Committee. I want to go back to the timeline because I actually think that the failure of DHS in this area is even more acute than the Chairman put forth.

It was 2 years ago that GAO last recommended that DNDO complete a strategic plan, but it actually was more than 7 years ago, in October 2002, that GAO first established the need for a strategic plan. Is that correct?

Mr. ALOISE. That is correct, Senator, yes, and we were recommending that Customs and Border Protection (CBP), or at that time the Customs Service, develop that plan.

Senator COLLINS. So if the Department issues the strategic plan for Global Nuclear Detection Architecture this fall, it will actually be about 8 years since GAO first made that recommendation.

Mr. ALOISE. That is correct.

Senator COLLINS. That is so troubling to me given what is at stake, and I know that it is to the Chairman as well. I am wondering if this is a case where the Department became so entranced with upgrading the technology of the radiation portal monitors that, as you put it, it dropped the ball; and instead of focusing on

the gaps in the system, it just became entranced by the technology. Is that a fair assessment based on your analysis?

Mr. ALOISE. I think it is, Senator. I think there was this promise from the ASPs—which, by the way, is not new technology. What was new was the software.

Senator COLLINS. Correct.

Mr. ALOISE. And there was a lot of marketing going around that this was the silver bullet. But we had looked at that technology and we had looked at the promise it offered, and even our earliest review back in 2006 said this will only be a marginal improvement, so, CBP, DNDO, and DHS need to do a cost/benefit analysis to see if it is going to be worth that marginal improvement, because if you are spending money on ASPs, you are taking money away from somewhere else.

Senator COLLINS. And, Mr. Lowenthal, when you looked at the ASPs, did you look at how much money was spent by the Department on this technology? And as GAO has pointed out, it was actually a software upgrade. Did you look at the amount of money spent?

Mr. LOWENTHAL. We were focused on the cost of the devices going forward, their life cycle costs and whatever benefits they might offer. We did not look at the historical investments within the ASP program and how they might have been spent otherwise because the committee was chartered to look at the testing and evaluation rather than whether DNDO is carrying out its larger mission properly.

Senator COLLINS. Correct me if I am wrong, Mr. Aloise, but I think the Department spent in the neighborhood of $2 billion on the ASP technology. Do you know if that is correct?

Mr. ALOISE. Well, that was what was planned to be spent.

Senator COLLINS. Planned to be spent.

Mr. ALOISE. Yes. They have spent so far—not counting testing—$224 million. We have actually asked for more updated information. We wanted it for this hearing, but they did not provide it to us yet. Hopefully they will have it for the next hearing.

Senator COLLINS. I guess what is so troubling to me is here the Department was prepared to invest $2 billion in one kind of technology when, in fact, it had never worked out a plan for railroads or for other means of smuggling nuclear materials into the country; and then when the technology did not prove to be as effective as hoped, there is this diversion of attention, money, energy, to just one kind of technology. And I think you put it so well that then what happened is the Department took its eye off the ball and, thus, we are faced with the situation that we have now.

Dr. Shea, you raised a really good point, that there are a number of other departments that play a role—Energy, State, Defense, as well as Homeland Security. Isn't that the reason that having a strategic plan becomes even more important? How, otherwise, do you know the investments that are going to be made by other departments?

Mr. SHEA. Yes, I agree. The agencies themselves have their programmatic priorities and invest in those programs trying to meet the programs' goals. But absent a strategic plan that lays out what the architecture's goals are and how to measure success towards

those goals, it could be very difficult for an agency to be investing with that purpose in mind, they would not have that information to bring into their budgeting process. So I think that a strategic plan that lays out the strategic goals of the architecture and provides metrics within that strategic plan for the agencies to align their program goals with is key for getting all of the agencies to work together in the same direction.

Senator COLLINS. And it also ensures that resources are going to be allocated appropriately.

Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thanks, Senator Collins.

I have a couple more questions. Let me go back to you, Mr. Aloise. At the outset, you talked about the difficulty of dealing with some of the areas of the Global Nuclear Detection Architecture that DNDO has not dealt with. You mentioned, for instance, the length of freight trains coming in from Canada, let us say. Do you have any doubt that this is an achievable task that we are giving DNDO? In other words, it may be difficult, but am I correct that you believe it is doable if they had concentrated on establishing essentially at least baseline defenses all across our country as opposed to focusing on the portals?

Mr. ALOISE. Actually, we do believe it is doable. We are not going to say it is easy, but we have gone around the country and looked at train depots, and we have seen where people have set up train portal monitors at certain choke points. It is not going to work everywhere, but there are certainly ways, if given the resources and analysis, you could do it.

So, yes, we do believe it can be done. In fact, when DNDO made the push for ASPs and their proposal was to spend $2 billion, they said they could do trains. Now they say they cannot, and they have to develop a new technology. We are not sure a new technology is needed, but it may be. There may be emerging technologies out there that would help.

Chairman LIEBERMAN. They said at that point that the ASPs could deal with the international rail cargo as well.

Mr. ALOISE. Yes, the ASPs were to cover almost all forms of entry into the United States.

Chairman LIEBERMAN. And now they conclude that they cannot.

Mr. ALOISE. Right.

Chairman LIEBERMAN. Give us an overall view on the public record here about whether there is any work going on within DNDO now in these areas of the architecture that they have at least underattended to.

Mr. ALOISE. There are studies going on. There are discussions going on. There is very little that actually has been done. In the green borders between ports of entry, they are starting to talk about using law enforcement more, which makes sense. They are not going to seal the borders, but they are going to have a presence at the borders.

Chairman LIEBERMAN. And when they say law enforcement, what do they mean?

Mr. ALOISE. Well, have a presence at the borders with customs officials.

Chairman LIEBERMAN. Customs and Border Protection.

Mr. ALOISE. Right, which sort of mirrors what the State police do in hunting down speeders on your highways. You do not know where they are, but you know they are out there, and you could be caught if you speed. So it is a deterrent. And we actually think that has merit, and they are looking at that.

Chairman LIEBERMAN. Years ago, when I acquired a burglar alarm system for my house, at the end of the installation the man doing it gave me the stickers for the windows and the doors and said, "Ninety-five percent of what you are paying for are these stickers." And he was an honest man. So I get your point.

I want to get to the question about whether there ought to be some consolidation across governmental departments of budgets and authority with regard to nuclear detection and ask each of you if you have a thought on that. I know we have said that DNDO has the authority under the Presidential Directive. Is there some value to the Committee, even by legislation, considering centralizing more of that budget authority for this function as a way to basically compel the various departments to work together?

Mr. ALOISE. I guess I will go first.

Chairman LIEBERMAN. Please.

Mr. ALOISE. I think our position is—and I know I sound like a broken record here—we would like to see a plan first on how we are going to complete this architecture. And by looking at the plan, where our resources will be devoted, what our goal is, and how fast we are going to get there, then I think we could see if anything else is needed beyond that to get this job done. But until we know what the job is, I am not sure what fixes we could put in place.

Chairman LIEBERMAN. Good enough. Dr. Lowenthal, do you have an opinion on that

Mr. LOWENTHAL. Yes, the report did not address this, so I will just say a few words.

First of all, the academy does not tell the Federal Government how it should reorganize itself unless sopecifically asked. It highlights problems and maybe some options for how to do it.

Chairman LIEBERMAN. You are really different than the rest of America in that regard. [Laughter.]

Mr. LOWENTHAL. But I think that what Mr. Aloise said is very consistent with what the Committee said in its report, which is that you need to establish what the priorities are in order to make trade-off decisions. And without a plan, it is hard to do that.

Chairman LIEBERMAN. Dr. Shea.

Mr. SHEA. As I believe all the witnesses have said, there are many agencies that are participating in the Global Nuclear Detection Architecture, and some of the programs of those agencies, they are not solely dedicated to nuclear detection. Bringing all of the budgets together into a single authority might pose challenges, especially for the programs that have a shared responsibility between nuclear detection and some other role.

That said, the current budgetary cross-cut for the Global Nuclear Detection Architecture is retrospective in nature. It appears in the Joint Annual Interagency Review report, and as a consequence, for planning purposes, it is not presented to Congress at a time that would allow it to influence, for example, budgetary decisions that were being made by Members of Congress and congressional com-

mittees. If the request from the President's budget was cast in such terms as is used in the Joint Annual Interagency Review, then perhaps that would provide some transparency for congressional policymakers in how the funding at the various agencies is feeding into the Global Nuclear Detection Architecture.

Chairman LIEBERMAN. Based on what you know about the development of the ASP at this point, would you recommend that DNDO just stop any further work on the ASP and really focus on the development of the parts of the nuclear detection architecture that are undeveloped, the ones we have been talking about all along, the areas essentially outside of the official portals of entry?

Mr. ALOISE. I think it would be our view that, yes, even if you deploy the ASP, it is going to be of marginal value. And what we need to do is close the gaps in the architecture first.

Chairman LIEBERMAN. Dr. Lowenthal, do you have an opinion on that?

Mr. LOWENTHAL. No, and I will just tell you what the academy is doing at this point.

Chairman LIEBERMAN. Go ahead.

Mr. LOWENTHAL. DNDO has been trying to respond to the recommendations in our report from last year, and so our study committee has been reconvened to evaluate their progress on that. We are not going to come out in the end with any kind of conclusion as to whether the ASPs should be terminated, continued, or expanded.

Chairman LIEBERMAN. Dr. Shea.

Mr. SHEA. I think that the cost/benefit analysis that the Department is currently performing with respect to the ASP program will likely inform the office as to whether or not this investment is a good investment for them to continue or not. One of the recommendations out of the Nuclear Regulatory Commission (NRC) interim report was that such a cost/benefit analysis be done in the greater context of the architecture, and I think that the results of such an analysis would inform that question as to whether or not continued investment in the ASP would be beneficial.

Chairman LIEBERMAN. But at this point, you are not prepared to reach a conclusion yourself?

Mr. SHEA. I do not think that I have the information.

Chairman LIEBERMAN. Understood. Thanks. Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

The Chairman has raised an important issue about whether government is organized correctly to have sufficient coordination, and he raised the issue of whether there needs to be a position within the White House or OMB. In fact, there already is a position. It was created in 2007, and it is within the Executive Office of the President, and it is the Coordinator for the Prevention of Weapons of Mass Destruction, Proliferation, and Terrorism.

The reason no one remembers this position is neither the Bush Administration nor the Obama Administration has ever filled this position, which is a presidentially nominated, Senate-confirmed position. So I do not think the problem is the need for the creation of a new position. I think the problem is that this position has not been filled. And that is an editorial comment rather than a question for our witnesses.

Chairman LIEBERMAN. I just want to join you in that op-ed. [Laughter.]

Senator COLLINS. Thank you, Mr. Chairman.

I just have one final question, and it is for our GAO witness. The GAO today is releasing a report that assesses DHS management of its complex acquisitions. It finds that in almost half of the DHS programs reviewed, there were no baseline requirements for the program until more than 2 years after the program began. Obviously, it is very difficult to have a successful acquisition if you start the acquisition before you establish the requirements.

Aren't we seeing some similar things when we look at DNDO's acquisitions in the ASP program and, in general, its failure to produce a plan before acquiring the equipment and technology?

Mr. ALOISE. Yes, Senator, it is very similar. The ASP program had no mission needs statement, had no cost/benefit analysis, had no life cycle cost analysis, and still does not have a plan. It was not until 2007 when the appropriations act said the testing should meet a significant increase in operational effectiveness before certification, and it was not until August 2008 that there were even any criteria established for that language. So, yes, it is eerily similar.

Senator COLLINS. It is, and I appreciate your confirming that because this is a problem that seems to permeate several agencies within DHS acquisitions, and it causes schedule delays and cost overruns and the procurement of the wrong kind of technology. We saw it with the puffer detectors that the Transportation Security Administraiton (TSA) used at airports that turned out not to work. And straightening out that fundamental planning process to me is absolutely critical, and I think, unfortunately, the ASP program and the failures at DNDO are regrettably additional examples of that. And when it comes to DHS, the consequences for the security of our Nation are enormous. So we have to get this right.

Mr. LOWENTHAL. Senator, can I add something?

Senator COLLINS. Yes.

Mr. LOWENTHAL. I think the academy report endorsed what Mr. Aloise was saying and what you have said about articulating what the needs are before you procure. The academy report also said something more about how they should do this, how they should proceed with deployment if they determine that they have promise there. And it is not that they should make a single decision that then means that they put these everywhere, that they should instead deploy them in a limited number of places, and see how they perform. These are complex pieces of equipment, and the software is complex as well. And so this should be an incremental deployment with some iterative performance enhancements as they go rather than just one big purchase.

Senator COLLINS. I agree. Dr. Shea, do you have anything to add to this?

Mr. SHEA. I do not have anything to add.

Senator COLLINS. Thank you very much, and I want to thank the Chairman for holding this hearing.

Chairman LIEBERMAN. Thank you, Senator Collins, for your partnership in this. Thanks to the witnesses. I know that in many ways you spend a lot of time and quite hard work, but I really want to

thank you because that work today has helped inform the Committee, and you have really, from my point of view, focused some tough questions. Some might say this has been an indictment of past behavior but certainly a critique of past behavior by DNDO and the Federal Government generally on this critical question of homeland security. But more to the point now, going forward, you have focused some questions for the Department of Homeland Security to answer, and, again, we are going to make clear to them—I hope somebody is here from the Department; if not, we are going to ask them to read the testimony—that they must be prepared to come in here on July 21 and answer the questions that your work and testimony and the Committee have posed. And hopefully those answers will then lead to corrective action so we will not have to be back here a year from now with all or some of you telling us that they still have not plugged the gaps that we need to have plugged. So I thank you.

Do you want to add anything, Senator Collins?

Senator COLLINS. I do not. Thank you.

Chairman LIEBERMAN. The record of the hearing will remain open for 15 days for submission of additional statements or questions. Again, I thank you very much.

The hearing is adjourned.

[Whereupon, at 11:08 a.m., the Committee was adjourned.]

NUCLEAR TERRORISM: STRENGTHENING OUR DOMESTIC DEFENSES—PART II

WEDNESDAY, SEPTEMBER 15, 2010

U.S. SENATE,
COMMITTEE ON HOMELAND SECURITY AND
GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 10:07 a.m., in room SD–342, Dirksen Senate Office Building, Hon. Joseph I. Lieberman, Chairman of the Committee, presiding.

Present: Senators Lieberman, Akaka, and Collins.

OPENING STATEMENT OF CHAIRMAN LIEBERMAN

Chairman LIEBERMAN. Good morning. The hearing will come to order.

This is the second part of the Committee's investigation of efforts by the Department of the Homeland Security (DHS) to strengthen our Nation's defenses against the threat of nuclear terrorism. I want to welcome Deputy Secretary of Homeland Security Jane Holl Lute, who will be our primary witness today, as well as the new Director of the Department's Domestic Nuclear Detection Office, Warren Stern, and representatives from other DHS agencies that have important roles to play in preventing a nuclear terrorist attack.

The first thing to say is that this threat is real. In fact, the National Security Strategy released by the Administration in May contained the following stark warning, "The American people face no greater or more urgent danger than a terrorist attack with a nuclear weapon. Black markets trade in nuclear secrets and materials. Terrorists are determined to buy, build, or steal a nuclear weapon."

At Part I of this hearing on June 30, witnesses from the Government Accountability Office (GAO), the Congressional Research Service (CRS), and the National Academies of Sciences testified that one of the key offices assigned to protect us from this threat, which is the Domestic Nuclear Detection Office (DNDO), is woefully behind in its planning and implementation efforts, despite $2 billion in funding since it was created in 2005 as an office within the Department of Homeland Security. And since our last hearing, DNDO has provided further financial information to GAO that shows another $2 billion was spent department-wide by Homeland Security in support of the Domestic Nuclear Detection Office's mission.

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And what has that $4 billion bought over 5 years? In part, that money has gone to expanding existing programs at Customs and Border Protection (CBP), the Coast Guard, the Transportation Security Administration (TSA), and other DHS agencies that are critical to our defenses against nuclear terrorism. But, unfortunately, there is too much evidence that very little progress has been made with the funds that have been targeted to enhancing our current nuclear detection capabilities.

Most importantly, the overall nuclear terror defense plan DNDO has been working on since it was created now 5 years ago, the Global Nuclear Detection Architecture, is still not completed. And, in fact, last year, DNDO officials concluded that the plan they were developing was too dependent on unproven technologies and did not take into consideration the contributions that law enforcement and intelligence agencies could make with their existing assets.

I appreciate that designing a global system of systems and coordinating the activities of agencies and other departments that are part of that system is a big challenge. But the threat is enormous here, and the size of the challenge, therefore, cannot explain away the failure of DNDO to develop a strategic plan for strengthening parts of the domestic layer of the architecture operated within the Department of Homeland Security and help guide the nuclear detection investments by its fellow DHS agencies. So that will be a focus, the primary focus of this hearing.

In our previous hearing, we also heard that DNDO has spent hundreds of millions of dollars trying to develop new radiation detection technology known as the Advanced Spectroscopic Portal (ASP), that the GAO concluded is only marginally better than what we have now. GAO has also provided the Committee details about the failure of a second large DNDO technology investment known as the Cargo Advanced Automated Radiography System (CAARS). According to GAO, the Nuclear Detection Office awarded contracts for the CAARS systems without ever determining if the system could be used in domestic ports of entry or whether it would meet the requirements of the Customs and Border Protection agency, which is on the front lines of protecting our borders.

GAO estimates that DNDO has spent approximately $400 million combined on the ASP and CAARS programs with little or nothing to show for it. GAO also contends that had DHS completed its strategic plan before making these investments, it might well have considered the security benefits of other mobile or portable detection systems.

Last year, GAO strongly recommended that DHS "develop a strategic plan for the domestic part of the Global Nuclear Detection Strategy to guide the domestic nuclear detection investments of DHS agencies."

This is sound advice, but it apparently has not been followed by DHS or DNDO in making expensive decisions about the investments that they are making here at home. So this morning we really need to hear a direct response from DHS to these criticisms, and we need to know what corrective actions are being taken now.

Because our Committee wants to make sure that in carrying out our oversight responsibilities we do not cause the revelation of any information that could be exploited by our enemies, the hearing

will adjourn at the appropriate time, to be resumed in closed session in the Senate Security offices.

Finally, I would say that the problems that are facing the Domestic Nuclear Detection Office and the Department of Homeland Security in our efforts generally to design and implement the Global Nuclear Detection Architecture are not new, and they have been well documented. We held hearings on this topic during the previous Administration, but now this Administration is in charge and must step up to the plate and close this gap in our defenses against nuclear terrorism.

Senator Collins.

OPENING STATEMENT OF SENATOR COLLINS

Senator COLLINS. Thank you, Mr. Chairman. Thank you for holding this second hearing on the efforts of the Department of Homeland Security to prevent nuclear terrorism against our country.

At our first hearing, we examined the Department's inexplicable failure to complete a much needed strategy to address this growing threat. As the Chairman has pointed out, we know that time is not on our side. The 2008 report by the Commission on the Prevention of Weapons of Mass Destruction predicted that it is more likely than not that a weapon of mass destruction (WMD) will be used in a terrorist attack somewhere in the world by the end of 2013. There is no more alarming prospect than that of a nuclear September 11, 2001.

After all, a nuclear bomb is the ultimate terrorist weapon, causing an unimaginable amount of death, suffering, and horror—precisely the kind of frightening and inhumane outcome that terrorists seek.

Terrorists have made clear their desire to secure a nuclear weapon. Given this stark reality, we must ask: What has the Department done to defend against nuclear terrorism on American soil? The answer, unfortunately, is: Not enough . . . not nearly enough.

Today the Department still lacks a strategic plan for the Global Nuclear Detection Architecture, a necessity first identified by the Government Accountability Office nearly 8 years ago. We cannot wait another 8 years or even another 8 months. The Department must complete this plan now.

As the Chairman has indicated, the office charged with this effort at DHS, the office known as DNDO, has seemed more intent in the past on investing in new technology than on the nuts and bolts planning that should guide these acquisitions. The office, for example, has spent approximately $282 million over nearly 5 years on the Advanced Spectroscopic Portal Program, with the goal of developing the next-generation primary cargo scanning technology to detect unshielded nuclear and radiological materials. But in February 2010, DNDO announced that the ASP was no longer being pursued as a possible primary scanning technology and now was only being looked at as a possible secondary scanning technology. Unfortunately, the GAO has determined that the technology is only slightly better than the existing monitors.

GAO's statement for the record today highlights problems with another scanning technology mentioned by the Chairman that would X-ray the contents of cargo containers. GAO found that

DNDO failed to adequately communicate with Customs and Border Protection about such basic issues as how large the equipment could be to still fit within the port of entry inspection lanes. I must say this is so frustrating. One of the reasons that we worked so hard to bring all of the agencies together under the umbrella of the Department of Homeland Security was to enhance communication and to ensure that the right hand knows what the left is doing. So to have this so basic a communications lapse is really discouraging and inexcusable.

After more than 2 years of work, DNDO has decided to cancel the acquisition of this technology and focus on more research and development. DHS must be a responsible steward of taxpayer dollars. Time and money have been wasted as DNDO has focused almost completely on marginal improvements in technology, rather than on identifying gaps in coverage and then determining the appropriate technology to eliminate those gaps. And as the Chairman indicates, this problem started in the previous Administration, but it is discouraging to not see more progress in this Administration which is now in charge.

Moreover, troubling gaps continue to exist that could be exploited by terrorists seeking to smuggle illicit nuclear materials into the United States. We know that terrorists are constantly probing and testing our vulnerabilities.

Now, to be sure, the Department deserves credit for deploying more than 1,400 radiation portal monitors, allowing nearly 100 percent of cargo entering our seaports and nearly 100 percent of vehicle traffic on the southern and northern borders to be scanned for unshielded nuclear material, and that is significant. But cargo coming into this country by rail from Canada or Mexico is still not scanned, and only a small percentage of international air cargo is scanned. Effective scanning technology for these shipments would form an important part of a layered, risk-based defense to nuclear terrorism.

Let me go back, however, to what I see as the essential issue, and that is the lack of a strong strategic plan to establish priorities, identify gaps, and to give our tactics cohesion. Without that, we are going to continue to see slow progress in an effective defense against terrorists' nuclear ambitions. This strategy should also include a comprehensive cost/benefit analysis that accounts for currently available and potential future technologies as well as the personnel, intelligence, and infrastructure needed to combat this threat.

In addition, to improve the coordination across government, President Obama must appoint a coordinator for the prevention of weapons of mass destruction, proliferation, and terrorism as required by the 2007 Homeland Security Act written by the Chairman and myself. This coordinator would help promote the interagency collaboration needed to develop and implement an effective strategy.

Inadequate planning causes schedule delays, cost overruns, and the procurement of the wrong kinds of technology at great cost to the taxpayer. And when we are talking about preventing nuclear terrorism, those failures can lead to catastrophic consequences for our Nation.

Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thanks, Senator Collins.

Deputy Secretary Lute, thank you for being here. You are in the hot seat, I suppose, this morning because you can sense or hear the frustration that the Committee has with how this responsibility has been advanced over these two Administrations, and that frustration has been deepened, of course, by the independent reports, including GAO's. So I am very anxious to hear your response to those critiques and where you are going to lead the effort now.

TESTIMONY OF HON. JANE HOLL LUTE,[1] DEPUTY SECRETARY, U.S. DEPARTMENT OF HOMELAND SECURITY

Ms. LUTE. Well, thank you very much, Mr. Chairman, and good morning. Good morning, Senator Collins.

Members of the Committee, it is my pleasure actually to be here before you today to discuss efforts by the Department of Homeland Security to increase our security and reduce the risk, as you both have pointed out, of nuclear terrorism.

Countering threats from terrorism is the Department's primary mission, and preventing nuclear terrorism has been and remains among our top-most priorities. The Department's first Quadrennial Homeland Security Review, which we released this year, reaffirms this critical mission. DHS cannot meet this challenge alone. Other Federal departments and agencies are and must be engaged in this effort, as must State and local law enforcement agencies, governments, and other responsible parties around the world, as well as international organizations such as the International Atomic Energy Agency (IAEA).

Since the establishment of DNDO in 2005, this Committee has engaged with the Department on the full range of issues associated with preventing terrorists' use of nuclear weapons, and we respect and appreciate that engagement and understand the frustrations that have been expressed this morning. My remarks today will focus on the core tasks we believe are inherent in effective detection and interdiction, namely, anticipating the threat and preventing hostile use.

This is a tough set of issues, as this Committee knows. We believe we now have a better understanding of the challenges that are posed by the limitations of technology, by operational constraints, and by issues related to the scale of the challenge of interdicting and detecting illicit nuclear trafficking across or within our borders. And we must do more, as you have noted, to synchronize and integrate the efforts of all actors to fill gaps and minimize vulnerabilities.

Noting these challenges, however, should not detract from progress that we have made in extending the coverage of our domestic nuclear detection capabilities and increasing the capacities of technologies and processes that are at the heart of that coverage. I will address this progress but also the challenges in greater detail when we have an opportunity to meet in closed session. I do want to note that we have seen a major expansion, as Senator Collins has noted, of monitors at our Nation's ports of entry and at other

[1] The prepared statement of Ms. Lute appears in the Appendix on page 82.

locations, detectors along our land and maritime borders, and there have been sizable increases in the development, testing, and evaluation of new detection systems. We have increased the training of qualified detection officials and been continuing to work on the development of new materials for potential future use.

As you have noted, I am pleased to acknowledge that DNDO has a newly appointed Director, Warren Stern, whose expertise and experience is valuable and will be directed and put to great aggressive, vigorous use, as the leadership of DNDO. And I know that the Committee is keenly interested in discussing DNDO's programs further with him.

One of DNDO's core mandates is to develop the strategic framework for a Global Nuclear Detection Architecture (GNDA), which is a risk-informed, multilayered network designed to detect illicit radiological and nuclear materials or weapons and is, therefore, a key part of our overall effort to prevent nuclear terrorism. I acknowledge the Committee has been expecting this for some time. I acknowledge, understand, and, in fact, share the frustration that this has not yet been presented. That work is progressing, and we expect the strategic plan to be completed by the end of the year, as I have already testified before this Committee.

I know the Committee is also keenly interested in DNDO's Advanced Spectroscopic Portal monitoring program. Again, I will reserve more detailed comments for our closed session regarding ASP.

This program has taken longer than anticipated, and while its likely deployment in secondary screening differs from the original plan, we believe it will offer a significant contribution to our nuclear detection capabilities.

Moreover, many of the problematic aspects of ASP have stemmed from our immaturity in developing and managing large acquisition programs, and I believe that we have built on the progress achieved by the leaders who preceded us at DHS and on the work that has been ongoing to establish a much more rigorous process for establishing requirements at the outset, knowing what we need as an operational Department, and ensuring that those requirements are validated through rigorous operational testing. This was not the case when ASP was started in 2005.

The Department has also recently established a Nuclear Terrorism Working Group staffed by the heads of key components in the Department. I chair it. We meet weekly. The working group examines the Department's role and activities, the components' roles and activities, and coordinates those activities with DNDO and also with our Science and Technology Directorate, headed up by Under Secretary Tara O'Toole, who is also with us today. And we want to understand and develop our plan for meeting the operational challenges on the ground.

DHS is now 7 years old, but as I have said to this Committee before, it is not 1 year old for the seventh time. A lot of progress has been made in those 7 years thanks in large part to the aggressive, continued focus of this Committee and the dialogue between us.

The Department has matured. Our understanding of the threat has matured, and we have developed and tested several tech-

nologies and explored operational requirements to devise solutions for the gaps that arise.

For decades, the United States has led the world in efforts to control nuclear weapons and materials and more recently to counter the threat of nuclear terrorism. As the President announced in his Prague speech of April 2009, the United States intends to pursue a new international effort to secure all vulnerable nuclear material around the world within 4 years. Smuggling of nuclear materials has occurred, only in small quantities that we know of thus far, and it remains a grave concern. Controlling it is a very high priority.

While the ultimate aim of the United States is to make nuclear terrorism near to impossible, our immediate goal is to make it a prohibitively difficult undertaking for any adversary.

But the responsibility to increase security and reduce the overall risk of nuclear terrorism is not owned by any one office, department, or even government. It must be a collective effort.

Thank you again for this opportunity to come and speak with you today about the Department's nuclear terrorism prevention efforts. Mr. Chairman, I have submitted my full testimony for the record, and I look forward to your questions.

Chairman LIEBERMAN. Thanks, Deputy Secretary Lute. We will go ahead with 7-minute rounds of questions.

I must tell you—and I will go back again over your prepared testimony, which I looked at yesterday—that I am somewhat disappointed because a number of the questions that the Committee specifically posed to you in our invitation to testify today have not been dealt with, nor have there been specific responses to the GAO, CRS, or Academy of Sciences' critiques. Now, maybe some of those you are going to give us in the closed session, but we have a lot of work to do. And, again, I come back from this statement that the GAO prepared a statement for the record today. Have you had a chance to see that?

Ms. LUTE. No, Senator, I have not.

Chairman LIEBERMAN. Well, I want to ask you to take a look at it and then respond in writing. In one case, they added a new—I will call it an accusation, that the Department has been misleading Congress with regard to the CAARS program. That is a serious question, and I think it is very important that you respond to it as soon as you can.

They also say in the statement filed for the record of this hearing, and I quote again, "To date, DHS has spent $4 billion on various aspects of the Nuclear Detection Architecture, but has not developed a strategic plan to guide its efforts to develop and implement this architecture, as we recommended in 2008."

And I know you expressed your own frustration with that. We are now more than a year and a half into this Administration. What is holding up that strategic plan? Why hasn't it been done earlier, either by the previous Administration or this one?

Ms. LUTE. Mr. Chairman, there are probably a number of reasons that account. They may sound like excuses. It is not my inclination to offer excuses. We now have a non-acting, head of DNDO.

Chairman LIEBERMAN. Right.

Ms. LUTE. We have established an interagency group at the Assistant Secretary level to guide and complete the implementation of the GNDA Strategic Plan. And we now have that strategic plan in draft form. So what I can tell you is that, notwithstanding the lack of progress made to date, we expect to deliver that plan before the end of this calendar year.

Chairman LIEBERMAN. Well, the sooner the better, obviously. I wonder if you are in a position to indicate to the Committee in generality what the content of the plan will be. In other words, will there be sufficient detail to enable DHS and the Federal Government to accomplish what it set out to do 5 years ago?

Ms. LUTE. This is going to be a strategic plan, Mr. Chairman, and as such, it will outline the vision, the goals, the objectives, and the performance metrics. It will necessarily be followed by an implementation plan which will look specifically at the existing architecture that we have in the domestic environment, look more specifically at those gaps, and identify concrete pathways with respect to procedures, acquisition, training techniques, and other elements necessary to put that plan to full effect.

Chairman LIEBERMAN. In the final version of your prepared statement for this morning, which we saw later yesterday afternoon, it looked to me like you were saying that DHS wanted to deemphasize the domestic part of the Domestic Nuclear Detection Office's role and to emphasize the global aspects of the role. Did I read that correctly?

Ms. LUTE. That may be due to the inadequacy of my drafting, Mr. Chairman. By no means.

Chairman LIEBERMAN. That is not your intention?

Ms. LUTE. By no means. There are, points of activity on both fronts, both domestically and abroad, but the focus of the domestic office begins domestically.

Chairman LIEBERMAN. Has to be domestic, of course. I appreciate that and am reassured to hear that.

As I understand it, since 2005, DNDO has spent, as I said, about $400 million researching, developing, and testing the CAARS machines and ASPs. You have had a chance now to look over this, I presume, and I want to know what your conclusions are about why DNDO put such a large investment into these devices. Maybe, to the best of your ability before you answer, you should give us a brief lay person's description of CAARS and ASPs.

Ms. LUTE. So I will speak to this to a certain degree, Mr. Chairman. I am not an expert.

Chairman LIEBERMAN. Yes. If you want to call somebody else up for the technical detail.

Ms. LUTE. But we can also discuss some of this in the closed hearing, with your indulgence.

Chairman LIEBERMAN. Right.

Ms. LUTE. I thank you for that invitation, so if I need to use a lifeline, I will.

Chairman LIEBERMAN. OK.

Ms. LUTE. But ASP essentially is the next generation of detection technology to be used at our ports of entry to screen cargo. Why did we want it? We wanted it because we bring in between 20 and 25 million containers of cargo annually, and we need to be able to

screen that cargo or scan that cargo. And we also need to be able to keep commerce moving. We pursued ASP as a fast means to detect reliably dangerous materials and fill gaps that we had.

Chairman LIEBERMAN. That was presumably better than the current system? That was the goal.

Ms. LUTE. That was the goal. We have learned some things. We were perhaps too aggressive in trying to field unproven technology. We have also known very fundamentally that good programs have to be supported by good process, and good process helps in turn generate good programs. We now have a solid acquisition system in the Department, a management directive that covers it, and that takes these large, complex requirements to which we are trying to match novel technologies, and walks us through the discipline of oversight and engagement at every step of the way.

The test results of ASP, if we want to go into detail, Mr. Chairman, with your permission, we will wait until the closed session. But we did want it there fast in order to reduce false positives and improve our capability both for detection and for throughput.

Chairman LIEBERMAN. How about the CAARS program?

Ms. LUTE. So this was a Cargo Advanced Automated Radiography System and, again, part of a multilayered defense that we have, and we are not pursuing it. Beyond that, Mr. Chairman, I would like to go into closed session.

Chairman LIEBERMAN. Do you draw any general lessons from these two investments about what should happen going forward? I mean, obviously, they had good intentions, but they both sound like they represented a considerable waste of money.

Ms. LUTE. Yes, Mr. Chairman, I think there are some lessons learned. Hope is not a method. We need to rely on the accuracy of our understanding of the operations of this Department. This is an operational Department. Technology must work in the field. It must solve the problems that we have in the field. We know this intuitively. You know it if you are an operator. And now we have built our ability to test equipment before it is fielded with field testing into our acquisition system.

We know that, again, good programs have to be supported by good processes, and the process itself does begin with a deep understanding of exactly what our requirements are from an operator's point of view. In both of these cases, as Senator Collins has pointed out, it is unacceptable that our research and development arm would not talk to our operating arms.

Chairman LIEBERMAN. I agree.

Ms. LUTE. It is unacceptable.

Chairman LIEBERMAN. So, presumably, that is one thing that is not going to happen again.

Ms. LUTE. No, not if I can help it.

Chairman LIEBERMAN. Yes. And the Department maintains the goal of improving the current monitoring equipment that we have?

Ms. LUTE. We do.

Chairman LIEBERMAN. Am I right that the Department has over the last 5 years, and more, increased the number of monitors at ports of entry?

Ms. LUTE. We have.

Chairman LIEBERMAN. Significantly.

Ms. LUTE. We have, and we are prepared to share greater detail in closed session.

Chairman LIEBERMAN. My time is up, but I want to indicate to you that in the GAO statement for the record today that I referred to, the charge of misleading was specifically with regard to the CAARS program, and I will quote from it. "The description of the progress of the CAARS program used to support funding requests in DNDO's budget justifications was misleading because it did not reflect the actual status of the program. For example, the fiscal years 2010 and 2011 DHS budget justifications both cited that an ongoing CAARS testing campaign would lead to a cost/benefit analysis. However, DNDO officials told GAO that when they canceled the acquisition part of the program in 2007, they also decided not to conduct any associated cost/benefit analysis."[1]

So that is a troubling statement. Part of that—it sounds like it happened on your watch with regard to the budget, so I hope you will take a quick look at that and respond.

Ms. LUTE. Mr. Chairman, I apologize. Just before walking in, I did see that statement. I did not realize it was presented for the record of this hearing. I will certainly revert back to the Committee with a written answer.[2]

Chairman LIEBERMAN. OK, because it is a serious charge, obviously.

Ms. LUTE. Absolutely.

Chairman LIEBERMAN. In terms of our trust from both branches of government. Thank you.

Senator Collins.

Senator COLLINS. Mr. Chairman, I am going to pick up exactly on that point with Deputy Secretary Lute because it is extremely troubling to read what GAO has written about the Department's annual budget justifications.

There is no dispute between GAO and the Department that DNDO made the decision in December 2007 to end its acquisition and deployment plans for the CAARS program. Yet the Department's last three budget justifications to Congress have cited the development and deployment of the CAARS technology as being feasible. And, indeed, when GAO looked at the budget justifications for fiscal year 2010 and fiscal year 2011, the Department cited an ongoing testing campaign that would lead to a cost/benefit analysis for the CAARS program.

It is inconceivable to me that the Department is still putting plans and money into its budget justifications for a program that it had decided to abandon in December 2007. So how could that happen? If DNDO ended its acquisition and deployment plans for the CAARS program, for the cargo screening program and as a result had decided not to proceed with a cost/benefit analysis, why were they included in the DHS budget documents that were submitted to Congress?

Ms. LUTE. Senator, CAARS was transitioned in 2007, it is my understanding, into a research and development (R&D) program. I

[1] The prepared statement from GAO appears in the Appendix on page 99.
[2] The response from DHS appears in the Appendix on page 111.

only quickly glanced at the statement of GAO this morning. We will certainly provide a detailed response to this line of inquiry.

Senator COLLINS. But that is not what the budget justification says. The budget is still citing the development and deployment of the CAARS technology, and this is long after DHS decided to cancel the acquisition plans.

We have to be able to take at face value the information the Department presents to us; otherwise, how can we proceed to evaluate the budget justifications?

Ms. LUTE. I absolutely agree with that basic point, Senator. Absolutely. And, again, I will provide a detailed response to you in writing.

Senator COLLINS. I just want to emphasize that I share the Chairman's view that this is extremely troubling because this speaks to the credibility of the budget requests. At a time when we are scrutinizing the budget, squeezing every dollar, if we cannot rely on the credibility of the information provided by the Department for a program that, nearly 3 years ago was abandoned, that is very serious. So I think we need an answer to this question.

I hope, Mr. Chairman, you will put a time frame on it, that within the next week we get an answer to this question.

Chairman LIEBERMAN. Why don't we just agree that we would like to hear back from you by a week from today on that question.

Ms. LUTE. Yes, absolutely. I would just like to say, Senator, that there can be no question—and let me leave no doubt in your mind—the Department seeks and works to achieve a standard of highest fidelity and integrity in our interactions with Congress and our interactions with the American people. I do not accept at this point the characterization by GAO that we were misleading Congress, but I will provide a written answer in detail within the time frame we just agreed.

Senator COLLINS. The second issue related to CAARS that I want to pursue further with you is the inexplicable lack of communication between DNDO and the client agency that actually was going to use the technology. And GAO's report says it very well in a headline: "DNDO planned for the acquisition and deployment of CAARS without fully understanding that it could not feasibly operate in a U.S. port environment." That is just extraordinary. It said that when the officials from CBP and DNDO finally met, CBP officials said that they made clear to DNDO that they did not want the CAARS machines because they would not fit in primary inspection lanes and would slow down the flow of commerce through these lanes and cause significant delays.

That is an extraordinary statement. That those basic requirements were not identified before a single dollar was spent is something that I just cannot understand. And it clearly led to the waste of millions of dollars. How is it that acquisition officials in DNDO could be proceeding with a technology that did not meet the needs of the end-user agency in a very fundamental way? It is not we need to tweak this a little bit or we will need additional training for our personnel. This is saying the technology will not fit in the primary inspection lanes and would lead to significant delays. How much more fundamental a specification is there than whether or not it would fit? How can this have happened?

Ms. LUTE. Senator, if it in fact happened, it is inexcusable. You are absolutely right. And even in your description of it, I find myself getting equally frustrated and annoyed. There is no excuse in an operating department for the acquisition of material that does not meet basic operational purposes like does it fit. There is no excuse.

I would just offer, in addition to responding to the specific question that you have asked on the transition of CAARS into an R&D program, that we give you a full accounting of how CAARS has unfolded to address these concerns.

What I can tell you, Senator, is that we have fixed that problem. We have established an acquisition system that fully integrates the needs of the operators with the acquisition system itself. We have introduced points along that system for active engagement and oversight. We have introduced an operational testing phase as well—and that is a field testing phase—to prevent these things from happening.

Senator COLLINS. You said "if this happened." Do you take issue with what GAO has told us in a written statement?

Ms. LUTE. Again, Senator, I just glanced at the statement before I walked in. I would like the opportunity to provide to you in writing, in detail, in a fully transparent way to the Committee the unfolding of this program.

Senator COLLINS. Let me just ask one final question on this round since my time has expired.

Chairman LIEBERMAN. That is OK.

Senator COLLINS. And that has to do with the strategic plan, the need for which was first identified 8 years ago, a source of huge frustration to the Chairman and myself, and a cause of significant waste of time and money.

You have said that there is a draft plan underway. I am going to ask you a very basic question. When will it be done?

Ms. LUTE. Before the end of this calendar year.

Senator COLLINS. More precisely—I mean, the end of this calendar year is a long ways away.

Ms. LUTE. Senator, I cannot give you a precise date. I can tell you before December 31.

Senator COLLINS. Well, Mr. Chairman, I would say that December 31 is too long. The need for this plan has been evident for 8 years, and in the meantime, the Department either has to freeze all of its technology acquisitions, because it does not really know what it needs—and that puts us at risk—or it has to proceed with acquisitions that may end up wasting more millions of dollars. So this has to be a priority.

Thank you.

Chairman LIEBERMAN. Thanks, Senator Collins. I agree. This has been a long time in coming, and it is September 15 today. Look, we cannot compel you by a court or other action to do this by a given date, but the fact is it is long overdue. And it would impress us at least if you got it done by sometime significantly earlier than the end of the year.

Is this going to be just an overall strategy? We had a little exchange before, but I presume this will be clear enough that it will guide action. I understand there may need to be details that follow,

but I hope this will be a real working strategic plan that will come forward.

Ms. LUTE. Senator, it will be at a strategic level. It will identify the vision we are trying to pursue, and it will outline objectives and performance metrics.

Chairman LIEBERMAN. Right.

Ms. LUTE. From that, we will necessarily create an implementation plan which will go into greater detail about programs, technologies, execution, and timelines.

I think I would just like to offer as well that we are following the original impulse of the Department when DNDO was created, which was to look at our existing operations in the three main areas that we work on to ensure the security of this homeland: Our border regions, the interior of this country, as well as abroad. And we have looked to reinforce existing processes and procedures with the kinds of technologies that give us a stronger hand in the ability to detect and interdict the movement of illicit materials.

So we are not frozen, Senator, and I know that is a concern of yours. It would be a concern of mine as well. We are not frozen in place. We are continuing to apply those technologies and procedures, to train our personnel in field, to deploy more trained personnel, and to develop our understanding of the threat and vulnerabilities. But I equally share your frustration—and certainly understand it—that this plan has not yet been produced.

Chairman LIEBERMAN. I really urge you to get it to us before the end of the year if you possibly can. I think that would be a significant step forward.

I have just a couple more questions. Incidentally, when you look at the statement that GAO filed for the record on this question of DNDO misleading the Congress, there is a final sentence in the paragraph that says—and this is GAO speaking—"During recent discussions with DNDO officials, they agreed that the language in the budget justifications lacked clarity, and they have no plans to prepare a cost/benefit analysis."

So there has already been some acknowledgment. It may be a difference of terminology. The GAO says it was a kind of intentional act of misleading Congress. DNDO acknowledges that it lacked clarity. But I want to ask you from your position as administrative accountability and responsibility at the top of the Department to give us your view of what happened here and how it should affect our interactions.

We have talked some about the unacceptable—I think that is the word you used—failure of some of the component agencies of the Department of Homeland Security to cooperate and to communicate in the development of some of the nuclear detection systems. DNDO, as you know, is also given the responsibility for coordinating nuclear detection activities of the Department of Homeland Security with other departments of our Federal Government—Defense, State, Justice, and Energy.

The question I want to raise is—I do not know whether it is under consideration at all. In light of the fact that it is not clear to me that DNDO has the authority to tell those agencies what to do and, therefore, must rely on cooperation from them, each with their own jurisdictions, sovereignties, and perhaps stovepipes,

whether we ought to be considering giving additional authority to DNDO to coordinate this responsibility for a defense against nuclear terrorism or whether we ought to confine DNDO's responsibility in some sense and have all these agencies accountable to someone higher up, in the White House, in the Office of Management and Budget (OMB), something of that kind. Is that under consideration at all? And if not, do you have any first responses to that?

Ms. LUTE. Senator, the situation is as you described. We do not have the authority such as the Office of National Drug Control Policy (ONDCP) has, and there have been some informal discussions about this. The right way forward, I think, remains to be decided.

We are certainly engaged vigorously with them, for example, on the strategic plan for the Global Nuclear Detection Architecture at the Assistant Secretary level, so DNDO is moving out aggressively to establish the relationships and operating pattern to achieve the kind of cooperation that is expected. I think it is certainly a live consideration that additional authorities be considered.

Chairman LIEBERMAN. Well, I would welcome your thoughts on that.

The final question I have is really the initial point, and just to draw you out on it, I take it that the Department and DNDO are operating on an assumption or a conclusion based on intelligence that the threat of nuclear terrorism is real and that terrorist groups continue to have an active interest in gaining the capability to carry out a nuclear terrorist attack, including within the United States.

Ms. LUTE. Yes, Senator. Beyond that, I would like to reserve our discussion for——

Chairman LIEBERMAN. Understood, but I wanted to clarify that.

The second may be a little harder but—which is—I know there was a relatively recent IAEA report recording some cases of attempts to smuggle quantities of enriched uranium out of the former Soviet Union, particularly Russia. I guess I am asking whether you have a concern about whether in terms of the thoughts about Global Nuclear Detection Architecture, whether the countries of the world, including Russia, are doing enough to protect the nuclear material that they have.

Ms. LUTE. Again, Senator, with respect to a more detailed discussion on that, I would like to reserve it for the closed session. But I think it is fair to say that no one should be satisfied with the current state of efforts and that more has to be done.

Chairman LIEBERMAN. Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

It is my understanding that in preparing the strategy, the Department is using these model guidelines. This is a document for nuclear detection architectures that DNDO developed in consultation with the international agencies as well as national domestic experts. These model guidelines state that the strategy should include a clear assignment of responsibility to the Federal, State, or local agency that is responsible for carrying out the strategies.

We are told that the draft strategy currently being considered at DNDO does not include such basic elements as which agencies are responsible for which strategic goals, and that instead Congress is

going to have to wait for yet another plan to be produced and an implementation plan for the strategy to be delivered at a yet unknown future date.

If the guidelines are recommending that agency responsibilities be defined in the national level strategy for the architecture, why isn't the Department doing that, including that critical information and assignment of responsibility within the strategy? Or are you going to, let me ask?

Ms. LUTE. Senator, that is why it is still a draft, so we are using in part the model guidelines. We are mindful also of getting something delivered. And we are mindful of getting something delivered that forms a credible basis for the implementation plan that follows, and we will ensure that it has all the essential elements for that purpose.

Senator COLLINS. Thank you, Mr. Chairman.

Chairman LIEBERMAN. Thank you, Senator Collins.

Senator Akaka, good morning and welcome.

OPENING STATEMENT OF SENATOR AKAKA

Senator AKAKA. Good morning, Mr. Chairman. It is good to be here with you and our Ranking Member, Senator Collins. Thank you so much for holding this hearing, and I would like to thank the Deputy Secretary for being here with us today

Ms. LUTE. Thank you, Senator.

Senator AKAKA. Nuclear terrorism is among the chief threats facing the United States. The Department's Global Nuclear Detection Architecture is a crucial tool in stopping the illicit movement of nuclear and radiological materials. I have some ongoing concerns about the status of the improvements to our nuclear detection capabilities, our international efforts, and our ability to prevent the entry of nuclear materials into the United States. I hope to hear more about these issues today.

Deputy Secretary Lute, in 2009, I introduced the Strengthening the Oversight of Nuclear Nonproliferation Act, which was included as an amendment to this Committee's WMD Prevention and Preparedness Act. My bill would require U.S. analysis of the IAEA's ability to detect a country's diversion of nuclear materials that could be used as a weapon and recommend ways for the United States to further support the IAEA.

Is DHS incorporating analysis of IAEA's detection capabilities, and ways to further its support of the IAEA, into its nuclear detection efforts?

Ms. LUTE. We are, Senator, but I am not in a position to give you a detailed accounting of how.

Senator AKAKA. Fine. Madam Secretary, education, training, and exercises can better prepare personnel charged with stemming the illicit flow of dangerous nuclear materials. What steps has DHS taken to put comprehensive training efforts in place for these personnel throughout the United States?

Ms. LUTE. Senator, DNDO has an aggressive program with respect to education and training, and we can provide details of the numbers of programs, numbers of trained individuals as well, to you in writing.

Senator AKAKA. Fine. International efforts to prevent nuclear smuggling require information sharing between international partners within a broad nuclear detection framework. To what extent has the U.S. Government coordinated with international partners to improve information sharing in support of nuclear detection at both the strategic and operational levels?

Ms. LUTE. Senator, as you know, there are a number of international programs that the government participates in on this set of issues. Where the Department of Homeland Security fits in, this is also part of our engagement as well. We have a number of quite specific dialogues with international partners regarding port activities, the issues of cargo movements, and, indeed, the whole question of secure global supply chains incorporates a set of issues that the United States is trying to pursue with its international trading partners.

So it is an imprecise answer to your question in terms of under which specific programs all of this is being conducted. There are other departments—the Department of Energy, for example—that have these dialogues as well, and equally there is dialogue with the private sector. We can provide those to you in writing. But as I mentioned earlier, we view homeland security and the efforts that we undertake to ensure the security of this homeland as entailing work abroad with the international community.

Senator AKAKA. Madam Secretary, in the DHS Bottom-Up Review Report, the Department stated that it will increase efforts to detect and counter nuclear and other dangerous materials by prioritizing nuclear detection research and development and by working with the intelligence community to develop new capabilities.

How is DHS implementing these efforts? And what new technologies and capabilities are being considered in these efforts?

Ms. LUTE. Senator, I would like to reserve any discussion of technologies for our closed session, if you will, and I would characterize at this point in an open setting our efforts on the intelligence front. We want to understand the threat fully. We want to understand who those individuals might be, or groups, or other institutions, agencies, entities that exist that might be trying to acquire illicit materials. What are the lines of communication that they might exploit, what are the means they might exploit to advance their threat? What are our vulnerabilities? How can we best address them? Those are the kinds of things that we are putting into our dialogue with the intelligence community to more fully develop our understanding of the threat.

Senator AKAKA. According to the Bottom-Up Review Report, DHS plans to enhance its risk assessment and management across its mission areas. One related effort that DHS has considered is conducting a homeland security national risk assessment. If conducted, how do you foresee this assessment better informing strategies, investments, and operations related to countering the threat of nuclear terrorism?

Ms. LUTE. As I mentioned in my opening statement, Senator, we believe that eventually we would like to make it near to impossible for anyone to acquire or attempt to use illicitly nuclear materials and weapons. In the meantime, we want to make it prohibitively

difficult. That depends on creating significant uncertainty in the minds of potential adversaries through layered defenses that reduce risk and shore up our ability to defend ourselves.

We believe this country can defend itself in this area as well as others, and so we will use all the tools at our disposal, including analyses and understandings of risks, vulnerabilities, and capabilities of technologies, processes, and our operating components to ensure that we keep this country safe.

Senator AKAKA. Well, thank you very much, Mr. Chairman. My time has expired. Thank you.

Chairman LIEBERMAN. Thanks very much, Senator Akaka, for being here and for asking those thoughtful questions. I think probably it is best now to adjourn to closed session. Look, bottom line, I think you hear us. We are not happy or satisfied with progress on the whole nuclear detection architecture and the way that a considerable amount of taxpayer money has been spent up until now without any substantial result. So we are counting on you, Deputy Secretary Lute, and, of course, Secretary Janet Napolitano, to really step in and take charge of this.

Short term, we look forward to the response within a week to this question of DNDO misleading the Congress on the budget question. And then you set the goal, but it is September 15. If you can get that strategic plan out sometime in November, that would be a great step forward and a sign of encouragement to us that things were changing.

I am tempted to ask Mr. Stern whether after this hearing he wants to go forward and take over DNDO.

Ms. LUTE. Of course he does

Chairman LIEBERMAN. He does, I know. So I appreciate that you do. It needs fresh new leadership, and we look forward to working with you on the progress that we all want.

With that, we will reconvene for the closed portion of the hearing as soon as our legs can take us to Room 217 in the Senate Security Offices over in the Capitol Visitor Center.

The hearing is adjourned.

[Whereupon, at 11:13 a.m., the Committee proceeded to other business.]

APPENDIX

Opening Statement of Chairman Joseph I. Lieberman
Committee on Homeland Security and Governmental Affairs

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part I"
June 30, 2010

Good morning and welcome. This is the eighth in a series of hearings our committee has held since 2007 to discuss how our nation is confronting the real and dire threats posed by nuclear terrorism. And I must say that, today, it seems to me, as I look back and look at where we are now, that the threat of nuclear terrorist attack on the United States is growing faster than our ability to prevent a nuclear terrorist attack on the United States, on our homeland, and obviously as the homeland security committee this is of great and growing concern for us.

Though most people would prefer not to think about the "unthinkable," but President Obama, to his credit, has recognized the threat that brings us together this morning. At the 47 nation nuclear summit held in April, the President outlined the dangers here quite clearly, and I quote:

"Nuclear materials that could be sold or stolen and fashioned into a nuclear weapon exist in dozens of nations. Just the smallest amount of plutonium -- about the size of an apple -- could kill and injure hundreds of thousands of innocent people.

"Terrorist networks such as al Qaeda have tried to acquire the material for a nuclear weapon, and if they ever succeeded, they would surely use it,"- these are all continuing quotes from the President.

"Were they to do so, it would be a catastrophe for the world -- causing extraordinary loss of life, and striking a major blow to global peace and stability.

"In short,"- and this is President Obama concluding- "it is increasingly clear that the danger of nuclear terrorism is one of the greatest threats to global security -- to our collective security."

Then, a month or so later, The "National Security Strategy," released by the Administration added: "The American people face no greater or more urgent danger than a terrorist attack with a nuclear weapon. . . . Black markets trade in nuclear secrets and materials. Terrorists are determined to buy, build, or steal a nuclear weapon."

The International Atomic Energy Agency's Illicit Trafficking Database, which tracks all reported cases of smuggling, theft, unexplained losses or black-market sales of nuclear materials, reports there have been 1,340 confirmed incidents of smuggling since 2007 that involve materials that could at least be used to make a so-called "dirty bomb."

And of those cases, 18 involved the smuggling of highly enriched uranium or plutonium – the material that is critical to the actual making an atomic weapon.

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In 2008, our Committee held hearings to examine the office created in our government to counter this threat – the little-known Domestic Nuclear Detection Office – or DNDO- within the Department of Homeland Security.

At that time, the question was: "How do we keep DNDO on track?"

Today, I ask seriously whether DNDO has been on the right track and moving rapidly enough to achieve its critical mission.

Though most Americans have never heard of DNDO, its mission is clearly vital to our homeland security in the world in which we live in today.

President Bush established the DNDO in 2005 to coordinate and oversee federal efforts to protect the U.S. against the nuclear terrorism. HSPD-14 designated DNDO as the lead organization for domestic nuclear detection, and charged it to work with the Departments of Defense, Energy, and State, and others to develop a GNDA- a global nuclear detection architecture.

Though it has never been defined in statute, the GNDA seems to consist of programs across numerous agencies designed to stop terrorists from getting nuclear materials or weapons, and if they do get them, to stop them from bringing them into the United States, and if they do bring them into the United States, to stop them from successfully detonating them.

DNDO was given the critical job of coming up with an overall plan about how the different departments would work together to implement that plan, and then to recommend what kind of investments in technology would be needed.

This was a big mission that they were given, and in fairness I should say that, and there have been some successes.

For instance, DHS has deployed nearly two thirds of the more than 2,100 radiation portal monitors identified in its deployment plan at established ports of entry on the northern and southern borders.

Today nearly 100 percent of the seaport containerized cargo and 100 percent of vehicle traffic on the southern and northern borders are scanned for nuclear material.

But there also have been omissions and failures, and they're serious.

Cargo coming by rail from Canada or Mexico is still not scanned, only a small percentage of international air cargo is scanned and DNDO apparently has no plans to scan commercial aviation aircraft or baggage.

Five years into its existence, based on its record, it's just inescapable to conclude that DNDO requires retooling, and quickly.

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It's made too little progress on its major mission, which is the development of the Global Nuclear Detection Architecture.

Even DNDO seems to have concluded that its approach to this task is fundamentally flawed and now seeks an increase of $13 million in next year's budget for a new round of studies to produce yet another "overarching strategic plan" over the next several years.

The time for multi-year "studies" is over; the time for urgent action really is now.

We're going to hear today that DNDO has spent hundreds of millions of dollars trying to develop a new radiation detection technology that GAO concludes is only marginally better than we have now.

Known as the Advanced Spectroscopic Portal – or ASP—this program has clearly drained resources from other programs, including development and deployment of mobile, portable or hand-held technologies that could screen other types of in-bound cargo or bulk shipments, like those on international trains and commercial aviation.

I know that the Administration is reexamining DNDO. We hoped that DHS- the Department of Homeland Security- would come and testify today; they said that they weren't ready. We've set down a hearing for July 21st to hear their response from this distinguished group of independent evaluators of DNDO, and I'll say that it's certainly my expectation that what we need to hear from DNDO, from the Department of Homeland Security, is exactly what the intent is to do with and to DNDO to make sure it gets its critical mission right, and quickly.

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Opening Statement of Senator Susan M. Collins
Committee on Homeland Security and Governmental Affairs

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part I"
June 30, 2010

Safeguarding our nation against the threat of nuclear terrorism is one of the most important responsibilities of the Department of Homeland Security. The WMD Commission predicted that "it is more likely than not that a weapon of mass destruction will be used in a terrorist attack somewhere in the world by the end of 2013."

Technological innovation is a critical element in our efforts to prevent nuclear terrorism. It is, therefore, troubling that the Department's efforts to develop a next-generation technology for scanning cargo for nuclear materials at ports of entry have been less than successful. The Advanced Portal (ASP) program has repeatedly encountered problems since its inception in 2004.

As a result, ASP has been relegated to being a potential secondary scanning tool, although the technology has yet to receive certification from DHS for even this limited function.

Given the unwavering ambitions of America's enemies, our nation cannot afford to repeat the mistakes of the past.

The DHS office currently responsible for making decisions about the development, testing, evaluation, and acquisition of detection equipment is the Domestic Nuclear Detection Office (DNDO). DNDO must make well-informed and threat-based investment decisions to meet the challenge of interdicting illicit nuclear material at our nation's borders and within our country.

Given our nation's significant investment in this critical area, DNDO also must serve as a responsible steward of taxpayer dollars. As we navigate the road forward, the Department must have a clearer strategy for developing the next-generation of scanning technologies to detect and identify shielded and unshielded nuclear materials.

The three organizations represented at our hearing today, GAO, CRS, and the National Research Council, have all produced recent reports that have found significant problems with the ASP program. They can give us valuable insights into the challenges the Department confronts, and that Congress must consider, as we move beyond the ASP program.

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United States Government Accountability Office

GAO

Testimony
Before the Committee on Homeland Security and Governmental Affairs, U.S. Senate

For Release on Delivery
Expected at 10:00 a.m. EDT
Wednesday, June 30, 2010

COMBATING NUCLEAR SMUGGLING

DHS Has Made Some Progress but Not Yet Completed a Strategic Plan for Its Global Nuclear Detection Efforts or Closed Identified Gaps

Statement of Gene Aloise, Director,
Natural Resources and Environment

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GAO-10-883T

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Highlights

Highlights of GAO-GAO-10-883T, a testimony before the Committee on Homeland Security and Governmental Affairs, U.S. Senate

June 30, 2010

COMBATING NUCLEAR SMUGGLING

DHS Has Made Some Progress but Not Yet Completed a Strategic Plan for Its Global Nuclear Detection Efforts or Closed Identified Gaps

Why GAO Did This Study

In April 2005, a Presidential Directive established the Domestic Nuclear Detection Office (DNDO) within the Department of Homeland Security (DHS) to enhance and coordinate federal, state, and local efforts to combat nuclear smuggling abroad and domestically. DNDO was directed to develop, in coordination with the departments of Defense, Energy, and State, an enhanced global nuclear detection system of radiation detection equipment and interdiction activities. (DNDO refers to this system as an architecture.) DNDO is to implement the domestic portion of the architecture. Federal efforts to combat nuclear smuggling have largely focused on established ports of entry, such as seaports and land border crossings, and DNDO has also been examining nuclear detection strategies along other pathways.

Over the past 7 years, GAO has issued numerous recommendations on nuclear or radiological detection to the Secretary of Homeland Security, most recently in January 2009. This testimony discusses the status of DHS efforts to (1) complete the deployment of radiation detection equipment to scan all cargo and conveyances entering the United States at ports of entry, (2) prevent smuggling of nuclear or radiological materials via the critical gaps DNDO identified, and (3) develop a strategic plan for the global nuclear detection architecture. GAO's testimony is based on prior work that was updated by obtaining DHS documents and interviewing DHS officials.

View GAO-GAO-10-883T or key components. For more information, contact Gene Aloise at 202-512-3841 or aloisee@gao.gov.

What GAO Found

DHS has made significant progress in both deploying radiation detection equipment and developing procedures to scan cargo and conveyances entering the United States through fixed land and sea ports of entry for nuclear and radiological materials since GAO's 2006 report. While DHS reports it scans nearly 100 percent of the cargo and conveyances entering the United States through land borders and major seaports, it has made less progress scanning for radiation (1) in railcars entering the United States from Canada and Mexico; (2) in international air cargo; and (3) for international commercial aviation aircraft, passengers, or baggage.

DHS efforts to prevent the smuggling of nuclear and radiological materials into the United States through gaps DNDO identified in developing the nuclear detection architecture remain largely developmental since GAO's 2009 report. The gaps DHS identified include land border areas between ports of entry into the United States, international general aviation, and small maritime craft such as recreational boats and commercial fishing vessels. These gaps are important because of their size, volume of traffic, and the difficulty of deploying available radiological and nuclear detection technologies. DHS's actions to address these gaps consist primarily of efforts to develop, test, and deploy radiation detection equipment; conduct studies or analyses to identify and address particular threats or gaps; develop new procedures to guide scanning for radiation; and develop and learn from pilot programs.

DHS does not yet have a strategic plan for the global nuclear detection architecture, but DHS officials said they began working on a plan earlier this year and expect to complete it by fall 2010—2 years after GAO last recommended this to DNDO—and more than 7 years after we first identified the need for a comprehensive plan in October 2002. The lack of a strategic plan has limited DHS's efforts to complete such an architecture, because although each agency with a role in combating nuclear smuggling has its own planning documents, without an overarching strategic plan, it is difficult to address the gaps and move to a more comprehensive global nuclear detection strategy. DNDO's 4-year effort to develop an advanced radiation detection monitor is an example of the consequences of not having a strategic plan and not reaching consensus on such a plan with other federal agencies. In GAO's view, the proposed deployment of this monitor distracted DNDO from its mission to fully deploy the architecture and close the gaps it identified. Also, in 2006 GAO recommended that the decision to deploy this monitor be based on an analysis of both benefits and costs—which GAO later estimated at over $2 billion—and a determination of whether any additional detection capability provided by the monitor was worth its additional cost. DNDO proceeded with ASP testing without fully completing such an analysis. Further, DNDO focused this monitor deployment effort on replacing components of the architecture where a radiation detection system was already in place—at established ports of entry—and shifting its focus away from closing the gaps it identified in the architecture.

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Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss the Domestic Nuclear Detection Office's (DNDO) efforts to develop a global nuclear detection architecture—an integrated system of radiation detection equipment and interdiction activities to combat nuclear smuggling in foreign countries, at the U.S. border, and inside the United States—and to provide an update on the deployment of radiation detection equipment at U.S. borders. Preventing terrorists from using radiological or nuclear material to carry out an attack in the United States is a top national priority. DNDO, within the Department of Homeland Security (DHS), is charged with enhancing and coordinating federal, state, and local efforts to prevent radiological and nuclear attacks.[1] Among other things, DNDO is required to coordinate with other federal agencies to develop an enhanced global nuclear detection architecture. It is also responsible for developing, acquiring, and deploying radiation detection equipment to support the efforts of DHS and other federal agencies. While federal efforts to combat nuclear smuggling have largely focused on established ports of entry, such as seaports and land border crossings, DNDO has also been examining nuclear detection strategies along other potential pathways and has identified several gaps in the architecture, including (1) land border areas between ports of entry into the United States; (2) international general aviation; and (3) small maritime craft, such as recreational boats and commercial fishing vessels.

Even before DNDO's inception in 2005, we were highlighting the need for a more comprehensive strategy for nuclear detection. In 2002, we reported on the need for a comprehensive plan for installing radiation detection equipment, such as radiation portal monitors, at all U.S. border crossings and ports of entry that (1) addresses vulnerabilities and risks; (2) identifies the complement of radiation detection equipment that should be used at each type of border entry point—air, rail, land, and sea—and whether equipment could be immediately deployed; (3) identifies longer-term radiation detection needs; and (4) develops measures to ensure that the equipment is adequately maintained.[2] More recently, in July 2008, we

[1]National Security Presidential Directive 43 / Homeland Security Presidential Directive 14, *Domestic Nuclear Detection*, April 15, 2005. DNDO was established in statute by the Security and Accountability for Every Port Act of 2006 (SAFE Port) Act, Pub. L. No. 109-347, § 501 (codified at 6 U.S.C. §§ 591-596a).

[2]GAO, *Customs Service: Acquisition and Deployment of Radiation Detection Equipment*, GAO-03-235T (Washington, D.C.: Oct. 17, 2002).

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testified that DNDO had still not developed an overarching strategic plan,[3] and recommended that DHS coordinate with the Departments of Defense, Energy, and State to develop one. In January 2009, we recommended that the Secretary of Homeland Security develop a strategic plan for the domestic part of the global nuclear detection strategy to help ensure the success of initiatives aimed at closing gaps and vulnerabilities.[4] We stated that this plan should focus on, among other things, establishing time frames and costs for the three gaps DNDO had identified—land border areas between ports of entry, aviation, and small maritime vessels. DHS agreed with the recommendation that we made in our 2008 testimony on the need for an overarching strategic plan to guide future efforts to combat nuclear smuggling and move toward a more comprehensive global nuclear detection strategy.

In addition, since 2006, we have been reporting on longstanding problems with DNDO's efforts to deploy advanced spectroscopic portal (ASP) radiation detection monitors, a more advanced and significantly more expensive type of radiation portal monitor to replace the polyvinyl toluene (PVT) portal monitors in many locations that the Customs and Border Protection (CBP), an agency within DHS, currently uses to screen cargo at ports of entry.[5] We have issued seven reports and testified before Congress five times identifying problems with the cost and performance of the ASPs and the lack of rigor in testing this equipment. For example, we found that tests DNDO conducted in early 2007 used biased test methods that enhanced the apparent performance of ASPs and did not use critical CBP operating procedures that are fundamental to the performance of

[3]GAO, *Nuclear Detection: Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture*, GAO-08-999T (Washington, D.C.: July 16, 2008).

[4]GAO, *Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities*, GAO-09-257 (Washington, D.C.: Jan. 29, 2009).

[5]CBP conducts primary inspections with radiation detection equipment called portal monitors—large stationary detectors through which cargo containers and vehicles pass as they enter the United States where they are screened for smuggled nuclear or radiological material that could be used in an improvised nuclear device or radiological dispersal device (a "dirty bomb"). When radiation is detected, CBP conducts secondary inspections using a second portal monitor to confirm the original alarm and a handheld radioactive isotope identification device to identify the radiation's source and determine whether it constitutes a threat.

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current radiation detectors.[6] In addition, in 2008 we estimated the lifecycle cost of each standard cargo version of the ASP (including deployment costs) to be about $822,000, compared with about $308,000 for the PVT standard cargo portal monitor, and the total program cost for DNDO's latest plan for deploying radiation portal monitors to be about $2 billion. Based in part on our work, DHS informed this committee in February 2010, after spending over $224 million, that the department had scaled back its plans for development and use of ASP technology. However, this $224 million figure does not include the considerable cost of physical testing of ASPs at national labs, the Nevada Test Site, and field validation at working ports of entry at land borders and seaports. We have asked DNDO for this information, and DNDO officials are in the process of providing it to us.

As I will discuss today, while some progress has been made, DHS and other federal agencies have yet to fully address critical gaps in the global nuclear detection architecture. Specifically, my testimony discusses the status of DHS efforts to (1) complete the deployment of radiation detection equipment to scan all cargo and conveyances entering the United States at ports of entry, (2) prevent smuggling of nuclear or radiological materials via the critical gaps DNDO identified, and (3) develop a strategic plan for the global nuclear detection architecture.

My testimony is based on our prior work on U.S. government efforts to detect and prevent the smuggling of nuclear and radiological materials from October 2002 through January 2009,[7] and details on the scope and methodology for those reviews are available in our published reports. With information from DHS officials, we updated our prior work on (1) DHS's deployment of radiation detection equipment since we last reported on this topic in 2006 and (2) DHS efforts to develop a strategic plan since we last reported on this topic in 2009. We conducted the work for this performance audit in accordance with generally accepted government

[6]GAO, *Combating Nuclear Smuggling: Additional Actions Needed to Ensure Adequate Testing of Next Generation Radiation Detection Equipment*, GAO-07-1247T (Washington, D.C.: Sept. 18, 2007).

[7]GAO-03-235T; GAO, *Combating Nuclear Smuggling: DHS Has Made Progress Deploying Radiation Detection Equipment at U.S. Ports-of-Entry, but Concerns Remain*, GAO-06-389 (Washington, D.C.: Mar. 22, 2006); GAO, *Nuclear Detection: Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture*, GAO-08-999T (Washington, D.C.: July 16, 2008); and GAO-09-257.

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auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

DHS Scans Almost All Cargo and Conveyances Entering the United States through Land Borders and Major Seaports but Is Still Developing Options to More Systematically Scan Rail, Air Cargo, and Commercial Aviation

DHS has made significant progress in deploying both radiation detection equipment and developing procedures to scan cargo and conveyances entering the United States through fixed land and sea ports of entry for nuclear and radiological materials. Specifically, DHS has deployed nearly two-thirds of the more than 2,100 radiation portal monitors identified in its deployment plan—over 1,400—but needs to deploy more than 700 more to complete the plan. According to DHS officials, the department scans nearly 100 percent of the cargo and conveyances entering the United States through land borders and major seaports. However, DHS has made less progress scanning for radiation (1) in railcars entering the United States from Canada and Mexico; (2) in international air cargo; and (3) for international commercial aviation aircraft, passengers, or baggage.

Land Ports of Entry

According to DHS officials, since November 2009 almost all non-rail land ports of entry have been equipped with one or more PVTs. Of the over 1,400 radiation portal monitors deployed, 885 PVTs have been deployed along the northern and southern borders of the lower 48 states to all but a few non-rail ports of entry. At present, 100 percent of all cargo, conveyances, drivers, and passengers driving into the United States through commercial lanes at land borders are scanned for radiation, as are more than 99 percent of all personally operated vehicles (non-commercial passenger cars and light trucks), drivers, and passengers.

Seaports

According to DHS officials, the department now scans nearly all containerized cargo entering the U.S. seaports for nuclear and radiological materials. Specifically, in addition to the PVTs deployed for land ports of entry, DHS has deployed 444 PVTs to major American seaports—including the largest seaports accounting for the majority of cargo. However, some smaller seaports that receive cargo may not be equipped with PVTs. DHS officials stated that current deployment plans have been in place to

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address all the remaining gaps in the deployment of PVTs to seaports but that current and future budget realities require a complete re-planning of the deployment schedule.

International Rail

At present there is limited systematic radiation scanning of the roughly 4,800 loaded railcars in approximately 120 trains entering the United States each day from Canada and Mexico through 31 rail ports of entry. Much of what scanning for radioactive materials takes place at these ports of entry is conducted with portable, hand-held radioactive isotope identification devices (RIID). Such scans are triggered when, for example, anomalous readings are detected from imaging scans of rail car contents. According to DHS officials, international rail traffic represents one of the most difficult challenges for radiation detection systems due to the nature of trains and the need to develop close cooperation with officials in Mexico and Canada. In addition, there are unique operational challenges in this environment due to the length of the trains (up to 2 miles), the distance required to stop moving trains, and the difficulties in separating alarming cars for further examination. Furthermore, DHS officials told us that rail companies resist doing things that might slow down rail traffic and typically own the land where DHS would need to establish stations for primary and secondary screening. Moreover, DHS officials said that it takes time to develop the necessary close cooperation with officials in Mexico and Canada and that an effective solution would require scanning of at least some rail traffic on Mexican or Canadian soil, before a train enters the United States. As a result, DHS is only in the early stages of developing the procedures and technology to feasibly scan international rail traffic. DHS is currently undertaking an International Rail Threat and Gap Study to determine the most promising radiation detection approach. DHS officials also told us that implementing the results of this study is subject to the availability of adequate funding.

International Air Cargo and Commercial Aviation

DHS is in the early stages of addressing the challenges of scanning for radioactive materials presented by air cargo and commercial aviation. At present DHS is scanning for radioactive materials at certain major international airports in the United States, and has deployed some of the PVTs in its plans. It plans to deploy more PVTs by the end of 2011.

International Air Cargo. At present, DHS officials are developing plans to increase their capacity to scan for radioactive materials in international air cargo conveyed on commercial airlines. DHS officials stated that their experience scanning air cargo at a few major international airports in the

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United States has helped them develop scanning procedures and inform current and future deployment strategies for both fixed and mobile radiation detection equipment. However, these officials told us that scanning air cargo planes is a challenge because of the lack of natural choke points in airports where fixed detection equipment could be deployed. They believe that further operational experience and research is necessary before they can develop practicable mobile scanning strategies and procedures. Until solutions to these challenges can be found, DHS's goal of scanning 99 percent of air cargo at 33 international airports by 2014 is currently on hold. According to DHS officials, whatever scanning for radioactive materials occurs at these 33 airports is currently conducted with hand-held detectors.

International Commercial Aviation. As part of a pilot program, DHS is developing plans to effectively scan commercial aviation aircraft, passengers, and baggage for radioactive materials.

DHS's Efforts to Prevent Smuggling of Nuclear and Radiological Materials into the United States via the Gaps DNDO Identified Are Still in the Early Stages of Development

DHS efforts to prevent the smuggling of nuclear and radiological materials into the United States through the critical gaps DNDO identified—land border areas between ports of entry, international general aviation, and small maritime craft—remain largely developmental. These pathways are important because dangerous quantities of nuclear and radiological material can be small and portable enough to be carried across land borders by vehicles or pedestrians, on most private aircraft, or by small maritime craft.

In addition, these pathways are challenging because of their size, volume of traffic, and the difficulty of deploying available radiological and nuclear detection capabilities and technologies. For example, the United States has more than 6,000 miles of land border with many locations outside of established ports of entry where people and vehicles can enter the United States. In the maritime environment, a Coast Guard risk assessment revealed that small boats pose a greater threat for nuclear smuggling than shipping containers. There are at least 13 million registered domestic pleasure craft in the United States and 110,000 commercial fishing vessels. These small boats have traditionally been used to smuggle drugs and people but could be used to smuggle nuclear or radiological material.

DHS's actions to address these gaps consist primarily of efforts to develop, test, and deploy current generation or newly developed radiation detection equipment; conduct studies or analyses to identify and address particular threats or gaps; develop new procedures to guide scanning for radiation in

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pathways where no scanning had occurred before; and develop and learn from pilot programs.

Land Border Areas between Ports of Entry

DHS is taking a number of steps it believes will improve its odds of deterring or detecting attempts to smuggle nuclear or radiological materials across the more than 6,000 miles of land border susceptible to illegal crossings by people and vehicles into the United States. Specifically, according to DHS officials, the department is procuring more current generation mobile radiation detection technology, seeking new technology, and further studying gaps in the detection architecture and the threat they pose. These efforts are, however, not yet complete and in some cases are behind schedule. For example, DHS is currently working to equip Border Patrol officers responsible for patrolling the U.S. borders with Canada and Mexico between ports of entry with current generation portable radiological and nuclear detection equipment—specifically, personal radiation detectors (PRD) and RIIDs. Portability is critical to strengthening radiation detection efforts, according to DHS officials, because it expands border patrol agents' ability to detect a potential radiological threat beyond fixed ports of entry. According to its deployment plan, DHS planned to buy a certain number of PRDs and RIIDs each fiscal year from 2008 through 2011 to complete acquisition by 2012. However, the department has fallen short of these targets, citing a lack of funds.

International General Aviation

According to officials, DHS has undertaken some initiatives to scan private aircraft entering the United States as international general aviation. Since December 2007, DHS has been scanning 100 percent of arriving international general aviation aircraft (approximately 400 flights per day) with a standard hand-held RIID for nuclear and radiological material. DHS depends on the aircraft operators to obey the law by either arriving in the United States only at an international airport—which are all equipped with scanning capability—or departing for the United States from one of four overseas airports where such aircraft can be scanned before departure. Accordingly, DHS has already initiated studies to help it address this challenge and plans, according to officials, to initiate further studies in 2011. Specifically, among other things, DHS plans to update its analysis of pre-clearance scanning capabilities at airports overseas and evaluate the feasibility of expanding the number of overseas airports with scanning capabilities. It also plans to study the characteristics of aircraft that do not comply with U.S. scanning requirements and develop interim surveillance

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options to enhance DHS capabilities and mitigation strategies to detect and interdict these aircraft.

Small Maritime Craft

A Coast Guard analysis revealed that small boats pose a greater threat than shipping containers for nuclear smuggling.[8] These small boats, which include maritime craft less than 300 gross tons, number in the millions. DHS has developed and tested equipment for detecting nuclear material on small maritime vessels. However, efforts to use this equipment in a port area have been limited to pilot programs. Whereas initiatives to combat smuggling at land border areas between established ports of entry and through aviation routes are being integrated into already existing CBP screening operations, initiatives in the maritime environment require DHS to acquire and test new equipment and procedures with the Coast Guard and local law enforcement agencies. DHS is currently conducting 3-year pilot programs in Puget Sound, Washington, and San Diego, California, to design, field test, and evaluate equipment and is working with CBP, the Coast Guard, state, local, tribal officials, and others as they develop procedures for screening. These pilot programs are scheduled to end in 2010, when DHS will decide the future path of screening of small vessels for nuclear and radiological materials. According to DHS officials, initial feedback from federal, state, and local officials involved in the pilot programs has been positive.

DHS hopes to sustain the capabilities created through the pilot programs via federal grants to state and local authorities through the port security grant program.[9] By working with state and local authorities in Puget Sound and San Diego since 2007, DHS hopes that equipment and procedures can be developed that could be transferred to other ports and other waterways and sustained with federal grants. DHS's goal is to build some capacity for radiation detection in all small and large ports so that

[8]From testimony delivered by Vice Admiral Thad Allen on the role of Coast Guard in border and maritime security, Committee on Appropriations, Subcommittee on Homeland Security, U.S. Senate, Apr. 6, 2006.

[9]The Port Security Grant Program (PSGP), established by the Maritime Transportation Security Act of 2002, is one of several DHS grant programs focusing on transportation infrastructure security. The purpose of the PSGP is to promote sustainable, risk-based efforts to protect critical port infrastructure from terrorism, particularly attacks using explosives and non-conventional threats that could cause major disruption to commerce. In fiscal year 2010, the total amount of funds distributed under this grant will be $288 million.

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federal, state and local law enforcement has the capacity for, at the least, random searches to keep would-be smugglers guessing, thereby offering some measure of deterrence to nuclear and radiological smuggling in this pathway.

According to DHS officials, the Puget Sound and San Diego pilot programs have been useful for assessing and developing technologies to address the specific challenges of nuclear and radiological detection in a maritime environment. DHS expects its testing of existing commercial and government off-the-shelf boat-mounted sensors to conclude in the summer of 2010 and, depending on the results, will either move forward with acquisition of this technology for future deployment or initiate a program to develop new technology to meet this need. According to officials, DHS also plans to complete or initiate a number of studies to analyze options for underwater detection and offshore secondary screening of nuclear and radiological materials and study the existing detection architecture of inland waterways. DHS also plans to conduct a top-down analysis of sea ports of entry to assess the effectiveness of existing and proposed nuclear and radiological detection architectures.

DHS Has Not Yet Completed a Strategic Plan for the Global Nuclear Detection Architecture

DHS does not yet have a strategic plan for the global nuclear detection architecture, but DHS officials told us they began working on a strategic plan earlier this year and expect to complete it by the fall of 2010—2 years after we last recommended such a plan—and more than 7 years after we first identified the need for comprehensive plan in October 2002. In our view, DHS might have made greater progress towards completing the architecture if it had a strategic plan.

DHS Officials Are Working on a Strategic Plan

According to DHS officials, DNDO is in the process of establishing a steering committee to guide and oversee the development of the strategic plan with interagency partners including the Departments of Defense, Energy, Justice, and State, the Nuclear Regulatory Commission, and the Office of the Director of National Intelligence. DHS officials attributed the delay in developing a strategic plan to a number of factors, including DNDO's initial focus on installing radiation detection equipment at ports of entry at land border crossings and major seaports in response to the requirements of the SAFE Port Act, which set a number of benchmarks and deadlines for scanning cargo entering the United States. DHS officials also cited the challenges and difficult decisions involved in addressing gaps in the areas between ports of entry.

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In addition, DHS officials said that they recognized that increasing detection capabilities in one area of the architecture could simply lead a potential smuggler of nuclear or radiological materials to use another pathway into the United States. In developing the strategic plan, they are considering ways to cover a greater range of potential pathways into the United States. Drawing lessons from the tactics police use to catch speeding motorists, DHS officials have concluded that the most effective way to deter and make more difficult the smuggling of nuclear and radiological materials into the United States is to develop more agile and randomly deployed detection capabilities, similar to how local and state police deploy officers and speed detection equipment randomly to deter drivers from traveling over the lawful speed limit. DHS officials described this approach as a shift from "detection to prevention." This approach is consistent with the basic design principles developed by DHS, as part of a multinational collaborative process, to guide countries' efforts to prevent nuclear terrorism. DHS identified several attributes of an effective nuclear detection architecture including, among other things, the capacity to balance risk reduction and cost effectiveness, rely on multiple layers of protection, adapt and evolve over time to changing threats, be unpredictable to the adversary, augment the effectiveness of radiation detection technologies with the use of intelligence and other information sources that could help law enforcement select certain targets for scrutiny, and be integrated within a larger national and international security framework.

DHS Might Have Completed the Architecture Sooner If It Had a Strategic Plan

In our view, the lack of a strategic plan has limited DNDO's efforts to develop a global nuclear detection architecture. Strategic planning is a way to respond to this governmentwide problem on a governmentwide scale. Our past work on crosscutting issues suggests that governmentwide strategic planning can integrate activities that span a wide array of federal, state, and local entities.[10] Although each agency with a role in combating nuclear smuggling has its own planning documents, an overarching strategic plan is needed to guide these efforts to address the gaps and move to a more comprehensive global nuclear detection strategy. In 2005, we reported that strategic plans should clearly define objectives to be accomplished, identify the roles and responsibilities for meeting each

[10]GAO, *A Call For Stewardship: Enhancing the Federal Government's Ability to Address Key Fiscal and Other 21st Century Challenges*, GAO-08-93SP (Washington, D.C.: Dec. 17, 2007).

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objective, ensure that the funding necessary to achieve the objectives is available, and employ monitoring mechanisms to determine progress and identify needed improvements.[11] For example, such a plan would define how DNDO would monitor the goal of detecting the movement of radiological and nuclear materials through potential smuggling routes, such as small maritime craft or land border areas in between ports of entry. Moreover, this plan would include agreed-upon processes and procedures to guide the improvement of the efforts to combat nuclear smuggling and coordinate the activities of the participating federal agencies. DNDO's 4-year effort to develop ASPs is an example of the consequences of not having a strategic plan and not reaching consensus on such a strategic plan with other federal agency partners. We believe the proposed deployment of ASPs distracted DNDO from its mission to fully deploy a nuclear architecture and close the gaps it identified in the architecture. In addition, in 2006 we recommended that the decision to deploy ASPs be based on an analysis of both the benefits and costs[12]—which we later estimated at over $2 billion[13]—and a determination of whether any additional detection capability provided by the ASP is worth its additional cost. DNDO has proceeded with ASP testing without fully completing such an analysis. Furthermore, DNDO focused its ASP deployment efforts on replacing components of the architecture with ASPs where a detection system was already in place—established ports of entry that were using PVTs and RIIDs—and shifting its focus away from finishing the PVT deployments at ports of entry and closing the gaps it identified in the architecture.

Similarly, in our view, had a strategic plan to complete the global nuclear detection architecture been in place, DHS may have been less likely to expend time and resources on ASPs when a radiation detection system was already in place at ports of entry but not at other potential pathways into the United States. A recent development that complicates the future deployments of radiation detection equipment is that both PVTs and ASPs

[11]GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, GAO-05-927 (Washington, D.C.: Sept. 9, 2005); *GAO, Results-Oriented Government: Practices That Can Help Enhance and Sustain Collaboration among Federal Agencies*, GAO-06-15 (Washington, D.C.: Oct. 21, 2005).

[12]GAO-06-389.

[13]GAO, *Combating Nuclear Smuggling: DHS Needs to Consider the Full Costs and Complete All Tests Prior to Making a Decision on Whether to Purchase Advanced Portal Monitors*, GAO-08-1178T (Washington, D.C.: Sept. 25, 2008).

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require helium-3, which was recently found to be in short supply.[14] According to DHS officials, if an alternative to helium-3 is not found by late 2011, further deployments of PVTs planned for the southern land border and at seaports may be delayed. We are currently conducting work on the helium-3 shortage—describing the federal government's current priority for how the limited supply of helium-3 will be allocated and assessing, among other things, what alternative technologies are currently available or in development that could replace helium-3. We plan to issue a report later this year.

In addition to lacking a strategic plan, we also found that DHS did not use the Joint Annual Interagency Review of the Global Nuclear Detection Architecture to effectively coordinate U.S. government nuclear detection priorities. In July 2007, Congress passed the Implementing Recommendations of the 9/11 Commission Act of 2007,[15] which required DHS to collaborate with the Departments of Defense, Energy, Justice, and State as well as the Director of National Intelligence on an annual report assessing federal agencies' involvement, support, and participation in the development, revision, and implementation of the global nuclear detection architecture. In January 2009, we recommended that DHS use this review to guide future strategic efforts to combat nuclear smuggling, including analyzing overall budget allocations to determine whether governmentwide resources clearly align with identified priorities to maximize results and whether there is duplication of effort across agencies.[16] DHS did not directly comment on our recommendation and did not use the most recent Joint Annual Interagency Review it issued in January 2010 as a tool to analyze nuclear detection budgets across the agencies with which it is required to collaborate on the report. Specifically, the 2010 report does not describe a process through which DHS used the review to guide or modify budget allocations or better align resources with identified priorities. While the report has been reviewed and approved by DHS and the Departments of Defense, Energy, Justice,

[14]Helium-3 is a by product of the production of tritium, a key isotope used in nuclear weapons. With the end of the Cold War the production of helium-3 has been reduced significantly. However, since September 2001, the demand of helium-3 has increased dramatically because radiation portal monitors deployed for homeland security and non-proliferation use it for neutron detection; neutrons are emitted by special nuclear materials, which can be used to construct a nuclear weapon.

[15]Pub. L. No. 110-53 (2007).

[16]GAO-09-257.

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State, and the Office of the Director of National Intelligence, the report does not make clear whether it is used as a part of these agencies' programmatic or strategic planning processes.

In conclusion, DHS is at a crossroads. With such vast land borders, coast lines, and air space to protect, addressing the gaps in the architecture is, in many respects, a more difficult task than preventing the smuggling of nuclear material through ports of entry. Now that land border crossings and seaports appear to have become more secure through law enforcement and technology, it makes the other gaps in the architecture potentially more attractive to would-be smugglers and terrorists. At a time of flat or declining federal agency budgets, it is especially important that DHS develop a strategic plan for its global nuclear detection architecture so that it can articulate its priorities in addressing these gaps and allocate resources based on those priorities to maximize results. In addition, given the national security implications and urgency attached to combating nuclear smuggling globally, and that multiple federal agencies are involved, we continue to believe that such a plan needs to be established as soon as possible. Without an overarching plan that ties together the various domestic and international efforts to combat nuclear smuggling and clearly describes goals, responsibilities, priorities, resource needs, and performance metrics, it is unclear how a strategy will evolve or whether it is evolving in the right direction.

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any questions that you or the other Members of the committee may have at this time.

GAO Contact and Staff Acknowledgments

For further information about this testimony, please contact me at (202) 512-3841 or aloisee@gao.gov. Dr. Timothy Persons (Chief Scientist), Ned Woodward (Assistant Director), Joseph Cook, Carol Kolarik, Jonathan Kucskar, Alison O'Neill, Kevin Tarmann, and Kiki Theodoropoulos made key contributions to this testimony.

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TESTIMONY BEFORE THE COMMITTEE ON HOMELAND SECURITY

AND GOVERNMENT AFFAIRS

U.S. Senate

342 Dirksen Senate Office Building

Washington, D.C.

Hearing on Nuclear Terrorism: Strengthening our Domestic Defenses

June 30, 2010

Micah D. Lowenthal, Ph.D.

Director, Nuclear Security and Nuclear Facility Safety Program

Nuclear and Radiation Studies Board

NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

Good morning Chairman Lieberman, Ranking Member Collins, and members of the committee. My name is Micah Lowenthal and I am the director of the program on nuclear security and nuclear facility safety in the National Research Council's Nuclear and Radiation Studies Board.[1] I am here to describe some of the findings and recommendations from the interim report of a congressionally mandated National Research Council study on procuring next-generation radiation detectors for screening cargo as part of the Global Nuclear Detection Architecture.[2] I am the study director supporting the committee of experts that authored the report.[3] I will begin by providing background on the request for this study and the remainder of my testimony will focus on the portion of the report that addresses costs and benefits of the new detectors in the context of the Global Nuclear Detection Architecture.

BACKGROUND ON THE REQUEST FOR THE STUDY

Containerized cargo entering the United States at sea ports and truck land-border crossings is currently screened for radiation using fixed detectors, called radiation portal monitors (RPMs), in conjunction with handheld radioisotope identifiers (RIIDs). The Department of Homeland Security (DHS) is seeking to deploy new radiation detectors, called advanced spectroscopic portals (ASPs), to replace the current RPM and RIID combination, which has known deficiencies. The ASPs consist of new detector equipment and new software, including improved algorithms for isotope identification.

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[1] The National Research Council is the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, chartered by Congress in 1863 to advise the government on matters of science and technology. The Nuclear and Radiation Studies Board is responsible for oversight of National Research Council studies on safety and security of nuclear materials and waste.

[2] The report is titled Evaluating Testing, Costs, and Benefits of Advanced Spectroscopic Portals for Screening Cargo at Ports of Entry: Interim Report. The abbreviated version of the report is available online at http://www.nap.edu/catalog.php?record_id=12966.

[3] Dr. Robert Dynes, a physicist at the University of California, member of the National Academy of Sciences, and former president of the University of California, chaired this study.

The ASP procurement has had several setbacks from the beginning of the government's effort to develop, buy, and deploy them.[4,5] In Title IV of Division E of the Consolidated Appropriations Act, 2008 (Public Law 110-161), Congress required that the Secretary of Homeland Security submit to Congress a report certifying that ASPs would provide a "significant increase in operational effectiveness" over continued use of existing screening devices. This certification is a precondition for proceeding with full-scale procurement and deployment of ASPs. Congress also directed DHS to request that the National Academies advise the Secretary on the certification decision by helping to validate testing completed to date, providing support for future testing, assessing the costs and benefits of this technology, and bringing "robustness and scientific rigor to the procurement process."

Due to delays in the test and evaluation program, the Academies and DHS agreed that the study committee would issue an interim report that provides (1) the committee's evaluation of the testing program, (2) advice on how the Domestic Nuclear Detection Office (DNDO) can complete and make more rigorous its ASP evaluation for the Secretary and the nation, and (3) provide guidance on what a cost benefit analysis (CBA) should encompass. The interim report was issued in June 2009; the committee is continuing its evaluations and plans to issue its final report in the late summer.

THE INTERIM REPORT

In the interim report, the committee provided advice on the difficult task of analyzing costs and benefits of the ASPs. The committee stated that a CBA can provide a structure for evaluating whether a proposed program (such as the ASP program) is reasonable and justified.

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[4] Government Accountability Office. 2008. COMBATING NUCLEAR SMUGGLING: DHS's Phase 3 Test Report on Advanced Portal Monitors Does Not Fully Disclose the Limitations of the Test Results. GAO-08-979.

[5] Shea, D.A., J.D. Moteff, D. Morgan. 2009. The Advanced Spectroscopic Portal Program: Background and Issues for Congress. Congressional Research Service, RL34750.

A CBA can provide insight about alternative choices--for example, whether the benefits of a given program exceed its costs, and which choices are most cost-effective.

The committee was mindful throughout the study that the Secretary is faced with the decision whether to procure ASPs, so the analysis should focus on what information she would need for that decision. One of the committee's criticisms of DHS' analytic approach and certification criteria as of June 2009 was that after completing the cost-benefit analyses planned at that time, even if ASPs met the criteria, DHS still would not know whether the benefits of the ASPs outweigh the additional costs associated with them, or whether the ASP procurement funds are more effectively spent on other parts of the Global Nuclear Detection Architecture (the opportunity costs).

To be effective, the CBA must include three key elements: (1) a clear statement of the objectives of the screening program; (2) an assessment of meaningful alternatives to deploying ASPs; and (3) a comprehensive, credible and transparent analysis of benefits and costs.

A clear statement of the objectives of the screening program

A cost-benefit analysis should clearly define the ASP program objectives, including describing the capabilities of ASPs in the context of their role in the Global Nuclear Detection Architecture. The committee noted that it was not clear whether ASPs were intended primarily to increase operational efficiencies or to increase the likelihood of detecting smuggled nuclear materials.

An assessment of meaningful alternatives to deploying ASPs

The committee's view is that to make a decision about ASP deployment, DHS should consider tradeoffs and interactions among different elements of the Global Nuclear Detection

Architecture.[6] Alternative investments can be made to help prevent the smuggling of nuclear materials into the United States. DHS could invest its resources in: (1) procuring and maintaining ASPs; (2) using a different technology or approach to fill the same gap that ASPs are meant to address; or (3) addressing different gaps, for example, different threats and different modes of transport, like rail, aircraft, or small watercraft. Furthermore, it would be best if DNDO evaluated a number of alternatives against a broad set of scenarios that represent not only cargo screening today, but how it may change in the future. For example, the preferred modes and routes of shipping and transportation are not static. Nor are the threats. A more comprehensive evaluation of security benefits would factor in trends in shipping patterns and practices, as well as an adversary's ability to adapt to defenses.

For example, the enhanced capabilities provided by the ASP-C[7] system are relevant to cargo containers entering the United States by truck, but not by rail. In the future, it is probable that less cargo will be brought directly into major U.S. seaports. Some of the fastest-growing ports in North America are in Canada and Mexico,[8] and it is expected that these ports will handle increasing amounts of cargo destined for the United States. Much of this cargo will be unloaded onto on-dock rail and will cross U.S. borders on rail.

A comprehensive, credible and transparent analysis of in-scope benefits and costs.

DNDO's analyses as of June 2009 focused on benefits in the form of operational efficiencies, not security benefits. The savings from operational efficiencies, however, appeared

[6] It would be more appropriate for an analysis of the tradeoffs among different spending options across the Global Architecture to be carried out at a higher level than the ASP cost-benefit analysis so that it can provide guidance and support for multiple programs in a coordinated fashion. The committee has, however, seen no evidence that the higher level tradeoff analysis has been done, and a 2009 report by the GAO confirmed this view.

[7] The ASP-C is the variant of the ASP designed for screening truck-borne containerized cargo, and to date is the only ASP tested in support of certification.

[8] Some of the fastest-growing ports in North America include Manzanillo, Lazaro Cardenas, Vancouver, and Prince Rupert.

not to exceed the additional lifecycle costs of the new systems, so to justify the expenditure, the CBA needed to address security benefits, as well.

DNDO recognized the difficulty in assessing two of the cost-risk elements in the CBA with respect to equipment performance: assessing the probabilities of failure to detect threat material, and factoring in potential consequences of such a failure.

It is a complex task to evaluate the probability of an adversary attempting to smuggle threat material into the United States. In fact, that probability is impossible to determine definitively. Despite this difficulty, analysts need to understand what they can about these probabilities based on analytical tools and information from the intelligence community and other sources.

The consequences are likewise uncertain for other reasons: the variability in the possible consequences is very broad, so the benefits from avoiding a nuclear smuggling incident are both difficult to quantify and factor into a CBA. However, that difficulty does not make it less important to consider these benefits.

Security benefits can result from improvements in detection, identification, and interdiction capabilities, which increase the probability that a given nuclear smuggling event is prevented. Benefits can also result from deflection (e.g., to overseas targets) or deterrence (effectively reducing the probability that someone will attempt to smuggle nuclear material).

While it is difficult to assess security benefits, there are several analytic approaches that have been used to justify programs or regulations in the context of security against terrorism. The committee offered three of them in its interim report. Each approach suffers a common shortcoming – it does not answer the question of whether the benefits of implementing ASPs exceed the program's costs. However, each in a different way can provide insights that could help the Secretary weigh the merits of acquiring and deploying ASPs or alternative nuclear detection technologies or deployments.

Capability-based planning

A capability-based planning approach is a structured assessment of the options for how a program, including the people and technology, can meet specific operational goals across a wide range of circumstances.[9] In this context, it can be used to evaluate how alternative detection technologies or deployment strategies reduce the risk of nuclear smuggling in the United States. The set of options could include alternative deployments of ASPs and current RPMs, deployment of alternative RIIDs, or (depending on the scope of analysis) shifting emphasis between port-of-entry and non-port-of-entry detection. The alternatives would be compared based on what is important to the program objective or the larger mission. For example, a measure of the detection system's performance might be its probability of detecting a specific threat object (e.g., a billet of highly enriched uranium). The strength of a capabilities-based planning approach is that it can provide a rich comparison of the security benefits emphasizing the circumstances under which each alternative might be preferred. The weakness of this approach is that exploring the circumstances that affect the system's capabilities can quickly lead to a large and complex analysis. Analysts must balance this complexity, which may be needed for fidelity, against the need for simplicity to draw salient insights about a system's capabilities.

Game theory

Game theory could provide insight into the benefits from deterrence or deflection associated with the parts of the Global Architecture. Studies of other security applications have found that the simple presence of security can significantly deter criminals. For example, using

[9] Davis, P.K. 2002. Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation. Report # MG-1513-OSD, RAND Corporation, Santa Monica, CA.

game theory, Ayres and Leavitt[10] predicted that there would be a difference in the security impact of observable security measures and known-but-not-observable security measures. Looking at vehicle theft statistics they found that increased use of hidden radio-transmitter devices for retrieving stolen vehicles in a given area resulted in substantial overall declines in auto thefts. In contrast, observable security measures against car theft just tended to shift or deflect the risk of theft to other vehicles, but not lower overall rates of theft. In summary, having an effective defense in some cars, and no way for an adversary to determine which cars have it, reduced theft rates.

Likewise, the existence of some radiation monitoring at seaports and land border crossings may deflect adversaries, causing them to focus on other gaps in the nation's security that are identified as easier targets. For these reasons, increasing detection probabilities in screening of truck-borne cargo may have only a modest overall benefit as long as there are significant gaps in the Global Architecture. This has sometimes been described as fortifying the locks on the front door but leaving the windows open. Improved detection can be expected to become more beneficial as those gaps are filled.

The general weakness of game theory is that analysts have to make assumptions about adversaries' goals, resources, and reasoning. For example, it is difficult to estimate the value to the adversary of different outcomes (what constitutes success and what are the costs of being caught). But still, useful insights can be gleaned. Consider the case of deterrence. Screening only a fraction of the containers entering the United States may provide for effective deterrence (or deflection), if detection probabilities are sufficiently high and if smugglers cannot predict which containers will not be screened. This benefit quickly evaporates if adversaries are able to stage several smuggling attempts simultaneously because the chance of at least one attempt

[10] Ayres, I and S.D. Levitt. 1998. Measuring Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack. *The Quarterly Journal of Economics*, v. 113, no. 1: 43-77.

succeeding grows rapidly with the number of attempts.[11] Like other game theoretic analyses, this enters a psychological realm, ascribing logical thinking to the adversary, such as that the threat material is a scarce and valuable asset and that the risk of discovery at a port of entry is not desired.

Cost-effectiveness analysis and break-even analysis

Finally, cost-effectiveness analysis and break-even analysis are related approaches that have been used to assess costs and benefits when it is difficult or impossible to perform a complete cost-benefit analysis. Because the security goals of the ASP program may be difficult to value monetarily, comparing program alternatives using cost-effectiveness measures such as dollars per life saved or dollars per attack avoided could provide insights into their relative merits. Break-even analysis seeks the conditions that must be met for benefits to exceed costs. In security applications, these conditions could be a required reduction in overall risk[12] or a baseline estimate of a threat of attack that exists.[13] In cases where break-even analysis identifies meaningful bounds on decisions, that is, cases where the threshold conditions can easily be judged to exist, this approach can simplify decision making. The downfall of break-even analysis is that these conditions do not always exist.

I want to reiterate that these and other methods for evaluating security benefits can provide different insights, but none is likely to provide fully quantitative and definitive results. But most policy decisions are made without fully quantitative and definitive results, so DNDO should

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[11] Bier, V.M. and N. Haphuriwat. 2009. Analytical method to identify the number of containers to inspect at U.S. ports to deter terrorist attacks. *Annals of Operations Research*. November.

[12] Willis, H.H. and T. LaTourrette. 2008. Using Probabilistic Terrorism Risk Modeling for Regulatory Benefit-Cost Analysis: Application to the Western Hemisphere Travel Initiative. *Risk Analysis*, v. 28, no. 2: 325-339.

[13] Martonosi, S.E., D.S. Ortiz, H.H. Willis. 2005. Evaluating the viability of 100 percent container inspections at America's ports. In H.W. Richardson, P. Gordon, and J.E. Moore II, The Economic Impacts of Terrorist Attacks. Edward Elgar Publishing, Cheltenham, UK.

incorporate these benefits to provide the most informative CBA it can. Proceeding this way will undoubtedly result in greater insight than not including these considerations.

This concludes my testimony to the committee. Thank you for the opportunity to testify on this important topic. I would be happy to elaborate on any of my comments during the question and answer period.

Testimony of Dana A. Shea, Ph.D.
Specialist in Science and Technology Policy
Resources, Science, and Industry Division
Congressional Research Service

Before the Senate Committee on Homeland Security and Governmental Affairs
June 30, 2010

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part I"

Chairman Lieberman, Ranking Member Collins, and other Members of the Committee:

Thank you for the opportunity to testify before the committee today. My name is Dana Shea, and I am a Specialist in Science and Technology Policy at the Congressional Research Service. At the Committee's request, I am here today to discuss efforts to strengthen nuclear detection.

My testimony today has three parts. First, I will provide a brief overview of federal efforts to enhance detection of nuclear smuggling. Second, I will discuss the Department of Homeland Security (DHS) Domestic Nuclear Detection Office (DNDO) report that describes DNDO's coordination of these nuclear detection activities. Third, I will identify several policy issues that may be of interest to the Committee and Congress regarding future efforts in nuclear detection.

Enhancing the Global Nuclear Detection Architecture

The U.S. government has a long history in developing and deploying nuclear detection equipment in an attempt to deter and detect nuclear smuggling. For example, since the mid-1990s, the Department of Defense, the Department of State, and the Department of Energy were all engaged in cooperative threat reduction programs that aimed to secure international stockpiles of special nuclear material. Even before the establishment of DHS, these federal efforts had adopted a defense-in depth approach. For example, programs established by the Department of Energy (DOE) National Nuclear Security Administration (NNSA) were described as a first and second line of Defense against nuclear terrorism.[1]

The DHS, established in 2003, expanded this defense-in-depth strategy by continuing the deployment of polyvinyl toluene (PVT) radiation portal monitors at key ports of entry into the United States.[2] In addition, the DHS Science and Technology Directorate began to conceptualize these federal programs as parts of a larger architecture. Homeland Security Presidential Directive 14 established the DNDO in 2005. Congress codified the office in 2006 in the SAFE Port Act.[3] The DNDO became responsible for

[1] The DOE/NNSA has described the material protection, control, and accounting (MPC&A) program as "the nation's first line of defense against the threat of theft or diversion of unsecured Russian nuclear weapons or weapons-usable nuclear material." (National Nuclear Security Administration, Department of Energy, *MPC&A Program Strategic Plan*, July 2001.) The DOE/NNSA has also established a Second Line of Defense program that aims to strengthen the capability of partner countries to deter, detect, and interdict illicit trafficking in nuclear and other radioactive materials across international borders and through the global maritime shipping system. (National Nuclear Security Administration, Department of Energy, *Office of the Second Line of Defense Strategic Plan*, 2006.)

[2] The U.S. Customs Service began deploying PVT radiation portal monitors at the U.S. border prior to the establishment of DHS. The DHS continued this deployment, currently through U.S. Customs and Border Protection.

[3] P.L. 109-347, Section 501.

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developing an "enhanced nuclear detection architecture" that multiple federal agencies, including the Departments of Defense, Energy, Homeland Security, Justice, and State.[4]

The DNDO calls this enhanced nuclear detection architecture the global nuclear detection architecture (GNDA). The DNDO describes it as:

- a multi-layered structure of radiological and nuclear detection systems, deployed both domestically and overseas;
- a well-defined and carefully coordinated network of interrelationships among them; and
- a set of systems engineering-based principles and guidelines governing the architecture's design and evolution over time.[5]

The DNDO global nuclear detection architecture has three layers (exterior, border, and interior) organized by their geographic scope. Each layer is itself composed of several sublayers. Each sublayer provides an independent opportunity to detect the radiological or nuclear threat. Each architecture layer has both physical and conceptual components. The physical component is the sensor systems deployed by federal agencies. The conceptual component is the mechanism for organizing and analyzing program capabilities.

The global nuclear detection architecture is more than a simple alignment of existing programs, equipment, and budgets. It aims also to identify gaps, needs, and requirements for further development of nuclear detection capability and to project necessary expansion, research, and development to close the gaps and meet the needs and requirements identified. From this perspective, the global nuclear detection architecture could be seen both as a plan that describes and aligns current government-wide efforts and as a tool to identify areas where the participating agencies need to coordinate or refine their activities to close detection gaps and vulnerabilities.

DNDO Reports on the GNDA

The DNDO developed the first budget cross-cut of federal programs engaged in the global nuclear detection architecture in 2006.[6] Subsequently, Congress enacted P.L. 110-53, the Implementing the Recommendations of the 9/11 Commission Act of 2007, which directs the Secretaries of Homeland Security, State, Defense, and Energy, the Attorney General, and the Director of National Intelligence to conduct a joint annual interagency review of their activities and ensure that each participating agency assesses and evaluates its participation in the global nuclear detection architecture. The joint annual interagency review is to include evaluation of detection technologies, identification of deficiencies, and assessment of agency capacity for implementation of its responsibilities within the global nuclear detection architecture. Additionally, the Secretary of Homeland Security is required to evaluate technologies implemented in the domestic portion of the GNDA. The results of these reviews are to be reported to Congress by March 31 of each year. The DNDO issued reports in June 2008 and January 2010.[7]

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[4] P.L. 109-347, Section 501 "Sec. 1802".

[5] Domestic Nuclear Detection Office, Department of Homeland Security, *FY2011 Congressional Budget Justification*, p. RD&O-86.

[6] Domestic Nuclear Detection Office, Department of Homeland Security, *Report on Program and Budget Crosscut of Federal agencies Involved in the Global Nuclear Detection Architecture*, November 2006.

[7] Domestic Nuclear Detection Office, Department of Homeland Security, *Domestic Nuclear Detection Office: Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, June 2008; *Domestic Nuclear Detection Office, Department of* (continued...)

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The January 2010 report has both strengths and weaknesses. The report is the most comprehensive and integrated source of information about the programs that comprise the GNDA, the activities underway in those programs, and how DNDO categorizes the budgets of the programs by layer. The report discusses the roles and involvement of participating agencies and identifies programs contributing to the various layers of the GNDA. The report discusses agency attempts at strategic planning and further considerations regarding the establishment of metrics to measure the completeness and success of the GNDA. The report draws heavily on the report issued in 2008, including repeating the language of the previous report's required technology assessment. The report does not address whether agencies shaped the reported budgets to align with GNDA priorities. Finally, the report is retrospective in nature and was submitted after its statutory deadline. As such, the report's timeliness may be brought into question. The rest of my testimony draws upon my analysis of the January 2010 report and other documents.

Strategic Planning

The DNDO intends that the global nuclear detection architecture eventually be an integrated, mutually enhancing infrastructure for detection, coordination, and response.[8] Various agencies deploy and have responsibility for these systems. Some are planning additional deployments based on their individual agency needs and priorities. One hope for an integrated GNDA is that such deployments would further both the needs and priorities of the architecture as a whole, not just those of the implementing agency.

The Government Accountability Office (GAO) has criticized the limited strategic planning accompanying the GNDA. The GAO has found that federal agencies do not analyze their budgets to align their resources with overarching architecture priorities.[9] In 2008, GAO recommended that the Secretary of Homeland Security, in coordination with the Secretaries of Defense, Energy, and State, develop a strategic plan to guide the development of a more comprehensive global nuclear strategy. Such a strategy would include clearly defined objectives, roles and responsibilities identified to meet each objective, funding identified as necessary to achieve objectives, and mechanisms to monitor progress and identify needed improvements.[10] In 2009, GAO recommended that DHS develop a plan for the domestic part of the global strategy and engage with other stakeholders to develop broader strategic efforts to combat nuclear smuggling.[11]

Since its establishment, the DNDO has acknowledged the need for interagency strategic planning in support of the GNDA. As the DNDO Director testified in 2005,

> I think that is exactly what the concentrated effort within DNDO is going to bring to the table for the first time, the collective insights of the various departments that have been working these problems separately to sit down and figure out what the elements of this strategy need to be, is the deployment of a detection architecture domestically the necessary next step or is it just part of a broader strategy?

(...continued)

Homeland Security, Joint Annual Interagency Review of the Global Nuclear Detection Architecture, January 2010.

[8] Domestic Nuclear Detection Office, Department of Homeland Security, *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, January 2010.

[9] Government Accountability Office, *Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities*, GAO-09-257, January 2009.

[10] Government Accountability Office, *Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture*, GAO-08-999T, July 16, 2008.

[11] Government Accountability Office, *Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities*, January 2009.

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> People often look at the development of a strategy as a delaying tactic, but in this case I think it has got to be the way we explain, not only how we execute this problem but how we tie together the various elements of the operational community and the intelligence community to solve the problem. And until we have been able to espouse that theory and that strategy, we could have these kind of discussions for the next five years, and the panel that met yesterday has told you what that has gotten us so far. We have essentially talked about this for eight years and have done very little.[12]

The DNDO has begun to engage in strategic planning efforts. During FY2010, it plans to develop an overarching strategic plan for the development of the GNDA.[13] The DNDO asserts in its January 2010 report that, in conjunction with its interagency partners, it has worked to develop a broad vision for the GNDA and is beginning to transform this vision into an overarching strategic plan.[14] Participating agencies may be more likely to fully adopt or accept GNDA priorities if an overarching strategy and agency implementation plan is developed and articulated. In the absence of such plans, agencies may instead continue to base planning efforts on the goals of individual programs, rather than the overall architecture. Additionally, agencies that do adopt GNDA priorities may find measuring progress challenging if overarching strategic goals are not available. A key challenge for DNDO is its inability to direct the nuclear detection investments of other agencies, inside or outside DHS. The implementing agencies determine their budget priorities. Thus, strategic plans developed by DNDO might not be implemented by other agencies, if they disagree with the DNDO-developed strategy. Conversely, strategic plans developed in conjunction with other agencies may serve to validate the other agency's programmatic investments rather than assess the needs of the architecture as a whole. The DNDO concedes that an overarching strategic plan will take time, effort, and cooperation to complete.[15]

Metrics and Measures of Effectiveness

The effectiveness of the GNDA at preventing nuclear terrorism is difficult to assess because of its multi-layered, multi-program structure. Because the GNDA is a defense-in-depth approach, no individual layer of the architecture needs to have perfect detection. The DNDO has designed the architecture so that multiple detection opportunities exist. The combination of these detection opportunities leads to a greater overall detection probability.

The DNDO has attempted to identify pathways where detection gaps exist. This gap analysis was an important outcome of the initial architecture development activities. The DHS has used the results of the gap analysis to focus its efforts. It has deployed additional radiation detection equipment, established operational plans, and implemented pilot programs in areas where it has identified gaps. For example, the DNDO has established the West Coast Maritime Pilot to design, field, and evaluate a detection architecture for threats that could be illicitly transported on recreational craft or small commercial vessels.[16]

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[12] Oral testimony of Vayl S. Oxford, Acting Director, Domestic Nuclear Detection Office, Department of Homeland Security, in House Committee on Homeland Security, Subcommittee on Prevention of Nuclear and Biological Attack, *DHS Coordination of Nuclear Detection Efforts, Part I & II*, H. Hrg. 109-10, April 19-20, 2005.

[13] Domestic Nuclear Detection Office, Department of Homeland Security, *FY2011 Congressional Budget Justification*, p. RD&O-13.

[14] Domestic Nuclear Detection Office, Department of Homeland Security, *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, January 2010.

[15] Domestic Nuclear Detection Office, Department of Homeland Security, *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, January 2010.

[16] Testimony of Acting Director Charles R. Gallaway, Domestic Nuclear Detection Office, Department of Homeland Security, (continued...)

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The DNDO is in the process of developing metrics for the GNDA.[17] Although program managers in agencies executing GNDA programs may have developed program-level metrics, these may not fully reflect the interactions between programs in the GNDA layers. Without GNDA-level metrics, it is difficult to assess the effectiveness of investments in the GNDA. Similarly, without implementation plans for a GNDA strategy, policymakers will be challenged in monitoring progress towards desired GNDA goals.

Potential Issues for Congress

Debate continues among policymakers about what should comprise a nuclear detection architecture; what role DNDO should have in implementing such an architecture with other agencies; which agencies should participate in the implementation and how their policies should be coordinated; how new technologies can best be identified and integrated into the GNDA; how risk reduction in the GNDA should be assessed; and how budgets for GNDA programs should be developed and presented.

Nuclear Detection Architecture Programs

A key question for policymakers is: what activities and programs should comprise a nuclear detection architecture? Many experts have focused on the role of detection technologies for identifying and interdicting smuggled nuclear materials. Others have claimed that the concept of a nuclear detection architecture should be expanded to include other activities, such as general law enforcement and intelligence collection. Although these activities are not dedicated exclusively to nuclear smuggling, they can deter or prevent smuggling because they can lead to interdiction. However, including these activities in the GNDA could create challenges. For example, it would be difficult to determine what fraction of regular law enforcement activities should be included in a budgetary analysis of the global nuclear detection architecture. Policymakers may opt to require DNDO to assess the role of law enforcement and intelligence collection in global nuclear detection architecture and determine whether their contributions are sufficient.

DNDO's Role in Implementing the Global Nuclear Detection Architecture

The SAFE Port Act gives DNDO the responsibility to develop the global nuclear detection architecture, but the Secretaries of State, Defense, and Energy maintain their respective responsibilities for policy guidance and implementation of the portion of the global architecture outside the United States.[18] As a consequence, many executive-branch agencies set policy for and implement portions of the GNDA, even within a single layer or sublayer. Policymakers may choose to assess whether this distribution of responsibilities is the most effective way to provide a coordinated and integrated architecture. Policymakers might assign the development and implementation responsibility for each portion of the GNDA to a single agency, based on which agency provides a majority of the funding for that portion or on some other criterion. Alternatively, policymakers may wish to require DNDO and other agencies to develop formal agreements that clearly delineate roles and responsibilities in developing and implementing the nuclear detection architecture.

(...continued)

before the House Committee on Appropriations, Subcommittee on Homeland Security, April 1, 2009.

[17] Domestic Nuclear Detection Office, Department of Homeland Security, *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, January 2010.

[18] P.L. 109-347, Section 501 "Sec. 1802." See also 6 USC 592.

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In its current form, the global nuclear detection architecture does not appear prescriptive. The DNDO does not seem to have dictated a particular strategy that other agencies are to comply with to optimize federal detection capabilities. Moreover, although the DNDO is responsible for implementing the architecture's domestic portion, in practice, DHS operational entities, such as the U.S. Coast Guard and U.S. Customs and Border Protection (CBP), implement the domestic architecture in conjunction with DNDO.

The DNDO has apparently focused to some extent on developing frameworks for portions of the domestic architecture, rather than for the architecture as a whole. For example, DNDO and the Coast Guard have established a joint acquisition strategy for radiological and nuclear detection equipment, DNDO and CBP developed a joint project execution plan for the deployment of radiation portal monitors, and DNDO has developed plans for individual components, such as maritime smuggling.[19] Policymakers may decide to assess whether the global nuclear detection architecture requirements should be given higher priority in agency decision making or remain advisory in nature. Currently, individual agencies likely deploy systems and develop programs based on agency priorities rather than architecture priorities. This may lead to a less-than-optimal configuration of the architecture. On the other hand, agency programs and deployments may respond to essential factors beyond the scope of the nuclear detection architecture, such as maintaining international relations or fulfilling prior commitments.

Agency Participation

Policymakers may opt to consider which agencies should be considered as part of the global nuclear detection architecture. The predominant agencies in the global nuclear detection architecture are the Departments of Defense, Energy, Homeland Security, Justice, and State. The SAFE Port Act identified these agencies as having specific responsibilities for the development and implementation of the global nuclear detection architecture.[20] The Implementing the Recommendations of the 9/11 Commission Act of 2007 required the Director of National Intelligence, in addition to the Attorney General and the Secretaries of the above departments, to assess agency participation in the nuclear detection architecture.[21] Other federal agencies, such as the Nuclear Regulatory Commission, and state and local entities, such as state and local law enforcement, may also have a role. Policymakers may move to mandate the formal inclusion of these agencies into the global nuclear detection architecture planning process. Such inclusion might lead to greater harmonization of efforts and ensure that the GNDA responds to the views and capabilities of the Intelligence Community and local law enforcement. On the other hand, broadening participation and consultation in the GNDA might also complicate consensus planning activities.

Integration of Efforts and Technology

Another key consideration within the global nuclear detection architecture is its time-phased nature. As technologies advance and threats change, the architecture must adapt to these changes. Agencies thus must develop, test, and assess new technologies for their usefulness in the global nuclear detection architecture framework. The Implementing the Recommendations of the 9/11 Commission Act of 2007 requires that technologies deployed in the nuclear detection architecture be assessed for their

[19] Domestic Nuclear Detection Office, Department of Homeland Security, *FY2011 Congressional Budget Justification*, p. RD&O-18.

[20] P.L. 109-347, Section 501 "Sec. 1802(a)(4)". See also 6 USC 592

[21] P.L. 110-53, Title XI, Sec. 1103.

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performance, operational, and technical deficiencies by the agencies that operate or deploy them.[22] The Secretary of Homeland Security is also to annually examine and evaluate development, assessment, and acquisition of radiation detection technologies for the domestic portion of the global nuclear detection architecture.[23] Finally, the Secretary of Homeland Security is required to develop a plan for a departmental technology assessment process to determine the technology readiness levels of nuclear detection technologies before such technologies are fully deployed.[24]

Policymakers may choose to consider how often agencies should assess the capabilities of deployed and developing technologies. Frequent assessment of existing technologies might burden federal agencies but might net substantial benefits considering the changing capabilities of potential adversaries. Infrequent technology assessment might be less costly and burdensome, but could lead to outdated and ineffective technology remaining deployed, thus creating vulnerability, or new technologies being overlooked.

Policymakers may wish to require agencies to perform a more formalized assessment of the capabilities of technologies being acquired for the nuclear detection architecture. Such a formal process has been implemented in the Department of Defense, where meeting the criteria for a particular technology readiness level is required prior to specific program decisions being made.[25] Critics of such a proposal might claim that such assessments are qualitative and subjective, but others might see documenting technology readiness as a balance against unverified performance assumptions.

Quantitative Analysis of Risk in the Global Nuclear Detection Architecture

The joint annual interagency review report states that the architecture analysis process should consider a variety of criteria, including risk reduction, direct and indirect costs, and feasibility.[26] The DNDO aims to use this process to achieve substantial risk reduction through a balanced, robust, cost-effective, and layered strategy. Such an analytic approach, in which deployments in the GNDA are related to discrete risk reduction activities with quantitative measures, is a hallmark of a systems analysis approach.

The development of such a risk-based analytical model is likely challenging. The DNDO has stated that it plans to engage in "overarching risk analyses and detection modeling," as well as continuing to support specific detection strategies.[27] Quantitative architectural modeling of parts of the architecture may be more easily achieved than for the architecture as a whole. Both likely require the successful development of metrics. Policymakers could take action to determine whether DNDO's process for establishing and evaluating metrics is sufficiently robust. Policymakers might provide direction to DNDO regarding the appropriate scope of GNDA metrics; direct DNDO to establish GNDA metrics by a certain date; or require DNDO to obtain external advice, such as from the National Academy of Sciences, the National Academy of Public Administration, the DOE national laboratories, or a new advisory panel, regarding metrics and their development. Similarly, policymakers might direct other agencies coordinating defense-in-depth programs, such as the Department of Defense or the Department of Energy National Nuclear

[22] P.L. 110-53, Section 1103 "Sec. 1907(a)(1)". See also 6 USC 596a.

[23] P.L. 110-53, Section 1103 "Sec. 1907(a)(2)". See also 6 USC 596a.

[24] P.L. 110-53, Section 1104.

[25] See Director, Research Directorate (DRD) Office of the Director, Defense Research and Engineering (DDR&E), Department of Defense, *Technology Readiness Assessment (TRA) Deskbook*, July 2009.

[26] Domestic Nuclear Detection Office, Department of Homeland Security, *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*, January 2010.

[27] Domestic Nuclear Detection Office, Department of Homeland Security, *FY2011 Congressional Budget Justification*, p. RD&O-13.

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Security Agency, to identify best practices and lessons learned that could be applied by DNDO when considering the GNDA.

Coordinated Budget

A key question for congressional policymakers is whether the investments being made by the federal government are sufficient to meet the needs of the GNDA. In January 2009, the GAO recommended that the joint annual interagency review report be used

> to guide future strategic efforts to combat nuclear smuggling. This effort should include analyzing overall budget allocations to determine whether government-wide resources clearly align with identified priorities to maximize results and whether there is duplication of effort across agencies.[28]

The joint annual interagency review report does not describe a process for using the report to modify budget allocations or align resources with identified priorities. While the report has been reviewed and approved by the Departments of Homeland Security, Defense, Energy, Justice, and State and the Office of the Director of National Intelligence, the text of the report does not make clear whether it is used as part of these agencies' programmatic or strategic planning processes.

The joint annual interagency review report does provide consolidated funding levels by architecture layer. While the level of funding may not accurately reflect the level of effort, importance, or value of the program, it is one method for assessing the relative focus in the layers of the GNDA. Policymakers might expand or reduce agency funding levels to more closely match levels determined by DNDO to meet the needs of the global nuclear detection architecture; increase overall funding for all aspects of the global nuclear detection architecture to increase redundancy; or decrease funding if it believes other priorities are more important.

As I have already stated in my testimony, the architecture contains a network of interrelated programs. It is challenging to determine the full ramifications of shifting funding between these programs. Potential unexpected ramifications include imperiled international agreements, perceptions of weakness or strength in the various programs, and interagency disagreements. Unless the global nuclear detection architecture has a robust evaluative system with clear metrics that tie architecture performance to program funding, changes in investment in the different architecture layers may not yield optimal risk reduction. It is difficult to assess without careful evaluation whether shifting funds from one program to another will have a positive or negative net impact; the relative size of the two programs is not necessarily the relevant criterion for assessing its effect on the global nuclear detection architecture. Since DNDO is not statutorily empowered to direct changes in the funding of other agencies, only through higher-level budgetary policy decisions can interagency funding profiles be changed. This situation may result in a mismatch between the optimal investment levels for the global nuclear detection architecture and the actual investments made. Policymakers might choose to provide the DNDO Director with the authority to review and assess the budgets of other departments and agencies involved in the global nuclear detection architecture and to comment or recommend alternative budget allocation to other departments and agencies or directly to the Office of Management and Budget. The Director of the National Security Agency was granted a similar type of authority for national security telecommunications and information systems security programs. [29]

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[28] Government Accountability Office, *Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities*, GAO-09-257, January 2009, p. 34.

[29] Executive Office of the President, The White House, *National Policy for the Security of National Security Telecommunications* (continued...)

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Another possible approach would be for policymakers to require that the combined agencies create a single global nuclear detection architecture budget. This might provide policymakers with a more transparent correlation between agency funding and the global nuclear detection architecture. For example, an annual budget supplement is issued for the National Nanotechnology Initiative, another multi-agency federal endeavor with a large budget. Such a budget supplement for nuclear detection might be coordinated by DNDO through an interagency process; by the National Security Council or the National Science and Technology Council; or through another agency that participates in the GNDA.

Conclusion

The detection of nuclear smuggling and prevention of nuclear terrorism are high national and homeland security priorities. This multi-agency endeavor is complex and relies heavily on coordination between the participating agencies. The Department of Homeland Security and the Domestic Nuclear Detection Office face significant challenges in coordinating these activities. The DHS and DNDO may benefit from continued congressional oversight of efforts to keep the United States safe from the threat of nuclear terrorism. Mr. Chairman, that concludes my prepared statement. I would be happy to answer any questions that you or other Members of the Committee might have.

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and Information Systems, National Security Directive 42 (NSD-42), July 5, 1990.

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United States Senate
Committee on Homeland Security and Governmental Affairs
Chairman Joseph I. Lieberman, ID-Conn.

Opening Statement for Chairman Joseph Lieberman
"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II"
Homeland Security and Governmental Affairs Committee
Sept. 15, 2010
As Prepared for Delivery

Welcome to our hearing on the Committee's investigation of efforts by the Department of Homeland Security to strengthen our nation's defenses against the threat of nuclear terrorism.

I want to welcome Deputy Secretary of Homeland Security Jane Holl Lute who will be our primary witness today, as well as the new director of the Department's Domestic Nuclear Detection Office, Warren Stern, and representatives from other DHS agencies that have important roles to play in preventing a nuclear terrorist attack.

The first thing to say is that this threat is real.

In fact, the "National Security Strategy," released by the Administration in May contained the following stark warning – and I quote:

"The American people face no greater or more urgent danger than a terrorist attack with a nuclear weapon. . . . Black markets trade in nuclear secrets and materials. Terrorists are determined to buy, build, or steal a nuclear weapon."

In Part I of this hearing, on June 30, witnesses from the Government Accountability Office (GAO), the Congressional Research Service and the National Academy of Sciences, testified that one of the key offices assigned to protect us from this threat – which is DNDO, the Domestic Nuclear Detection Office – is woefully behind in its planning and implementation efforts despite $2 billion in funding since it was created in 2005 as an office within the Department of Homeland Security.

And since our last hearing, DNDO has provided further financial information to GAO that shows another $2 billion was spent department wide by Homeland Security in support of the Nuclear Detection Office's mission.

And what has that $4 billion bought over five years?

In part, that money has gone to expanding existing programs at Customs and Border Protection, the Coast Guard, TSA and other DHS agencies that are critical to our defenses against nuclear terrorism.

But, unfortunately, there is too much evidence that very little progress has been made with the funds that have been targeted towards enhancing our current nuclear detection capabilities.

Most importantly, the overall nuclear terror defense plan DNDO has been working on since it was created now five years ago– the Global Nuclear Detection Architecture – is still not completed.

And, in fact, last year, DNDO officials concluded that the plan they were developing was too dependent on unproven technologies and did not take into consideration the contributions that law enforcement and intelligence agencies could make with their existing assets.

I appreciate that designing a global system-of-systems – and coordinating the activities of agencies in other Departments that are part of that system – is a big challenge.

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But the threat is enormous here, and the size of the challenge, therefore, cannot explain away the failure of DNDO to develop a strategic plan for strengthening parts of the domestic layer of the architecture operated within the Department of Homeland Security, and help guide the nuclear detection investments by its fellow DHS agencies.

So that will be a primary focus of this hearing.

In our previous hearing, we also heard that DNDO has spent hundreds of millions of dollars trying to develop new radiation detection technology – known as the Advanced Spectroscopic Portal, or ASP – that the GAO concluded is only marginally better than what we have now.

GAO has also provided the Committee details about the failure of a second large DNDO technology investment, known as the Cargo Advanced Automated Radiography System, or CAARS.

According to GAO, the Nuclear Detection Office awarded contracts for the CAARS systems without ever determining if the system could be used in domestic ports of entry or whether it would meet the requirements of the Customs and Border Protection (CBP) agency, which is on the front lines of protecting our borders.

GAO estimates that DNDO has spent approximately $400 million combined on the ASP and CAARS programs with little or nothing to show for it.

GAO also contends that had DHS completed a strategic plan before making these investments, it might well have considered the security benefits of other mobile or portable detection systems.

Last year, GAO strongly recommended that DHS "develop a strategic plan for the domestic part of the global nuclear detection strategy . . . to guide the domestic nuclear detection investments of DHS agencies."

This is sound advice – but it has apparently not been followed by DHS or DNDO in making expensive decisions about the investments that they're making here at home.

This morning, we really need to hear a direct response from DHS to these criticisms and we need to know what corrective actions are being taken now.

Because our Committee wants to make sure that in carrying out our oversight responsibilities we do not cause the revelation of any information that could be exploited by our enemies, the hearing will adjourn at the appropriate time, to be resumed in closed session in the Senate Security offices.

Finally, I'd say that the problems facing the Domestic Nuclear Detection Office and the Department of Homeland Security, and our efforts generally to design and implement the global nuclear detection architecture are not new and they have been well documented. We held hearings on this topic during the previous administration.

But now this Administration is in charge and must step up to the plate and close this gap in our defenses against nuclear terrorism.

Sen. Collins.

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Opening Statement of
Senator Susan M. Collins

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II"

Committee on Homeland Security and Governmental Affairs
September 15, 2010

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Thank you, Mr. Chairman, for holding this second hearing on the efforts of the Department of Homeland Security to prevent nuclear terrorism against our country. At our first hearing, we examined the Department's inexplicable failure to complete a much-needed strategy to address this growing threat.

We know that time is not on our side.

The 2008 report by the Commission on the Prevention of Weapons of Mass Destruction predicted that "it is more likely than not that a weapon of mass destruction will be used in a terrorist attack somewhere in the world by the end of 2013." There is no more alarming prospect than that of a nuclear 9/11.

A nuclear bomb is the ultimate terrorist weapon, causing an unimaginable amount of death, suffering, and horror – precisely the kind of frightening and inhumane outcome that terrorists seek.

Terrorists have made clear their desire to secure a nuclear weapon. Given this stark reality, we must ask: what has the Department done to defend against nuclear terrorism on American soil? The answer, unfortunately, is not enough . . . not nearly enough.

Today, the Department still lacks a strategic plan for the global nuclear detection architecture, a necessity first identified by the Government Accountability Office (GAO) nearly eight years ago. We cannot wait another eight years or even another eight months. The Department must complete this plan now.

The office charged with this effort at DHS – the Domestic Nuclear Detection Office (DNDO) – has seemed more intent on investing in new technology than on the nuts-and-bolts planning that should guide these acquisitions. The Office has spent more than 224 million dollars over nearly

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five years on the Advanced Spectroscopic Portal (ASP) program, with the goal of developing the next-generation primary cargo scanning technology to detect unshielded nuclear and radiological materials.

But in February 2010, DNDO announced that ASP was no longer being pursued as a possible primary scanning technology, and was now only bein looked at as a possible secondary scanning technology. Unfortunately, GAC has found that the technology is only slightly better than existing monitors.

GAO's statement for the record today highlights problems with another scanning technology that would x-ray the contents of cargo containers. GAO found that DNDO failed to adequately communicate with Customs and Border Protection about such basic issues as how large the equipment could be to still fit within port of entry inspection lanes. After more than two years of work, DNDO decided to cancel the acquisition of thi technology and focus on more research and development.

DHS must be a more responsible steward of taxpayer dollars. Time and money have been wasted as DNDO focused almost completely on marginal improvements in technology, rather than identifying gaps in coverage and the appropriate technology to eliminate those gaps.

Moreover, troubling gaps continue to exist that could be exploited by terrorists seeking to smuggle illicit nuclear materials into the United States.

To be sure, the Department has deployed more than 1,400 radiation portal monitors, allowing nearly 100 percent of cargo entering seaports and nearly 100 percent of vehicle traffic on the southern and northern borders to be scanned for unshielded nuclear material. And that is significant.

But, cargo coming into this country by rail from Canada or Mexico is still not scanned, and only a small percentage of international air cargo is scanned.

Effective scanning technology for these shipments would form an important part of a layered, risk-based defense to nuclear terrorism.

The lack of a strong strategic plan to establish priorities and to give our tactics cohesion has contributed to our slow progress on an effective defense against terrorists' nuclear ambitions.

This strategy should include a comprehensive cost-benefit analysis that accounts for currently available and potential future technologies, as

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well as the personnel, intelligence, and infrastructure needed to combat the terrorist nuclear threat.

In addition, to improve the coordination across government, President Obama must appoint a Coordinator for the Prevention of Weapons of Mass Destruction Proliferation and Terrorism as required by the 2007 homeland security law. This Coordinator would help promote the interagency collaboration needed to develop and implement an effective strategy to defend against this threat.

Inadequate planning causes schedule delays and cost overruns and the procurement of the wrong kinds of technology. When we're talking about preventing nuclear terrorism, these failures can lead to catastrophic consequences for our nation.

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The Honorable Jane Holl Lute

Deputy Secretary
United States Department of Homeland Security

Testimony on
"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II"

Before the
United States Senate
Committee on Homeland Security and Governmental Affairs

September 15, 2010

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Good morning Chairman Lieberman, ranking member Collins, and distinguished members of the Committee. It is my pleasure to appear before you today to discuss DHS's efforts to increase our security and reduce the overall risk of nuclear terrorism, by making nuclear terrorism a prohibitively difficult undertaking for our adversaries.

Few would disagree that the detonation of a nuclear device in a U.S. city would have devastating consequences. I don't need to itemize damage and casualty estimates for you. Preventing nuclear terrorism has been and remains one of the Department's top priorities.

But, DHS cannot meet this challenge alone: other federal departments and agencies are engaged in this effort, as are state and local law enforcement agencies, foreign governments, and international organizations, such as the International Atomic Energy Agency (IAEA). We must do more to synchronize and integrate our efforts so that gaps are filled, unnecessary redundancy is avoided, and vulnerabilities are minimized.

President Obama has made preventing nuclear terrorism a top priority through his consistent, strong support for the Global Initiative to Combat Nuclear Terrorism, United Nations Security Council Resolution 1540, Proliferation Security Initiative, emphasis on bolstering the Nuclear Nonproliferation Treaty, and his hallmark Nuclear Security Summit held in April of this year. In his April 2009 speech in Prague, the President affirmed that terrorist acquisition of a nuclear weapon is the "most immediate and extreme threat to global security." DHS stands committed to its responsibilities to help prevent such an attack.

GLOBAL EFFORTS TO COMBAT NUCLEAR TERRORISM

Committing an act of nuclear terrorism is not a simple task; it requires access to a sufficient quantity of fissile nuclear material – the core of a nuclear bomb. We believe that the only feasible way this could be achieved by a non-state organization is through theft or diversion from existing stockpiles. The stockpiles in question consist primarily of weapons components or materials from states with nuclear weapons, as well as highly enriched uranium (HEU) and plutonium used in some civil applications, such as fuel for specialized reactors. It would also necessitate financial, technical, and logistical resources to construct or modify the device (in most cases), transport it to the target, perhaps across multiple international borders and by various modes of conveyance, and detonate; all without being detected. Nevertheless, this is no time to remain static in our efforts.

The United States has led the world in countering the nuclear terrorism threat, starting with preventing acquisition of nuclear material through several landmark programs. The Nunn-Lugar Cooperative Threat Reduction (CTR) program, operated by the Department of Defense (DOD), aims to secure or eliminate weapons of mass destruction (WMD) and related materials around the world. There is a broad range of additional U.S. programs designed to minimize the risk of nuclear terrorism. For example, the Department of Energy's (DOE) Global Threat Reduction Initiative (GTRI) addresses the research and test reactor fuel issue by assisting foreign nations with transitioning these reactors to low enriched uranium fuel that cannot be used in a nuclear weapon.

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Under GTRI, considerable quantities of HEU originally obtained from the United States have been repatriated. In addition, the DOE's Materials Protection, Control and Accounting Program (MPC&A) serves as an important line of defense in increasing security and reducing the overall risk of nuclear terrorism by working cooperatively with international partners to secure and eliminate potentially vulnerable nuclear weapons and weapons-usable material. The MPC&A Program emphasizes improvements in physical protection, protective forces, material control and accounting, nuclear security culture, and creating an infrastructure that supports these programs. The President announced in his Prague speech a "new international effort to secure all vulnerable nuclear material around the world within four years." The GTRI and MPC&A programs help to minimize the amount of fissile nuclear material available globally by securing, relocating, and removing nuclear material that might otherwise be stolen or diverted for terrorist purposes.

But, against a determined adversary no effort is 100 percent effective and nuclear materials may indeed escape national control. Smuggling of nuclear materials has occurred - only in small quantities that we know of thus far - but smuggling remains a grave concern and very high priority. The Weapons of Mass Destruction Proliferation Prevention Initiative (PPI) is an element of DOD's CTR program. The PPI aims to avert or interdict smuggling of WMD materials and related components, addressing vulnerabilities through increased security along borders. DOE's Second Line of Defense (SLD) program works around the world to strengthen the capability of foreign governments to deter, detect, and interdict illicit trafficking in nuclear and other radioactive materials across international borders and through the global maritime shipping system. SLD has two parts, the Core Program and the Megaports Initiative. The Core Program installs radiation detection equipment at borders, airports, and strategic ports in Russia, other FSU States, in Eastern Europe, and other key countries. The Megaports Initiative provides radiation detection equipment to key international seaports to screen cargo containers for nuclear and other radioactive materials regardless of the container destination.

The Proliferation Security Initiative (PSI) is a global effort that aims to apply intelligence, diplomatic, law enforcement, military, and other tools at our disposal to interdict shipments of weapons of mass destruction (WMD), their delivery systems, and related materials to and from nation states and non-state actors of proliferation concern. The PSI relies on cooperative actions by states that are consistent with national legal authorities and relevant international law and frameworks. Launched by President Bush in May 2003, this successful program today has the support of 98 countries around the world.

We don't assume overseas programs, however robust, will completely stem the threat. While DHS supports overseas activities with our expertise, our primary domain is the United States and its territories, and the approaches to the United States by sea, air and land. We are working diligently to protect the U.S. against this threat.

DHS's lead Component specifically focused on combating nuclear terrorism is the Domestic Nuclear Detection Office (DNDO). I am happy to announce that DNDO has a newly appointed Director. I know that the Committee is keenly interested in DNDO programs,

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especially the Advanced Spectroscopic Portal (ASP) program. While ASP is certainly important, there is much more to DNDO than ASP, which I will address later in the testimony.

One of DNDO's core mandates is to develop a Global Nuclear Detection Architecture (GNDA). The GNDA is a risk-informed, multilayered network to detect illicit radiological and nuclear materials or weapons. This involves developing and deploying effective detection solutions within the U.S. and abroad, maintaining situational awareness, and sharing critical information related to detection.

DHS's jurisdictional authority and responsibility for these pathways extends beyond nuclear smuggling: DHS agencies are responsible for interdicting a range of illicit smuggling and trafficking activities across U.S. borders. To secure the U.S. borders from threats from abroad while expediting the safe flow of lawful travel and commerce, DHS pursues the goals of effectively securing U.S. air, land, and sea borders, safeguarding lawful trade and travel, and disrupting and dismantling transnational criminal organizations. The focus of these efforts includes narcotics, weapons, bulk cash, and human smuggling and trafficking, in addition to nuclear materials. While concern with cross-border criminal activity does not rise to that associated with smuggling of a nuclear device, transnational criminal and terrorist organizations may seek to smuggle a range of high-value goods and people across U.S. borders, including organization leaders, large quantities of bulk cash, highly valuable weapons and weapons technology, and experts in various types of criminality.

These steady-state transborder efforts, while not specifically aimed at nuclear smuggling, may provide the knowledge and expertise necessary to successfully interdict an attempt to smuggle a nuclear weapon into the United States. Overlaid on this steady-state transborder security activity is the threat-focused interagency nuclear terrorism prevention effort, which includes the programs and capabilities of our interagency partners, DHS operational Components described below, and others that are identified in the GNDA.

DHS EFFORTS TO COUNTER NUCLEAR TERRORISM

When DHS was formed, the Department inherited agencies that possessed clear homeland security roles. Among those agencies were the United States Coast Guard (USCG), the Immigration and Naturalization Service (which included the Border Patrol), and the United States Customs Service. The latter two agencies are now three: U.S. Immigration and Customs Enforcement (ICE), U.S. Customs and Border Protection (CBP), and U.S. Citizenship and Immigration Services (USCIS). These agencies brought with them significant authorities and capabilities to detect and interdict transport of nuclear weapons materials and the people potentially involved, and to enforce U.S. laws. In addition, the Transportation Security Administration (TSA) was formed within the Department of Transportation after September 11, 2001, and later transferred to DHS.

The U.S. Coast Guard

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As the principal federal agency responsible for maritime safety and security, the Coast Guard protects vital economic and security interests of the United States, including the safety and security of the maritime public, the global transportation system and the integrity of our maritime borders. The Coast Guard's layered defense against nuclear terrorism threats begins far from the nation's shores and includes inspection of foreign ports and vessels, employment of cutters, aircraft and boats offshore and in the nation's ports, and deployable specialized forces with global reach. The Coast Guard's unique authorities provide unparalleled access to maritime infrastructure and potential threats both offshore and in port. The Coast Guard conducts daily inspections and boardings to ensure vessels comply with maritime law and safety standards, applicable U.S. law and regulations, and control procedures for access to the nation's ports. All Coast Guard vessel boardings and inspection teams are equipped with nuclear/radiological detectors, with more than 72,000 boardings and 15,000 facility inspections conducted each year. The Coast Guard also has access to over 5,000 facilities for enforcement of safety and security requirements, with each boarding and inspection team playing a role in the nuclear detection architecture.

A. Detection Capabilities and Capacity

Maintaining a chemical, biological and radiological (CBR) detection capability in the nation's maritime approaches is critical to domestic defense. The Coast Guard's National Security Cutter provides maritime domain command and control, including management of vessels and air traffic control, in a CBR-contaminated environment. The National Security Cutter employs the Collective Protection System (CPS), which creates a contaminant-free environment within the ship so that the crew may operate without specialized personnel protective equipment.

All major Coast Guard cutters are equipped with specialized CBR personal protective equipment for exposure to chemical and some biological agents. Major cutters are also equipped with decontamination systems intended to mitigate exposure to radiological fall-out, persistent and semi-persistent chemical agents, and biological weapons.

In 2003, the Coast Guard implemented a Maritime Radiation Detection Program to provide all Coast Guard boarding and inspection teams with human portable radiation detectors designed to identify and interdict radiological threats as far offshore as possible and to expand boardings to counter the small vessel threat. These capabilities are sustained and strengthened by partnerships with other federal, state, local, private and international organizations as part of a layered approach to security that leverages technology and partnerships to enhance detection – consistent with the goals of DHS's Small Vessel Security Strategy.

The Coast Guard works closely with DNDO, DOE, CBP and other federal agencies to ensure that its program aligns with and contributes to ongoing efforts toward building a layered, integrated defense against nuclear terrorism threats.

Current Coast Guard radiological/nuclear detection capability includes more than 5,000 personal radiation detectors (PRDs), more than 800 radioisotope identification devices (RIIDs), and more than 200 wide-area radiological search systems. Coast Guard radiation

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detection/identification equipment has been deployed to 210 cutters, 190 boat stations, 35 Sectors, 12 Maritime Safety and Security Teams (MSST), the Maritime Security Response Team (MSRT), two Tactical Law Enforcement Teams, three national Strike Force (NSF) Teams, and 60 other operational/training units. DNDO is also working to develop and acquire the next generation of RIIDs and PRDs for the Coast Guard.

The Coast Guard Maritime Law Enforcement Academy provides training in basic and advanced radiological detection and triage, and Coast Guard boarding teams have reach-back capacity for isotope interpretation and alarm resolution.

The Coast Guard's MSRT and MSSTs provide the nation with unique maritime capabilities for nuclear/radiological detection and identification, personnel protection, and self-decontamination in both routine and hostile situations. MSRT capabilities are designed and implemented to integrate with follow-on forces.

The Coast Guard NSF provides DHS with the capability for maritime chemical, biological, radiological or nuclear (CBRN)/hazardous materials incident response and mitigation. The NSF – which provides detection, identification, personnel protection, surface and self decontamination, hazardous material packaging, and mobile command and control during post incident response – supports federal-on-scene-coordinators in the coastal zone and inland.

B. Partnerships

The Coast Guard supports continued integration of DHS efforts to deter, detect, prevent or respond to and recover from nuclear or radiological incidents. Improved unity of effort across the U.S. government requires enhanced integrated planning. The Coast Guard leads the interagency Maritime Operational Threat Response process, which supports operations including interdiction of suspected nuclear/radiological materials.

Coast Guard nuclear detection equipment development, acquisition and sustainment are achieved through a joint acquisition strategy with DNDO that relies on DNDO centralized funding for acquisition and testing of Coast Guard maritime radiation detection systems. The Coast Guard and DNDO are developing a radiological/nuclear module for the Coast Guard's Maritime Security Risk Analysis Model (MSRAM), which will enable the Coast Guard and DNDO to assess, analyze, and manage risk from direct radiological/nuclear attacks, exploitation attacks, and transfer scenarios. The Coast Guard and DNDO also conducted maritime small vessel standoff radiation detection testing of vessel-mounted sensor systems.

U.S. Customs and Border Protection (CBP)

CBP has the lead responsibility for implementing the Department's border security mission, which includes detecting and preventing terrorists and terrorist weapons from entering the United States. CBP currently employs a layered enforcement strategy at ports of departure and ports of entry to prevent the importation of nuclear materials, assembled nuclear devices, or the materials that could potentially be used to assemble a nuclear device. CBP's nuclear

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terrorism prevention activities occur at ports of entry, between the ports of entry, and even in overseas locations such as at passenger preclearance locations, or as part of the Container Security Initiative (CSI), outlined below. CBP and ICE also conduct enforcement activities to prevent criminals and terrorists from obtaining financial or material support for nuclear proliferation through outbound enforcement efforts.

A. ***Non-intrusive Inspection and Radiation Detection Technology***

The deployment of large-scale Non-Intrusive Inspection (NII) imaging systems and radiation detection equipment has made a tremendous contribution to CBP's ability to help secure the supply chains that bring goods into the United States from around the world. NII technology serves as a force multiplier that allows officers to detect possible anomalies between the manifested contents of a conveyance and the scanned image that could lead to preventing its exploitation by terrorist groups, the discovery of WMD materials or devices and other contraband.

CBP has aggressively deployed NII and Radiation Portal Monitor (RPM) technology. Prior to 9/11, not a single RPM, and only 64 large-scale NII systems were deployed to our country's borders. Currently, CBP has a total of 269 large-scale NII systems deployed nationwide. To date, CBP has used the deployed NII systems to conduct over 43 million examinations, resulting in over 9,200 narcotic seizures, with a total weight of over 2.8 million pounds, and over $34.7 million in undeclared currency seizures. CBP also employs the Automated Targeting System (ATS), a computerized risk assessment system. This system identifies commerce deemed to represent elevated threats that require a more intensive inspection.

As of August of this year, CBP has deployed a total of 1,426 RPMs to our nation's ports of entry. Since the inception of the RPM program in 2002, CBP has scanned over 438 million conveyances for the presence of illicit radiological materials and resolved over 2.7 million radiation alarms. Deployed RPMs currently enable CBP to scan 100 percent of all containerized cargo arriving in the United States by land and 99.4 percent by sea. CBP, in partnership with DNDO, has deployed 495 RPMs at Northern border land ports of entry; 392 RPMs at Southern border land ports of entry; 453 RPMs at seaports; 50 RPMs at mail facilities and 36 RPMs to other locations, such as training facilities. Funded by the American Recovery and Reinvestment Act of 2009, CBP has begun deploying the first integrated NII and RPM system.

B. ***Container Security Initiative, Secure Freight Initiative, and Customs-Trade Partnership Against Terrorism***

The Container Security Initiative (CSI) extends our nation's zone of security by targeting, with our foreign counterparts, containers that may be used to conceal terrorist weapons before they leave foreign ports of lading. CSI strengthens the nation's security by forging relationships and liaisons with foreign customs counterparts to facilitate communication and coordination, establishing security criteria for identifying high-risk containers based on advance information, pre-screening containers at the earliest possible point, and using technology to quickly pre-screen high-risk containers.

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To date, foreign nations representing 58 ports that ship directly to the United States have agreed to participate in CSI, and teams of CBP Officers have been deployed overseas to target and screen containers destined for the United States. More than 80 percent of U.S.-bound containerized cargo currently passes through a CSI port. To date, over 40,000 examinations of high-risk shipments have taken place overseas at CSI locations.

The Secure Freight Initiative (SFI) is an effort to build upon existing port security measures by enhancing the U.S. government's ability to scan containers for nuclear and radiological materials in seaports worldwide and to better assess the risk of inbound containers. This initiative is the culmination of DHS's work with other federal departments and agencies, foreign governments, the trade community, and vendors of cutting-edge technology. SFI provides carriers of maritime containerized cargo greater confidence in the security of the shipment they are transporting, and increases the likelihood of an uninterrupted and secure flow of commerce.

SFI deploys networks of radiation detection, provided by the Department of Energy, our partner in SFI, and imaging equipment at two overseas pilot ports. CBP will prioritize future deployments of scanning systems to locations of strategic importance by identifying seaports where non-intrusive imaging and radiation detection data would be most practical and effective in deterring the movement of WMD via containerized cargo. The additional scan data provided by SFI will enhance DHS's risk-based and layered approach to securing maritime containerized cargo. DHS will continue to work with Congress to enhance the safety of our nation's ports and the security of incoming cargo.

The Customs-Trade Partnership Against Terrorism (C-TPAT) is a voluntary government-industry initiative to build cooperative relationships that strengthen and improve the overall international supply chain and U.S. border security. C-TPAT recognizes that CBP can provide the highest level of cargo security only through close cooperation with the ultimate owners of the international supply chain: importers, carriers, consolidators, licensed customs brokers and manufacturers. C-TPAT allows CBP to designate certain companies as low-risk, based on the company's past Customs compliance history, security profile and the validation of a sample international supply chain. C-TPAT has conducted domestic and foreign site visits to physically review companies' security best practices and weaknesses along their international supply chains. By extending our zone of security to point of origin, C-TPAT allows for better risk management and targeting and allows CBP to allocate appropriately inspectional resources. There are currently 9,965 certified C-TPAT members.

C. *National Targeting Center – Cargo and the Advanced Targeting System*

As part of CBP's layered targeting strategy, the National Targeting Center – Cargo (NTC-C) proactively analyzes advance cargo tactical and strategic information using the ATS before shipments reach the United States. ATS provides uniform review of cargo shipments for identification of the highest threat shipments, and presents data in a comprehensive, flexible format to address specific intelligence threats and trends. National targeting rule sets have been implemented in ATS to provide threshold targeting for national security risks for all modes of

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transportation—sea, truck, rail, and air. ATS is a decision support tool for CBP officers working in the NTC-C and in Advanced Targeting Units at our ports of entry and CSI ports abroad.

Once NTC-C has analyzed the advanced information using ATS and other tools, intelligence briefs are created and disseminated to officers in the field. This information is used by CBP and other agencies to support enforcement actions, such as seizures and arrests.

NTC-C has established partnerships and liaisons with other agencies, both domestically and abroad. Partnerships with ICE, the Drug Enforcement Administration, the Financial Crimes Enforcement Network, the Department of Commerce, and the Department of Health and Human Services promote information sharing and the exchange of best practices, while collaboration with foreign governments results in seizures and detection of threats at our borders and in foreign ports.

Transportation Security Administration (TSA)

TSA is an intelligence-driven agency that employs a risk-based strategy to secure U.S. transportation systems from the evolving terrorist threat, working closely with stakeholders in aviation, rail, transit, highway, and pipeline sectors, as well as the partners in the law enforcement and intelligence community. To achieve this mission, TSA has a dedicated workforce of over 50,000, protecting every domestic commercial airport and strengthening security in all transportation modes.

TSA works in close partnership with other DHS Components, such as DNDO, CBP, the Coast Guard and the Science and Technology Directorate to address the nuclear and radiological threat in the transportation sector and enhance the Department's capabilities to increase security and reduce the overall risk of the United States.

To enhance its ability to detect potential nuclear or radiological threats in transportation systems within the United States, in cooperation with DNDO, TSA has established 10 dedicated Visible Intermodal Prevention and Response (VIPR) teams equipped with human portable nuclear detection systems. TSA also recently stood up an additional 15 VIPR teams which are currently equipped with similar capabilities. Nationwide, VIPR teams enhance security in all transportation modes, including rail and mass transit systems. VIPR teams work with local transportation security and law enforcement officials to supplement existing security resources, provide deterrent presence and detection capabilities, and introduce an element of unpredictability to disrupt potential terrorist planning activities.

TSA collaborates with CBP to implement the requirements of the SAFE Port Act to deploy radiation detection capabilities to U.S. ports of entry to scan international air cargo with RPMs to prevent the illicit importation of nuclear and radiological materials into the United States. TSA also partners with CBP in instances where domestic cargo may be co-located with international cargo. CBP and TSA are working to establish a Memorandum of Understanding to provide an official framework for information sharing and regulatory assistance.

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Collaborating with DNDO and the Department of Justice, TSA was a founding partner of the Southern Regional Radiological Pilot Program (SRRPP) to improve domain awareness and transportation security at the Port of Charleston, South Carolina. From April 2005 to December 2008, SRRPP partners successfully tested and evaluated radiation detection technologies, practices, and response procedures to prepare for, deter, and respond to radiological and/or nuclear terrorist threats. Upon completion of the project, TSA transferred ownership of the radiation detection devices and supporting equipment to DNDO.

TSA works closely with DNDO through formally chartered DHS/TSA Integrated Product Teams and frequent collaboration to help identify technologies and systems that will be most useful and effective in detecting nuclear materials and devices in the transportation system. TSA's knowledge of transportation systems is essential to identify gaps in capabilities and requirements for further coordinated research and development.

TSA's experience in developing and deploying explosives detection systems is particularly helpful because technologies and systems for detection of improvised nuclear devices are sometimes similar to those for improvised explosives device (IED) detection. For example, DNDO and TSA are assessing the use of the same vehicle inspection portal systems for detection of both vehicle-borne IEDs and improvised nuclear devices, and are collaborating to ensure commonality of development and system components to the maximum extent possible. This approach should prevent duplication of effort and reduce overall system costs over time.

TSA and DNDO are also exploring a collaborative field experiment and pilot program to test DNDO products in surface and multimodal transportation locations. The goal of the field tests is to seek information that could lead to product design improvements and to test production-representative or low rate initial production systems under operational conditions. As part of the research and development (R&D) and field testing collaboration, TSA and DNDO would establish operational protocols for use of the systems and for actions resulting from detection of a threat.

In the general aviation sector, TSA is dedicated to DHS-wide strategic efforts to prevent the introduction of nuclear or radiological threat materials through international general aviation. TSA's experts in general aviation security and airports work collaboratively with DNDO to establish joint plans and prevent duplication of effort in international general aviation.

TSA also establishes and enforces security-related regulations and requirements to ensure the adequacy of security measures for all transportation modes. On November 26, 2008, TSA issued regulations affecting freight rail shippers, receivers, and carriers of rail security-sensitive materials (RSSM) which includes a rail car containing a highway route-controlled quantity of a Class 7 (radioactive) material. The rule requires freight rail carriers and certain facilities handling rail security-sensitive materials to designate a rail security coordinator, report tank car location and shipping information to TSA upon request, report significant security concerns, and implement custody and control requirements in transit and at the shipping and receiving locations. Additionally, as required by the Implementing Recommendations of the 9/11 Commission Act, TSA is developing regulations that will require all freight rail carriers of

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RSSM to provide security training for freight railroad employees and to conduct vulnerability assessments and develop security plans.

On June 26, 2008, TSA provided carriers with voluntary security measures for the highway transportation of specific hazardous materials defined as Highway Security-Sensitive Materials (HSSM). HSSM includes International Atomic Energy Agency Code of Conduct Category 1 and 2 materials including Highway Route Controlled quantities of radioactive materials. TSA is presently working to incorporate these guidelines in security regulations.

In addition, TSA is in the process of formalizing its collaboration with the U.S. Nuclear Regulatory Commission and the Department of Transportation through a Memorandum of Understanding concerning the security of radioactive material while in transport. The purpose of this memorandum is to delineate clear lines of authority, roles and responsibility and promote communications, efficiency, and non-duplication of effort through cooperation between the parties in the area of transportation security based on existing legal authorities and core competencies.

The Office of Intelligence & Analysis

The DHS Office of Intelligence & Analysis (I&A) provides strategic intelligence assessments tailored to meet the information needs of DHS components and state, local, tribal, territorial and private sector stakeholders. I&A also prepares actionable, operational and strategic intelligence assessments on threat actors, their claims and plans to attack the United States with nuclear materials. These analyses support DNDO's implementation of the domestic portion of the GNDA. I&A also participates and organizes other Intelligence Community (IC) participation in the threat elicitation process for departmental risk assessments related to nuclear and radiological terrorism, supports DNDO and other DHS components by acting as a conduit to the larger IC and represents DHS's interests in relevant IC forums.

I&A produces tailored nuclear and radiological threat-related products designed to support state and local officials and DHS front-line personnel. Examples include a reporting guide designed to assist fusion centers during a nuclear or radiological crisis and a series of reference aids designed to educate first responders and field personnel about high-risk radiological materials. I&A's input supports nuclear and radiological risk assessments that help leaders focus their resource, consequence-management and training activities for maximum effect.

Immigration and Customs Enforcement (ICE)

ICE conducts counter-proliferation investigations that concentrate on the illegal export of U.S. munitions list items and controlled technologies used in nuclear programs, along with any violations of U.S. sanctions programs. One of the most effective tools ICE special agents use to protect the United States is "Project Shield America" (PSA). PSA is an industry outreach initiative whereby agents conduct presentations with manufacturers, distributors, and/or exporters of strategic commodities that are believed to be targeted for procurement by terrorist

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organizations, rogue countries that support them, as well as countries identified as weapons proliferators.

In addition to ICE's lead in identifying, disrupting and dismantling nuclear procurement networks, ICE collaborates with CBP on CSI, through which CBP has stationed multi-disciplinary teams overseas to work with host government counterparts to target and pre-screen containers at foreign seaports and to develop additional investigations to prevent the import of WMD into the United States via shipping containers. In addition, more than 200 ICE agents assigned to the FBI Joint Terrorism Task Forces (JTTFs) and would be part of the FBI led investigation to disrupt any such plot.

Currently, ICE administers and participates in numerous programs that address the trafficking of nuclear devices and materials as well as other WMD. ICE partners with the State Department in the Export Control Related Border Security (EXBS) program, designed to develop the capabilities of foreign law enforcement in the detection of WMD, missile system, and conventional weapon proliferation. In support of the CSI program, ICE currently has 15 agents assigned overseas and three foreign-service national investigators. ICE also has agents assigned to 63 foreign attaché offices to support counter-proliferation investigation and enforcement efforts. Finally, ICE has an active intelligence requirements program that coordinates with other agency and intelligence community collection managers in order to ensure that ICE receives timely and accurate WMD and nuclear proliferation intelligence.

Domestic Nuclear Detection Office

On April 15, 2005, the President signed National Security Presidential Directive-43 and Homeland Security Presidential Directive-14 directing the Secretary of Homeland Security, in coordination with the Secretaries of State, Defense, and Energy, and the Attorney General, to establish a jointly-staffed, national-level Domestic Nuclear Detection Office (DNDO) within the Department. Subsequently, the SAFE Port Act of 2006 formally codified the DNDO and added a presidentially-appointed Director.

DNDO's mandate is to improve the nation's capability to detect and report unauthorized attempts to import, possess, store, develop, or transport nuclear or radiological material for use against the nation, and to further enhance this capability over time. With assistance and participation from a wide variety of U.S. Government departments and agencies, DNDO synchronizes and integrates inter-agency efforts to develop technical nuclear detection capabilities, characterizes detector system performance, ensures effective response to detection alarms, integrates nuclear forensics efforts, coordinates the global detection architecture and conducts a transformational research and development program for advanced technology to detect nuclear and radiological materials.

Advanced Spectroscopic Portal (ASP)

In 2005, DNDO embarked on an aggressive program to develop the next generation radiation portal monitor to address key detection gaps. The ASP program set a schedule without sufficiently accounting for technical risk, which has caused a number of delays. We have accepted many of the GAO's recommendations and have substantially improved program

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management and oversight. Under the leadership of the Under Secretary of Management, the Department has developed Acquisition Directive 102-01, which gives us greater insight into all acquisition programs in the Department, and which we have leveraged to significantly improve the ASP program.

The ASP program is approaching a key decision milestone. DNDO and CBP are currently working together to resume field testing. Upon successful completion, DHS will finalize the cost-benefit analysis and proceed to the Acquisition Review Board (ARB). The ARB will make its recommendation to the Secretary on ASP certification. We continue to believe that if certification is realized, the ASP deployment will be a major improvement in border security against nuclear threats without impeding the flow of commerce.

It is important to note that we will seek certification for the ASP in secondary scanning only. While we have always considered the possibility of the ASP serving in primary or secondary scanning, we now believe, based on test results and a preliminary cost-benefit analysis, that limiting deployments to secondary scanning is justified.

In addition to ASP, DNDO engages in a broad range of other nuclear-detection programs. For example, under its mandate to develop a GNDA, DNDO has created a world-class development and testing program for radiation detection systems. DNDO has also developed programs supporting federal, state, and local agencies and other governments within its core competence of nuclear detection, and is coordinating U.S. government technical nuclear forensics efforts.

Since its inception in 2005, DNDO has established the U.S. government's premier radiological and nuclear detection system test and evaluation organization. DNDO has conducted 48 separate test and evaluation campaigns at more than 20 experimental and operational venues. These test campaigns were planned and executed using rigorous, reproducible, and peer-reviewed processes. Tested detection systems include pagers, handhelds, portals, backpacks, mobiles, boat-mounted, and spreader bar-mounted detectors as well as next generation radiography technologies. The results from DNDO's test campaigns have informed federal, state, local, and tribal operational users on the technical and operational performance of radiological and nuclear detection systems, supporting selection of the most suitable equipment and effective concepts of operations to help keep the nation safe from the nuclear terrorist threat.

DNDO has also completed construction and put into operation the state-of-the-art Radiological and Nuclear Countermeasures Test and Evaluation Complex at the recently renamed Nevada National Security Site to allow testing against significant threat quantities of special nuclear material. DNDO also established the Rail Test Center at the Port of Tacoma, Wash., to conduct testing in an operational port environment. DNDO's testing expertise and experience is sought by interagency partners, such as DOE and DoD, and international partners such as the United Kingdom, Canada, Israel, European Union, and the IAEA.

To support basic research and the long-term development of systems with increased capabilities, DNDO is conducting R&D investigations for advanced high-performance handheld systems; advanced passive standoff detection technologies; improved detection through

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networked and distributed detection systems; and better detector materials, as well as R&D for improved material attribution and radiochemistry.

Underlying these efforts is our work to ensure a continued pipeline for human capital development and basic research, executed through DNDO's partnership with the National Science Foundation for the Academic Research Initiative. To date, the Academic Research Initiative has awarded 36 grants to 32 universities.

Moreover, building upon partnerships with federal, state, and local stakeholders, DNDO has worked to improve domestic radiological and nuclear detection capabilities within our borders. Through the Southeast Transportation Corridor Project, DNDO forged a regional partnership with nine states and the District of Columbia to identify the most effective methodologies and locations for the deployment of fixed, mobile and handheld detectors at interstate weigh stations in each jurisdiction. In 2007, DNDO launched the Securing the Cities (STC) Initiative, beginning with a 3-year pilot in the New York City region, to provide the analytical tools and technical support to develop regionally-based detection strategies aimed at preventing radiological and nuclear attacks. DNDO also established the West Coast Maritime Pilot to work with authorities in Washington's Puget Sound and the San Diego area to design, field, and evaluate a radiological and nuclear detection architecture (specific to each selected region) that reduces the risk of threats that could be illicitly transported on recreational craft or small commercial vessels. Additionally, DNDO established the Mobile Detection Deployment Program to provide a domestic detection equipment package for federal, state and local authorities to augment their incident response teams for pre-planned activities such as National Special Security Events. Since 2005, DNDO has piloted and fielded fifteen training courses and effectively trained over 15,000 law enforcement officers and public safety professionals in preventive radiological and nuclear detection operations. In addition, DNDO, through its Joint Analysis Center, supports federal, state and local officials in adjudicating detection alarms.

We have also supported other U.S. global efforts to counter nuclear terrorism. For example, DNDO provides essential support to the President's Global Initiative to Combat Nuclear Terrorism. Under this framework, in 2009, DNDO coordinated the international development of the *Model Guidelines Document for Nuclear Detection Architectures*, which promotes the development of national nuclear detection architectures and capabilities to combat the illicit trafficking of nuclear and radioactive materials, weapons and components. Since its release in 2009, the document has received a positive response from international and domestic partners. Furthermore, the IAEA will likely include this document in its Nuclear Security Series publications that promulgate recommendations and guidance level documents to all 151 IAEA member states.

DNDO has also coordinated the U.S. government technical nuclear forensics efforts. The National Technical Nuclear Forensics Center (NTNFC), established in 2007, serves as a national-level "system integrator" for joint planning, exercising, and evaluating our national capabilities, while investing in technical capability advancement. The NTNFC also led the interagency effort to develop the national Strategic Five-Year Plan for Improving the Nuclear Forensics and Attribution Capabilities of the United States, which was signed by the President and submitted to Congress in April. DHS recognizes the deterrent value of an effective forensics

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and attribution capability – U.S. declaratory policy emphasizes that any nation or group that enables a terrorist to acquire nuclear devices or materials will be held accountable. Robust forensics and attribution capabilities help to underwrite this policy.

Of course, DNDO works closely with other DHS components to implement the domestic portion of the GNDA, as previously described in relevant component sections.

The Global Nuclear Detection Architecture (GNDA)

The GNDA is a global, integrated, defense-in-depth approach that synchronizes and integrates numerous detection programs across the interagency. GNDA is a major component of DHS efforts to increase security and reduce the overall risk of nuclear terrorism. It is "global" in that it includes both U.S. systems and those of other countries as well as the sharing of information among those systems. It seeks "nuclear" material and weapons but is designed to also find radioactive material to help protect against nuclear and radiological terrorism. It "detect[s]" by way of radiation-sensing and radiography instruments as well as by non-instrument means, such as ongoing law-enforcement operations, and observation and reporting of suspicious behavior. But the GNDA is more than deployed technologies. The DHS and interagency programs that make up the GNDA address distinct layers where detection, deterrence, and interdiction opportunities exist from the point of origin of nuclear material to transit routes, potential entry points and even movement within the United States. Efforts to improve security at the source, namely DOD and DOE programs, are the root of any effort to reduce the risk of nuclear terrorism and are considered in any analysis of the effectiveness of the GNDA.

Several interrelated elements make the GNDA function: awareness of nuclear threats; a multi-layered structure of detection systems; a well-defined and carefully coordinated network of relationships among them; and guidance for governing the architecture's design and evolution over time. Detection may be achieved in a number of ways, including technologies to sense emissions from radioactive materials, technologies for NII, and other technical means, such as ultrasound or weight measurement. Perhaps most important, however, is the non-technical, human factor – alert agents who notice anomalies and suspicious activities and initiate further investigation and interdiction.

As stated earlier, several critical international programs of DOD and DOE, both managed wholly by our federal partners, and joint programs, like SFI, help fill the external layer of the GNDA. The domestic portion of the GNDA is made up of programs and initiatives covering borders and the nation's interior. Efforts at land, sea and air points of entry continue to improve coverage and capability while new efforts to provide detection capabilities at non-POE sites have been initiated.

In 2005, DNDO determined the baseline detection architecture. However, we did not develop a strategic plan to guide the implementation of a new architecture. DNDO is now working with DHS Components and interagency partners to develop such a strategic plan to establish goals for the various elements of the GNDA. DNDO has established an interagency Assistant Secretary-level committee to provide guidance and oversight for development of the strategic plan, which will articulate what the GNDA must accomplish, and guide its development and implementation.

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DNDO will complement the GNDA Strategic Plan with a revised annual report on the Joint Interagency Review of the GNDA, required by Congress, which will provide a means to document and track progress to assist DNDO and the interagency in developing and refining the GNDA. It will also link the federal organizational roles and responsibilities to the GNDA goals to inform resource decisions in order to achieve those objectives. The GNDA strategic plan and annual report will be jointly produced and agreed upon by the interagency, enabling the U.S. government to implement the GNDA in a coordinated manner.

WAY FORWARD

In the last five years, the Department has matured; our understanding of the threat has matured; we have conducted substantial research; we have developed and tested technologies and explored operational constraints; we have initiated disciplined acquisition programs, and trained and deployed competent people. We have made significant progress, but we recognize we have a long road ahead.

As noted above, the Department recently completed its first Quadrennial Homeland Security Review. The QHSR describes a homeland security enterprise of federal, State and local agencies engaged in daily watchfulness over our land, air, sea, and borders, investigating suspicious persons, vehicles and cargo, checking visas and identity, enforcing laws, and monitoring for threats. Overlaid on this complex of steady-state security activity is a threat-focused interagency nuclear terrorism prevention effort.

To meet this challenge, the Department has established a Nuclear Terrorism Working Group, staffed by the heads of key Components in the Department. The Working Group meets regularly to: closely examine departmental roles and activities contributing to nuclear terrorism prevention; work with DNDO to develop nuclear terrorism prevention strategies; engage our Science and Technology Directorate apparatus to apply its skills to the problem; and plan how our operational components will meet these challenges on the ground.

The GNDA is DHS's primary means to increase security and reduce the overall risk related to nuclear terrorism. We will develop a strategic plan for the GNDA in careful coordination with other U.S. government departments and agencies and with our international partners.

Our goal is to make nuclear terrorism a prohibitively difficult undertaking for our adversaries. We will look strategically at all means the Department has at its disposal to achieve security for the United States against nuclear terrorism. The target should not be the nuclear material or device alone: we must also target our adversary. A strategic approach should not focus entirely on the detection of nuclear materials or weapons, but must take advantage of other parts of our security apparatus. .

I also stated earlier that we must work together, and we must integrate our efforts so that gaps are filled, unnecessary redundancy is avoided and vulnerabilities are eliminated. It is

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imperative that federal departments and agencies synchronize and integrate efforts in the fight against nuclear terrorism. Without cooperation, the GNDA is an architecture in name only – conceptual, but not effectual. There is no room for turf battles here. We will succeed together, or we will fail together. To that end, a key measure of success should be the degree of cooperation and integration of federal programs to counter nuclear terrorism. DHS was given the job to lead development of the GNDA and facilitate cooperation, and I am pleased to say that cooperation is improving, but we know we must continue to reach out to our partners.

The responsibility to increase security and reduce the overall risk of nuclear terrorism is not owned by any one office, or department, or even government. It must be a collective effort of freedom-loving peoples committed to the protection of those freedoms here and abroad. Thank you and I look forward to the Committee's support in this endeavor, and am happy to take any questions you may have.

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United States Government Accountability Office

GAO

Statement for the Record
To the Committee on Homeland Security and Governmental Affairs,
U.S. Senate

For Release on Delivery
Expected at 10:00 a.m. EDT
Wednesday, September 15, 2010

COMBATING NUCLEAR SMUGGLING

Inadequate Communication and Oversight Hampered DHS Efforts to Develop an Advanced Radiography System to Detect Nuclear Materials

Statement for the Record by Gene Aloise, Director,
Natural Resources and Environment

and

Stephen L. Caldwell, Director,
Homeland Security and Justice

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GAO-10-1041T

September 15, 2010

COMBATING NUCLEAR SMUGGLING

Inadequate Communication and Oversight Hampered DHS Efforts to Develop an Advanced Radiography System to Detect Nuclear Materials

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Highlights

Highlights of GAO-10-1041T, a statement for the record to the Committee on Homeland Security and Governmental Affairs, U.S. Senate.

Why GAO Did This Study

The Department of Homeland Security's (DHS) Domestic Nuclear Detection Office (DNDO) is charged with developing and acquiring equipment to detect nuclear and radiological materials to support federal efforts to combat nuclear smuggling. Also within DHS, Customs and Border Protection (CBP) has the lead for operating systems to detect nuclear and radiological materials entering the country at U.S. ports of entry. In 2005, DNDO began working on the cargo advanced automated radiography system (CAARS) intending that it be used by CBP to detect certain nuclear materials in vehicles and containers at U.S. ports of entry. However, in 2007 DNDO decided to cancel the acquisition phase of the program and convert it to a research and development program. GAO was asked to examine events that led to DNDO's decision to cancel the acquisition phase of the program and provide lessons learned from DNDO's experience. This statement is based on prior GAO reports from March 2006 through July 2010 and ongoing work reviewing DHS efforts to develop radiography technology. For ongoing work, GAO reviewed CAARS planning documents and interviewed DHS, DNDO, and CBP officials.

GAO provided a draft of the information in this testimony to DHS and component agencies, which provided technical comments and which were incorporated as appropriate.

View GAO-10-1041T or key components. For more information, contact Gene Aloise at 202-512-3841 or aloisee@gao.gov.

What GAO Found

From the start of the CAARS program in 2005 until DNDO cancelled the acquisition phase of the program in December 2007, DNDO pursued the acquisition and deployment of CAARS machines without fully understanding that they would not fit within existing primary inspection lanes at CBP ports of entry. This occurred because during the first year or more of the program DNDO and CBP had few discussions about operating requirements at ports of entry. When CBP and DNDO officials met, shortly before DNDO's decision to cancel the acquisition phase of the program, CBP officials said they made it clear to DNDO that they did not want the CAARS machines because they would not fit in primary inspections lanes and would slow down the flow of commerce through these lanes and cause significant delays. Also, the CAARS program was among numerous DHS acquisition programs about which GAO reported in 2008 that appropriate oversight was lacking. Further, the development of the CAARS algorithms (software)—a key part of the machine needed to identify shielded nuclear materials automatically—did not mature at a rapid enough pace to warrant acquisition and deployment. Also, the description of the progress of the CAARS program used to support funding requests in DNDO's budget justifications was misleading because it did not reflect the actual status of the program. For example, the fiscal years 2010 and 2011 DHS budget justifications both cited that an ongoing CAARS testing campaign would lead to a cost-benefit analysis. However, DNDO officials told GAO that when they cancelled the acquisition part of the program in 2007, they also decided not to conduct any associated cost benefit analysis. During recent discussions with DNDO officials, they agreed that the language in the budget justifications lacked clarity, and they have no plans to prepare a cost benefit analysis.

Based on GAO's review of the CAARS program and its prior reports on DHS development and acquisition efforts, GAO identified lessons learned for DHS to consider in its continuing efforts to develop the next generation of radiography imaging technology. For example, GAO previously reported that agencies can enhance coordination by agreeing on roles and responsibilities. In this regard, a draft memorandum of agreement among DHS agencies that intends to clarify roles and responsibilities in developing technologies and help ensure effective coordination has not been finalized. Completing this memorandum could give DHS reasonable assurance that problems associated with the CAARS program do not recur. In discussions with senior officials from DHS, DNDO, CBP and S&T, they all agreed with the need for the memorandum and said that they intend to work toward finalizing the draft memorandum of agreement. Other lessons GAO identified include (1) engage in a robust departmental oversight review process (2) separate the research and development functions from acquisition functions (3) determine the technology readiness levels before moving forward to acquisition, and (4) rigorously test devices using actual agency operational tactics before making decisions on acquisition.

United States Government Accountability Office

Mr. Chairman and Members of the Committee:

We appreciate the opportunity to provide a statement for the record on efforts of the Department of Homeland Security's (DHS) Domestic Nuclear Detection Office (DNDO) to develop the cargo advanced automated radiography system (CAARS) to strengthen DHS's ability to prevent the smuggling of nuclear materials into the United States. Preventing terrorists from using radiological or nuclear materials to carry out an attack in the United States is a top national priority. As we reported in January 2009, a terrorist could try to smuggle nuclear materials into the United States in a variety of ways, including hiding them in a car, train, private aircraft or small vessel; sending them through the mail; carrying them in personal luggage through an airport; walking them across the border; or concealing them in maritime cargo containers in the global supply chain.[1] Maritime cargo containers are of particular concern because they can be filled overseas at many different locations and are transported through complex logistics networks before reaching U.S. ports. As a result, terrorists could try to take advantage of such vulnerabilities by placing nuclear materials into a container for shipment to the United States. U.S. government officials believe that the likelihood of terrorists smuggling nuclear materials into the United States in cargo containers is relatively low, but criminals have long exploited containers for other illegal purposes, such as smuggling weapons, people and illicit substances.

As we testified before this committee in June, DHS has made significant progress over the past several years in both deploying radiation detection equipment and developing procedures to scan cargo and conveyances entering the United States through fixed land and sea ports of entry for nuclear and radiological materials.[2] Moreover, DHS reports that while it scans nearly 100 percent of the cargo and conveyances entering the United States through land borders and major seaports, it has made less progress scanning for radiation in other pathways into the United States such as general aviation and small maritime craft.

[1] GAO, *Nuclear Detection: Domestic Nuclear Detection Office Should Improve Planning to Better Address Gaps and Vulnerabilities*, GAO-09-257 (Washington, D.C.: Jan. 29, 2009).

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

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DNDO is charged with developing, acquiring, and deploying equipment to detect nuclear and radiological materials in order to support the efforts of DHS and other federal agencies, such as the departments of Energy and State, in combating nuclear smuggling. DNDO is also charged with enhancing and coordinating federal, state, and local efforts to prevent radiological and nuclear attacks. In doing this, DNDO is required to work with other federal agencies to develop a global nuclear detection architecture.[3] To date, DHS has spent nearly $4 billion on various aspects of the architecture but has not developed a strategic plan to guide its efforts to develop and implement this architecture as we recommended in 2008.[4] DNDO agreed with this recommendation but has not developed such a plan.

Also within DHS, Customs and Border Protection (CBP) has the lead for deploying, operating, and maintaining systems to detect nuclear and radiological materials entering the country through land borders, seaports, and other ports of entry. CBP also has a broad mission to detect more traditional contraband, such as drugs and guns; to prevent the inflow of inadmissible aliens; and to conduct its operations in a way that does not impede the flow of commerce. To detect nuclear materials, CBP, in coordination with DNDO, has deployed over 1,400 radiation portal monitors (RPM) at U.S. ports of entry. Most of the RPMs are installed in primary inspection lanes through which nearly all traffic and shipping containers must pass. These monitors alarm when they detect radiation coming from a package, vehicle, or shipping container. CBP then conducts further inspections at its secondary inspection locations to identify the cause of the alarm and whether it is a reason for concern.

While these RPMs are sensitive and have been effective at detecting radiation, they also have limitations. In particular, in May 2009 we reported that RPMs are capable of detecting certain nuclear materials only when these materials are unshielded or lightly shielded.[5] In contrast,

[3]National Security Presidential Directive-43 (also known as Homeland Security Presidential Directive-14), sec. 2(d).

[4]GAO, *Nuclear Detection: Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture*, GAO-08-999T (Washington, D.C.: July 16, 2008).

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

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advanced radiography can be used to detect dense material that may be consistent with the presence of certain nuclear materials in vehicles and cargo containers, and CBP already uses radiography to more closely investigate the contents of a vehicle or cargo container that has been selected for secondary inspection at a U.S. port of entry. However, according to CBP officials, only a small percentage of vehicles or cargo containers are subjected to secondary inspections.

DNDO began working on the CAARS program in 2005 with the intention that through advanced radiography and improved algorithms (software), CAARS would be used by CBP to automatically detect and identify highly shielded nuclear material in vehicles and cargo containers in both primary and secondary inspection lanes at U.S. ports of entry. Thus, through CAARS, DNDO expected that CBP would be able to detect more heavily shielded nuclear material in nearly all vehicles and cargo containers going through primary inspection lanes, and therefore, close a gap in the nuclear detection architecture. In September 2006, DNDO awarded a contract for the CAARS program to research, develop, acquire, and deploy advanced radiography imaging technology designed to detect highly shielded nuclear material being smuggled through U.S. ports of entry. At that time, DNDO expected the program could cost as much as $1.5 billion. However, in December 2007, DNDO made what it called a "course correction," by canceling the program's acquisition and deployment plans and significantly reducing its scope. The CAARS program then became a research and development program designed to demonstrate the potential capability of the technology. As a result of this change, DNDO no longer expected to deploy CAARS machines but instead opted to demonstrate the maturity and promise of CAARS technology. As part of the CAARS demonstration project, DNDO, with the assistance of scientists from the Department of Energy's Lawrence Livermore National Laboratory (LLNL), began testing the capabilities of CAARS' prototypes in the fall of 2009 and completed testing in March 2010. According to DNDO officials, DNDO plans to report on the results of the tests and lay out a way forward regarding the future application of CAARS radiography imaging by the end of September 2010. Overall, from the inception of the program in 2005 until today, DNDO officials reported that the agency has spent about $113 million on the CAARS program.

Since the capabilities of radiography systems are an important part of cargo security, you asked us to examine the history of the CAARS program. Accordingly, this statement discusses events that led to the course correction in the CAARS program, and provides potential lessons learned from DNDO's experience with the CAARS program. This

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statement is based on prior reports and testimonies we issued from March 2006 through July 2010.[6] Detailed information on our scope and methodology for our prior work can be found in these reports. This statement is also based on results from our ongoing work in response to your request to review radiography systems within DHS.

As part of our ongoing review of radiography systems, specifically CAARS, from March 2010 to September 2010 we analyzed key CAARS planning documents developed in the early stages of program development, such as the acquisition plan, program baseline, performance specifications, and requests for proposals and reviewed subsequent CAARS documents that reflect DNDO's decision to scale back the program and removal of the acquisition phase from CAARS contracts. We conducted interviews with former and current CAARS program managers and other key officials within DNDO, CBP, the DHS Science & Technology Directorate (S&T), and the DHS Office of Policy. We also met with representatives from contractors that were developing CAARS and consulted with subject matter experts from LLNL involved in testing those contractors' CAARS prototypes. We provided a draft of the information in this testimony to DHS and component agencies, which provided technical comments and which we incorporated as appropriate. We conducted this work in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[6] See Appendix I for a list of related GAO products.

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DNDO Planned for the Acquisition and Deployment of CAARS without Fully Understanding that It Could Not Feasibly Operate in a U.S. Port Environment

From the start of the CAARS program in 2005 until the course correction in December 2007, DNDO planned the acquisition and deployment of CAARS machines without understanding that they would not fit within existing primary inspection lanes at CBP ports of entry. This occurred because during the first year or more of the program DNDO and CBP had few discussions about operating requirements for primary inspection lanes at ports of entry. In addition, the CAARS program was among numerous acquisition programs about which we previously reported that appropriate DHS oversight was lacking. Furthermore, the development of the CAARS algorithms—a key part of the machine needed to identify shielded nuclear materials automatically—did not mature at a rapid enough pace to warrant acquisition and deployment. Moreover, the description of the progress of the CAARS program used to support funding requests in DNDO's budget justifications for fiscal years 2009 through 2011 was misleading because it did not reflect the actual status of the program.

Inadequate Communication

From the inception of the CAARS program until the decision in December 2007 to cancel acquisition of the program, DNDO and CBP had few, if any, in-depth discussions about CBP's requirements to be able to use radiography in primary inspection lanes. According to DNDO officials, they requested information from CBP on its user requirements for the CAARS system, but CBP was slow to respond to these requests. DNDO continued with its plans to develop CAARS machines because, according to DNDO officials, at the time it was thought that a solution was urgently needed to be able to detect shielded nuclear materials in primary inspection lanes. In discussing this with senior CBP officials, they said that DNDO officials did not attempt to meet with them during the beginning of the CAARS program. When CBP and DNDO officials met, shortly before the course correction, CBP officials said they made it clear to DNDO that they did not want the CAARS machines because they would not fit in primary inspections lanes and would slow down the flow of commerce through these lanes and cause significant delays.[7]

In our view, had CBP and DNDO officials met early in the development of the program to discuss CBP's needs and operational requirements, as stated in DHS's acquisition policy at the time, it is unlikely that DNDO

[7]DNDO officials later acknowledged that they proceeded in developing CAARS with the CBP specifications for using radiography in secondary inspection areas—not knowing that these same specifications were not suitable for primary inspection lanes.

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would have found reason to move forward with its plan to develop and acquire CAARS technology. Nonetheless, in September 2006, DNDO awarded contracts to three CAARS vendors. In December 2007, DNDO decided to cancel the acquisition of CAARS and limit any further work to a research and development effort. In recent joint discussions with CBP and DNDO officials, they acknowledged that communication between the two agencies could have been improved during the early part of the CAARS program. They said they communicate much more routinely now and that, in their view, it would be unlikely that the communication problems associated with the CAARS program would reoccur.

Inadequate Oversight

DNDO did not follow DHS acquisition protocols for the CAARS program. Specifically, in 2008, we reported that CAARS was among numerous major DHS acquisition programs that did not have a mission needs statement—a required DHS acquisition document that formally acknowledges that the need for an acquisition is justified and supported.[8] DHS policy also called for programmatic reviews at key decision points and required certain analytical documents. However, CAARS did not undergo annual department level reviews as called for nor did DNDO program officials obtain or prepare basic analytical documents. For example, one of these documents, a concept of operations (CONOPS), was intended to demonstrate how CBP would use CAARS machines in primary inspection areas at the ports. However, as a result of inadequate communication and collaboration between CBP and DNDO discussed earlier, no CONOPS was developed during the early phase of the CAARS program. Ultimately, according to DNDO officials, once DNDO made the decision to cancel the acquisition portion of CAARS in December 2007, a CONOPS was no longer required.

Immature Technology

According to DNDO officials, at the time of the inception of the CAARS program, there was a widespread view within DNDO that something had to be done to provide CBP with the capability to detect highly shielded nuclear material in primary inspection lanes. DNDO officials acknowledged that the agency decided to move forward with the CAARS program despite the fact that automatic detection, a key feature of CAARS, depended on the rapid development of algorithms that were

[8]GAO, *Department of Homeland Security: Billions Invested in Major Programs Lack Appropriate Oversight*, GAO-09-29 (Washington, D.C.: Nov. 18, 2008).

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technologically immature. The algorithms are critical because they provide the capability for CAARS to automatically detect highly shielded nuclear material in primary inspection areas without the need for extensive operator review and interpretation of an image—two factors that could adversely affect CBP's ability to avoid delays to the flow of commerce along with its overall effectiveness in detecting highly shielded nuclear material. Although algorithms supporting the CAARS technology were technologically immature, DNDO created an aggressive production and deployment schedule that was to begin in August 2008, the end of DNDO's planned 2-year development period for the CAARS program. At the time it decided on this production milestone, DNDO officials said it was likely that the algorithms would be developed in time to meet the start of planned production. However, the technology did not develop as expected and contributed to DNDO's decision to cancel the acquisition phase of CAARS.

Basis of CAARS Funding Requests

For fiscal year 2009 through fiscal year 2011, DHS justified annual budget requests to Congress by citing significant plans and accomplishments of the CAARS program, including that CAARS technology development and deployment was feasible, even though DNDO had made the decision in December 2007 to cancel the acquisition of CAARS. For example, in its fiscal year 2009 budget justification, DHS stated that a preliminary DNDO/CBP CAARS production and deployment program had been successfully developed and that CAARS machines would be developed that would detect both contraband and shielded nuclear material with little or no impact on CBP operations. The fiscal years 2010 and 2011 DHS budget justifications both cited that an ongoing testing campaign would lead to a cost benefit analysis, followed by rapid development of a prototype that would lead to a pilot deployment at a CBP point of entry. Furthermore, the fiscal year 2010 budget justification stated that while the CAARS technology was less mature than originally estimated, successful development was still feasible. However, DHS's description and assessment of the CAARS program in its budget justification did not reflect the actual progress of the program. Specifically, DNDO officials told us that when they made their course correction and cancelled the acquisition part of the program in 2007, they also decided not to conduct a cost benefit analysis because such analyses are generally needed to justify going forward with acquisitions. In addition, DNDO completed CAARS testing in March 2010; however, as of today, the final test results for two of the three CAARS machines are not yet available. Currently, no CAARS machines have been deployed. CAARS machines from various vendors have either been disassembled or sit idle without being tested in a port

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environment, and CBP is considering whether to allow DNDO to collect operational data in a port environment. During recent discussions with DNDO officials, they agreed that the language in the budget justifications lacked clarity and stated that they are not planning to complete a cost benefit analysis since such analyses are generally associated with acquisition programs.

CAARS Offers Lessons Learned Regarding the Importance of Developing Requirements, Coordinating with Users, and Managing Acquisitions

Based on our review of the CAARS program and our reports on DNDO efforts to develop an advanced RPM called the advanced spectroscopic portal (ASP),[9] we have identified lessons learned for DHS to consider in its continuing efforts to develop the next generation of radiography imaging technology.

Enhance Interagency Collaboration and Coordination

Despite the importance of coordinating crosscutting program efforts, we have reported that weak coordination of those efforts has been a long-standing problem in the federal government and has proven to be difficult to resolve.[10] We have also reported that agencies can enhance and sustain their collaborative efforts. One way we reported that agencies can enhance coordination is to agree on roles and responsibilities and establish mutually reinforcing or joint strategies.[11] As discussed, DNDO did not coordinate and collaborate with CBP early in the development of the CAARS program to identify CBP's needs and requirements. According

[9]GAO, *Combating Nuclear Smuggling: Additional Actions Needed to Ensure Adequate Testing of Next Generation Radiation Detection Equipment*, GAO-07-1247T (Washington, D.C.: Sept. 18, 2007), and *Combating Nuclear Smuggling: Lessons Learned from DHS Testing of Advanced Radiation Detection Portal Monitors*, GAO-09-804T (Washington, D.C.: June 25, 2009)

[10]GAO, *Managing for Results: Barriers to Interagency Coordination*, GAO/GGD-00-106 (Washington, D.C.: Mar. 29, 2000).

[11]GAO, *Results-Oriented Government: Practices that Can Help Enhance and Sustain Collaboration among Federal Agencies*, GAO-06-15 (Washington, D.C.: Oct. 21, 2005).

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to DHS budget documents, in fiscal year 2011, the responsibility for research and development of advanced radiography will shift from DNDO to S&T. Leading up to this transition, there is confusion related to roles and responsibilities among DNDO, S&T, and CBP. For example, DNDO officials said they have requested permission from CBP to collect operational data in a port environment on an enhanced radiography machine. However, CBP officials stated that they had already purchased, operationally tested, and deployed 11 of these machines in secondary inspection areas. We recently discussed this issue at a joint meeting with DNDO and CBP officials. CBP and DNDO officials agreed that there was confusion over this issue, and both agencies agreed with the need to collect operational data on this enhanced radiography machine, and CBP has begun making arrangements to do so.

Also, S&T officials said that they are about to contract out for radiography imaging technology for CBP that will improve imaging capabilities. DNDO officials told us that S&T's efforts will include development of radiography capabilities to detect shielded nuclear material, while S&T officials told us that this is not an area of their focus. As DHS transitions its research and development of radiography, DHS officials said that a draft memorandum of agreement intended to clarify roles and responsibilities for cooperation and coordination among DNDO, CBP, and S&T has not been finalized. Completing the memorandum of agreement to clarify roles and responsibilities before proceeding with the research, development, and deployment of radiography technology could give DHS reasonable assurance that problems resulting from a lack of clearly defined roles and responsibilities in the CAARS program do not recur. In discussions with senior officials from DHS, DNDO, CBP and S&T, they all agreed with the need for the memorandum and said that they intend to work toward finalizing the draft memorandum of agreement.

Engage in a Robust Oversight Review Process

DNDO officials said that they were aware of the DHS draft management directive in 2006 that was intended to guide management and oversight of acquisition programs like CAARS but did not follow it. DHS policy officials acknowledged that at the time CAARS was in its early stages, DHS was continuing the process of organizing and unifying its many disparate components and there was not strong oversight over its major programs, including CAARS. Policy officials told us the oversight review process is more robust today. However, we reported in June 2010 that DHS

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acquisitions need further improvement and sustained management attention.[12] For example, while DHS' current management directive includes more detailed guidance than the previous 2006 management directive for programs to use in preparing key documentation to support component and departmental decision making, it is not applied consistently and most major programs have not been reviewed.

Separate Research and Development from Acquisition Functions

DNDO was simultaneously engaged in a research and development phase while planning for an acquisition phase of the CAARS program. In this regard, we have previously reported that separating technology development from product development and acquisition is a best practice that can help reduce costs and deliver a product on time and within budget because separation of the technology development phase from production in particular helps to ensure that (1) a sound business case is made for the product, (2) product design is stable, and (3) production processes are mature and the design is reliable.[13]

Determine the Technology Readiness Levels Before Acquisition

At the time that the CAARS program was in its early stages, DHS and DNDO did not have clearly defined ways to define and communicate the maturity of technology leading to acquisition. We have previously reported on the need for a disciplined and knowledge-based approach of assessing technology maturity, such as using technology readiness levels.[14] In that report, we recommended that technologies need to reach a high readiness level before an agency should make a commitment to production. DNDO officials acknowledged that CAARS algorithm's readiness level was not high enough to warrant entering into the acquisition phase.

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

[13]See GAO, *Defense Acquisitions: Assessments of Selected Weapon Programs*, GAO-07-406SP (Washington, D.C.: Mar. 30, 2007) and *Best Practices: Better Management of Technology Development Can Improve Weapon System Outcomes*, GAO/NSIAD-99-162 (Washington, D.C.: July 30, 1999).

[14] GAO/NSIAD-99-162.

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U.S. Department of Homeland Security
Washington, DC 20528

September 21, 2010

The Honorable Joseph I. Lieberman
Chairman
Committee on Homeland Security and
Governmental Affairs
United States Senate
Washington, DC 20510

The Honorable Susan M. Collins
Committee on Homeland Security and
Governmental Affairs
United States Senate
Washington, DC 20510

Dear Chairman Lieberman and Senator Collins:

Thank you for allowing the Department to testify about the important work being done to reduce the threat of nuclear terrorism.

I am writing to clarify the hearing record and to reaffirm that the Department did not mislead Congress. The Government Accountability Office (GAO) statement submitted for the record on the Cargo Advanced Automated Radiography System (CAARS) program asserted the Department's Congressional budget justifications were "misleading" to Congress.

The opinion expressed in the GAO statement is that Domestic Nuclear Detection Office's (DNDO) budget justifications were misleading because they "did not reflect the actual status of the program." The primary example cited by GAO as evidence for this is the fact that the budget justifications for fiscal years 2010 and 2011 indicated that DHS would perform a cost-benefit analysis, which GAO claims DHS did not intend to perform. However, GAO's assertion is incorrect.

At the time those budget justifications were drafted, DNDO fully intended to conduct a cost-benefit analysis. The GAO report states that "DNDO officials told GAO that when they cancelled the acquisition part of the program in 2007, they also decided not to conduct any associated cost benefit analysis." While DNDO no longer intended to pursue a cost-benefit analysis as part of its original acquisition program, it did intend to pursue a cost-benefit analysis at the completion of the R&D program, planned for those years. The decision to forgo the completion of a cost-benefit analysis completely was not made until 2010 when the CAARS test results became available and indicated that the CAARS technology was still not ready for

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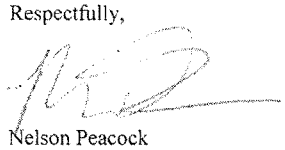
transition to an acquisition program. Therefore, a cost-benefit analysis was not warranted, and the CAARS program will not proceed into the next fiscal year.

Later in the report, GAO appears to take issue with the DNDO assertion in its 2010 budget justification that the technology needed to achieve the goals of the CAARS program was still feasible. At the time of drafting (FY 2008), DNDO did believe that the technology was feasible, but we also knew that the technology was less mature than originally estimated. As a result, we transitioned the program from an acquisition program to an R&D program. The budget justification does make clear that the technology was less mature and would take longer than originally expected. However, we acknowledge that the language in the budget justifications should have been clearer on the transition back to R&D status. We believe we have been transparent with Congress, briefing members and staff multiple times on the maturity of the technology and the transition of the program back to R&D.

The Department takes its obligation to provide Congress with accurate information seriously, and the Department did not mislead Congress with respect to the CAARS program as alleged by GAO. Representatives from DNDO and the Department are happy to meet with you or your staff to provide more information about the status of the CAARS program and further clarify the budget justification language. Should you wish to discuss this further, please do not hesitate to contact me at (202) 447-5890.

Respectfully,



Nelson Peacock
Assistant Secretary for Legislative Affairs

Post-Hearing Questions for the Record
Submitted to the Honorable Jane Holl Lute
From Senator Daniel K. Akaka

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II"
September 15, 2010

Question#:	1
Topic:	IAEA
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

Question: In 2009, I introduced the Strengthening the Oversight of Nuclear Nonproliferation Act (S.1931), which was included as an amendment to this Committee's Weapons of Mass Destruction Prevention and Preparedness Act (S.1649). My bill would require U.S. analysis of the International Atomic Energy Agency's (IAEA) ability to detect a country's diversion of nuclear materials that could be used in a weapon and recommend ways for the U.S. to further support the IAEA.

At the hearing, you stated that the Department of Homeland Security (DHS) is incorporating analysis of IAEA's detection capabilities and ways to further support of the IAEA into its nuclear detection efforts, but you were not in a position to detail how.

Please describe how is DHS is taking these actions.

Response: At the hearing, the Department explained that DNDO interacts with the IAEA in developing the Global Nuclear Detection Architecture (GNDA). DNDO also is part of a USG interagency team that interacts with the IAEA on nuclear detection, the prevention of nuclear smuggling, and other technical nuclear issues.

DNDO has increased its participation in IAEA activities over the past several years to help support efforts to increase radiological and nuclear detection capabilities. Efforts have focused specifically on material out of regulatory control. To document these best practices and promulgate to IAEA member states, the IAEA has been developing a number of publications within their "Nuclear Security Series," including the recently finalized "Nuclear Security Recommendations on Nuclear and other Radioactive Material Out of Regulatory Control." DNDO, along with other USG agencies, actively participated in the two year development of the document that provides "recommendations to States and their competent authorities on the establishment or improvement of the capabilities of their nuclear security regimes, for carrying out effective strategies to deter, detect and respond to a criminal act, or an unauthorized act, with nuclear security implications." Additionally, DNDO has also provided the IAEA

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Question#:	1
Topic:	IAEA
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

with the Model Guidelines Document for Nuclear Detection Architectures (MGD) for consideration as an implementing guide under the afore-mentioned recommendations level document. Developed initially under the framework of the Global Initiative to Combat Nuclear Terrorism, the MGD was designed to provide nations with an over-arching framework and high-level reference for nations and organizations interested in improving their capabilities for preventing nuclear terrorism and the illicit trafficking of nuclear and other radioactive materials and devices. The IAEA was a participant in the development of the MGD. In July 2010, DNDO received confirmation from the IAEA that it intends to place the document within the review process for inclusion into the IAEA's Nuclear Security Series publications that are promulgated to all 151 IAEA member states.

DNDO, along with other USG agencies, also regularly participates in the periodic review and development of other IAEA documents within its Nuclear Security Series relative to detection of nuclear and radioactive materials; specifically, the development of Nuclear Security Series No. 2 "Nuclear Forensics Support" and revisions to Nuclear Security Series No. 1 "Technical and Functional Specifications for Border Monitoring Equipment." In addition, DNDO is a regular participant in discussions that include the IAEA on international standards for detection systems. The International Electrotechnical Commission (IEC), the oldest of the international standards organizations, publishes standards for all fields of electrotechnology. Within the IEC, Technical Committee TC45 is in charge of the international standard covering nuclear instrumentation and Sub-Committee SC45B covers radiation protection instrumentation and preventive radiological and nuclear detection systems. DNDO participates in two working groups of this sub-committee to develop, maintain, and review international standards for preventive radiological and nuclear detection systems.

The ability for international partners to detect and report on the illicit trafficking of radiological and nuclear materials is paramount to the success of the GNDA. The IAEA plays a significant role in coordinating the reporting function of the GNDA by maintaining the IAEA Illicit Trafficking Database (ITDB) which serves as a central repository for smuggling report information related to nuclear and radioactive materials. This database is accessible to relevant USG partners.

Question: How do these actions support the Global Nuclear Detection Architecture?

Response: As the primary entity responsible for the development of the GNDA, DHS must be able to identify the gaps and vulnerabilities of not only the domestic portion of the GNDA, but also of the international component. In working with foreign partners and international organizations such as the IAEA, DHS can effectively identify gaps and

58397.076

Question#:	1
Topic:	IAEA
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

vulnerabilities in the architecture and suggest solutions and/or help to promulgate best practices in conceptual development of detection architectures to reduce the risk of illicit materials smuggling. Such interaction with our foreign counterparts is a crucial element to building the GNDA. Radiological and nuclear smuggling is not simply a USG problem, but a global issue that requires global participation.

As foreign governments continue to realize the growing threat of radiological and nuclear terrorism, many countries look to the IAEA for technical expertise in developing their own capabilities to combat illicit activities. As participants in the document development process within the IAEA's Nuclear Security Series and suppliers of concepts for developing nuclear detection architectures, DHS and our inter-agency partners are in a position to shape policies that will have a significant impact on how countries develop their own national nuclear detection architectures. At the most fundamental level, these documents can provide best practices and lessons learned that will help IAEA member states avoid costly mistakes and more effectively develop their own capabilities. Moreover, the IAEA provides guidance and recommendations to all 151 Member States to the IAEA. Once countries better understand their needs and frameworks required to more effectively develop and enhance indigenous detection capabilities, countries will be able to more effectively request the technical or financial assistance from USG agencies, the IAEA and international assistance efforts to further support the development of the GNDA. DHS will continue to support the development of such capabilities by providing technical expertise, facilitated workshops and participation in bi-lateral and multi-lateral engagements that include the IAEA as a critical partner.

Question#:	2
Topic:	education
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

Question: I asked you at the hearing what steps DHS has taken to put comprehensive education, training, and exercises in place for U.S. personnel to stem the illicit flow of dangerous nuclear materials. You responded that you could provide details in writing.

Please provide the relevant information.

Response: DNDO, in partnership with Federal, State, and local stakeholders, has developed the Preventive Radiological and Nuclear Detection (PRND) Program Management Handbook and accompanying modules as capstone products for domestic capability enhancement. The Handbook provides comprehensive guidance to State and local agencies in developing, enhancing, and maintaining PRND programs around the framework of planning, organization, equipment, training, and exercises. For the Handbook and other program development, DNDO also relies on the subject matter expertise of other State and local public safety agencies on specialized operations such as maritime, special events, and commercial vehicle inspection (CVI).

As national awareness increases and more resources are dedicated to the PRND mission by Federal, State, and local governments, operational programs will expand and create further demand on support services. To meet these needs, DNDO will develop additional training, exercise, and other support resources that remain relevant to the full range of operations, technologies, and threats. Specialized capabilities at the State and local levels, as well as Federal capabilities such as the DNDO's Mobile Detection Deployment Program (MDDP), will require much greater hands-on assistance to foster and develop comprehensive, integrated, and regional approaches to PRND programs.

DNDO will also continue close working relationships with the Federal Emergency Management Agency (FEMA) to assist them in developing National planning guidance, including PRND-specific planning scenarios, Target Capability Lists (TCLs), and PRND guidance for Homeland Security grants. Beyond existing partnerships, DNDO will enhance our relationships with other Federal partners inside and outside DHS. As a result, DNDO will leverage DHS resources, contacts, and expertise and develop more expansive and fully networked PRND communities as we integrate them with State and local agencies at regional and national levels. In response to repeated stakeholder input, DNDO will also reach out to broader Chemical, Biological, Radiological/Nuclear, High Explosives mission partners and support stronger coordination and collaboration where mission areas and engagement activities overlap.

58397.078

Question#:	2
Topic:	education
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

The Training and Exercises Program develops and implements rad/nuc training and exercise execution for Federal, State, and local law enforcement and public safety professionals to increase PRND operational capabilities. The program's main objectives are to increase operational capabilities at the Federal, State, and local levels; develop and exercise protocols and standards for effective use of radiation detection equipment and associated alarm resolution and reporting processes; develop training curricula in support of emerging detection technologies; and foster organic capabilities by assisting Federal, State, and local agencies in institutionalizing training courses in their academies. Additionally, the Training and Exercises Program supports National Security Special Events (NSSE), DHS Special Events and elevated threat conditions, as required.

The Training and Exercises Program is responsible for the development, oversight and administration of the design, delivery, evaluation and continual improvement of the PRND training curriculum and associated exercise support services. This training is directed by DNDO personnel and provided by contracted instructors in the vicinity of the requesting State or local agency utilizing their own equipment. Additionally, the Training and Exercises Program will finalize development of a comprehensive Train-the-Trainer curriculum, including distribution of self-study courseware compact discs to a wide spectrum of State and local law enforcement and public safety agencies. This training will significantly increase the number, awareness and capabilities of PRND participants involved with the DNDO mission.

Furthermore, the Training and Exercises Program supports exercise services for rad/nuc detection and prevention in States, regions and domains within the Interior layer of the GNDA, as well as providing exercise support and consultation within international rad/nuc prevention missions.

Beyond the efforts of DNDO, U.S. Immigration and Customs Enforcement's Homeland Security Investigations (HSI) regularly delivers training at home and abroad relevant to stemming the illicit flow of radiological/nuclear materials. At home, HSI's investigators and intelligence analysts regularly educate private industry officials about trends and "red flags" in illicit procurement of weapons of mass destruction components as part of Project Shield America. HSI investigators and intelligence analysts also provide training to foreign partner law enforcement agencies to help them better identify illicit procurement of such items as nuclear and radiological weapons components. This training is delivered in nations deemed to be in the best position to disrupt illicit procurement networks, and is provided in cooperation with other Federal Government partners, including the Department of Defense.

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Question#:	3
Topic:	GAO
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

Question: According to the Government Accountability Office, DHS did not use the most recent Joint Annual Interagency Review as a tool to analyze the various agency budgets that support the Global Nuclear Detection Architecture. Doing so could help the Department make funding decisions better aligned to the highest-priority issues.

What steps are being taken to ensure an approach that maximizes the impact of U.S. Government resources on preventing nuclear smuggling?

Response: The 2011 Joint Annual Interagency Review of the GNDA will differ from its predecessors, both in terms of the analysis framework and the report content. The revised Annual Report will consist of four sections described below. DNDO will work with interagency partners to perform the analysis. The GNDA Strategic Plan will also be used in the Annual Review to provide context for the analysis results reported therein. The GNDA analysis framework involves a step-by-step process designed to produce results consistent with achieving the goals and objectives of the GNDA Strategic Plan.

The first section of the 2011 report will include the GNDA Description and "as-is" architecture. (This closely resembles the annual reports in the past.) This section will summarize the GNDA status using the same geographical/transport model, or description, of the GNDA, based on the transport of weapons or materials from a point of origin, or source, through a series of detection "layers," to targets (typically in the United States) The second section of the 2011 report will include a description/inventory of programs and physical assets of the GNDA as they exist/are deployed currently, including the budget crosscut for these programs. This will be all the systems, components and equipment on which we have data.

The third section of the 2011 report will include a gap analysis that identifies gaps, vulnerabilities, and areas in the architecture that need improvement based on the Strategic Plan (the delta between the GNDA Strategic Plan and the as-is).

The fourth section of the 2011 report will include roles and recommendations for improvement of the GNDA, including technical advances, policy shifts, deployment strategy shifts, and changes in operational concepts. This section will also detail enhanced coordination or integration approaches and solutions that are time-phased, reflecting near-term, mid-term, and long-term time horizons (consistent with the GNDA Strategic Plan goals and objectives). Finally, this section will link organizational roles and responsibilities and the interagency agreed-upon GNDA improvements over the next 1, 3, and 5 years. These solutions will be analyzed in terms of comprehensiveness, adaptability, feasibility, and other qualitative and quantitative factors that could affect decisions and priorities for potential implementation.

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Post-Hearing Questions for the Record
Submitted to the Warren M. Stern
From Senator Daniel K. Akaka

"Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II"
September 15, 2010

Question#:	4
Topic:	guidelines
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

Question: The December 2009 Model Guidelines Document for Nuclear Detection Architectures states that internationally accepted technical guidance and standards of operation for nuclear detection radiography equipment and equipment for systems integration have not yet been adequately developed.

How does the Department of Homeland Security intend to address this issue with its international partners?

Response: The development of standards within the international community is an issue that is continually addressed in order to obtain a level of confidence in our ability to detect nuclear and radioactive materials. In the United States, our standards are developed under the auspices of the American National Standards Institute (ANSI). Within the international community, the governing body is the International Electrotechnical Commission (IEC). Though different institutes, the current ANSI and IEC standards for rad/nuc detection are fairly similar as many of the IEC standards reflect the ANSI standards, but deviations occur.

The IEC publishes standards for all fields of electro-technology. Within the IEC, Technical Committee TC45 is charged with the international standard covering nuclear instrumentation and Sub-Committee SC45B covers radiation protection instrumentation and preventive radiological and nuclear detection systems. DNDO participates in two working groups of this sub-committee to develop, maintain, and review international standards for preventive radiological and nuclear detection systems.

In order to further develop common standards for radiography, systems integration and other areas of concern, the IEC utilizes an international working group, which develops, maintains and revises these international standards. To ensure USG equities are included, DNDO, along with other USG agencies, collaborates with international partners and participates in the working group to push towards a standard that effectively increases the probabilities of detection of all systems within the Global Nuclear Detection Architecture.

58397.081

Question#:	4
Topic:	guidelines
Hearing:	Nuclear Terrorism: Strengthening Our Domestic Defenses, Part II
Primary:	The Honorable Daniel K. Akaka
Committee:	HOMELAND SECURITY (SENATE)

In addition to these efforts, DHS/DNDO is participating in a joint systems testing and evaluation campaign with the European Union's Joint Research Centre (JRC) under the title of the Illicit Trafficking Radiation Assessment Program (ITRAP+10). The original ITRAP test was conducted ten years ago and this effort, ITRAP+10 (years) seeks to build upon that prior testing campaign. One of the higher level objectives of the program is to provide scientific and technical data on COTS RN detection systems of European origin to EU Policy Makers. Another objective is to promote harmonization of EU-wide standards with ANSI and IEC standards, as well as IAEA guidelines. In order to accomplish these objectives, the JRC will test all EU detection equipment and DNDO will test all non-EU equipment against both the ANSI and IEC standards. To ensure the appropriate standards are adhered to, DNDO and JRC are completing a "mapping" exercise to ensure the standards for comparison are consistent. Once the tests are completed, unclassified test data will be exchanged to show which equipment from all participating governmental agencies and/or vendors satisfactorily meets the standards. This effort will further solidify our international commitment to a common capability standard and serve as a valuable acknowledgement of the success of international collaboration in a technical setting.