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# NUCLEAR DETECTION

# Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture

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Natural Resources and Environment

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# Highlights

Highlights of GAO-08-999T, a testimony before the Committee on Homeland Security and Governmental Affairs, U.S. Senate

July 16, 2008

# NUCLEAR DETECTION

## Preliminary Observations on the Domestic Nuclear Detection Office's Efforts to Develop a Global Nuclear Detection Architecture

### Why GAO Did This Study

In April 2005, a Presidential Directive established the Domestic Nuclear Detection Office (DNDO) within the Department of Homeland Security to enhance and coordinate federal, state, and local efforts to combat nuclear smuggling domestically and abroad. DNDO was directed to develop, in coordination with the departments of Defense (DOD), Energy (DOE), and State (State), an enhanced global nuclear detection architecture—an integrated system of radiation detection equipment and interdiction activities. DNDO implements the domestic portion of the architecture, while DOD, DOE, and State are responsible for related programs outside the U.S.

This testimony provides preliminary observations based on ongoing work addressing (1) the status of DNDO's efforts to develop a global nuclear detection architecture, (2) the challenges DNDO and other federal agencies face in implementing the architecture, and (3) the costs of the programs that constitute the architecture. This statement draws on prior GAO reviews of programs constituting the architecture, and GAO's work on strategic planning.

### What GAO Recommends

GAO recommends that DNDO develop, in coordination with DOD, DOE, and State, a strategic plan to guide agency efforts to develop a more comprehensive architecture. In commenting on a draft of this statement, DNDO concurred with this recommendation.

To view the full product, including the scope and methodology, click on GAO-08-999T. For more information, contact David Maurer at (202) 512-3841 or maurerd@gao.gov.

### What GAO Found

According to GAO's preliminary work to date, DNDO has taken steps to develop a global nuclear detection architecture but lacks an overarching strategic plan to help guide how it will achieve a more comprehensive architecture. Specifically, DNDO has developed an initial architecture after coordinating with DOD, DOE, and State to identify 74 federal programs that combat smuggling of nuclear or radiological material. DNDO has also identified gaps in the architecture, such as land border crossings into the United States between formal points of entry, small maritime vessels, and international general aviation. Although DNDO has started to develop programs to address these gaps, it has not yet developed an overarching strategic plan to guide its transition from the initial architecture to a more comprehensive architecture. For example, such a plan would define across the entire architecture how DNDO would achieve and monitor its goal of detecting the movement of radiological and nuclear materials through potential smuggling routes, such as small maritime craft or land borders in between points of entry. The plan would also define the steps and resources needed to achieve a more comprehensive architecture and provide metrics for measuring progress toward goals.

DNDO and other federal agencies face a number of coordination, technological, and management challenges. First, prior GAO reports have demonstrated that U.S.-funded radiological detection programs overseas have proven problematic to implement and sustain and have not been effectively coordinated, although there have been some improvements in this area. Second, detection technology has limitations and cannot detect and identify all radiological and nuclear materials. For example, smugglers may be able to effectively mask or shield radiological materials so that it evades detection. Third, DNDO faces challenges in managing implementation of the architecture. DNDO has been charged with developing an architecture that depends on programs implemented by other agencies. This responsibility poses a challenge for DNDO in ensuring that the individual programs within the global architecture are effectively integrated and coordinated to maximize the detection and interdiction of radiological or nuclear material.

According to DNDO, approximately $2.8 billion was budgeted in fiscal year 2007 for the 74 programs included in the global nuclear detection architecture. Of this $2.8 billion, $1.1 billion was budgeted for programs to combat nuclear smuggling internationally; $220 million was devoted to programs to support the detection of radiological and nuclear material at the U.S. border; $900 million funded security and detection activities within the United States; and approximately $575 million was used to fund a number of cross-cutting activities. The future costs for DNDO and other federal agencies to address the gaps identified in the initial architecture are not yet known or included in these amounts.

Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss our preliminary work for several members of Congress on the Domestic Nuclear Detection Office's (DNDO) efforts to develop a global nuclear detection architecture—essentially, 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. Preventing terrorists from using radiological or nuclear material to carry out an attack in the United States is a top national priority. Since the events of September 11, 2001, there is heightened concern that terrorists may try to smuggle nuclear materials or a nuclear weapon into the United States. If terrorists were to carry out such an attack, the consequences could be devastating to our national interests.

In April 2005, the President issued a directive establishing DNDO, within the Department of Homeland Security (DHS), to enhance and coordinate federal, state, and local efforts to prevent radiological and nuclear attacks.[1] Congress subsequently passed the SAFE Port Act of 2006, which established DNDO in statute.[2] Among other things, DNDO must develop, in coordination with the departments of Defense (DOD), Energy (DOE), and State (State), an enhanced global nuclear detection architecture. DNDO is explicitly charged with implementing the domestic portion (at the U.S. border and within the United States) of the architecture and with coordinating the nuclear detection efforts of federal, state, and local governments. It is also responsible for developing, acquiring, and deploying radiation detection equipment to support the efforts of DHS and other federal agencies. The directive and the SAFE Port Act also reaffirmed that DOD, DOE, and State are responsible for programs to combat radiological and nuclear smuggling outside the United States.

Over the past few months, we have been examining the steps that DNDO has taken to develop a global nuclear detection architecture. Our work is ongoing and our statement today will provide preliminary observations on DNDO's effort. Specifically, our statement will discuss (1) the status of DNDO's efforts to develop a global nuclear detection architecture, (2) the challenges DNDO and the other federal agencies face in implementing the

[1]Homeland Security Presidential Directive 14 / National Security Presidential Directive 43, *Domestic Nuclear Detection*, April 15, 2005.

[2]6 U.S.C. §§ 591-596a.

architecture, and (3) the costs of the current and proposed programs that constitute the global nuclear detection architecture. We plan to issue our final report in January 2009.

To begin addressing these objectives, we interviewed officials from DNDO about steps taken to develop and improve upon the existing architecture. We reviewed and analyzed documents DNDO used to help create the baseline, or initial, architecture, as well as studies on gaps identified in the architecture.[3] We interviewed agency officials from DOD, DOE, and State who manage programs that are part of the architecture to get their perspectives on challenges faced in implementing the architecture. In addition, we interviewed subject matter experts from the academic and nonprofit sectors, as well as representatives from the International Atomic Energy Agency (IAEA), to gain their perspective on efforts to develop and implement the architecture. We have conducted our work to date 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.

## Summary

According to our preliminary work to date, DNDO has taken steps to develop a global nuclear detection architecture, but it lacks an overarching strategic plan to help guide how it will achieve a more comprehensive architecture. Specifically, DNDO has developed an initial architecture after coordinating with, among others, DOD, DOE, and State, to identify 74 federal programs that combat smuggling of nuclear or radiological material. Many of these programs predate the establishment of DNDO. These programs cover all of the layers of detection, including securing special nuclear and radiological materials at their source in foreign countries and in the United States as well as detecting these materials at

[3]To assess DNDO's efforts to develop the architecture, we are in the process of comparing DNDO's planning practices with those that we have found to be effective in developing enterprise architectures. An enterprise architecture is a tool, or blueprint, for understanding and planning complex systems. GAO has developed an Enterprise Architecture Management Maturity Framework. This framework outlines steps toward achieving a stable and mature process for managing the development, maintenance, and implementation of enterprise architectures. See GAO, *Information Technology: A Framework for Assessing and Improving Enterprise Architecture Management (Version 1.1)*, GAO-03-584G (Washington, D.C.: April 2003).

U.S. borders or within the United States. DNDO has also collaborated with other federal agencies, such as DOD, DOE, and State, to (1) identify gaps in the initial architecture, such as land borders between ports of entry, small maritime vessels, and international general aviation, and (2) develop programs to address these gaps. For example, DNDO has a joint project underway with the Customs and Border Protection's (CBP) Office of Border Patrol to assess the feasibility of equipping border patrol agents with portable radiological and nuclear detection equipment along the U.S. border. Although these efforts to address recognized gaps in the architecture are necessary first steps, DNDO has not developed an overarching strategic plan that will guide its transition from the initial architecture to a more comprehensive architecture. Such a plan would define across the entire architecture how, for example, DNDO will achieve its goal of detecting the movement of radiological and nuclear materials through potential smuggling routes, such as small maritime craft or land borders in between ports of entry. This plan would also define the steps and resources needed to achieve a more comprehensive architecture and provide metrics for measuring progress toward goals, such as enhancing detection along borders.

DNDO and other federal agencies face a number of coordination, technological, and management challenges in developing a more comprehensive detection architecture. First, prior GAO reports have demonstrated that critical, long-standing U.S.-funded radiological detection programs overseas—which are a critical component of the architecture—have proven problematic to implement and sustain and have not been effectively coordinated. Although coordination among the agencies has improved, as a chain is only as strong as its weakest link, challenges in any of the programs that constitute the architecture may ultimately limit its overall effectiveness. Second, detection technology has limitations and is currently unable to detect and identify all smuggled radiological and nuclear materials. For example, smugglers may be able to effectively mask or shield radiological materials so that it evades detection. We have also previously raised concerns about DNDO's efforts to develop a new generation of radiation detection equipment. Furthermore, while radiation detection equipment is an important part of the architecture, combating nuclear smuggling requires an integrated approach that also includes proper training and intelligence gathering on smuggling operations. Third, DNDO faces challenges in managing the implementation of the architecture. DNDO has been charged with developing an architecture that is dependent on programs implemented by other agencies. Ensuring that these individual programs within the architecture are effectively integrated poses a challenge for DNDO. In addition, the majority of the employees in DNDO's architecture office are on detail from other federal agencies or are contractors. While this staffing approach taps expertise across several agencies, detailees return to their home organizations after a relatively short time and in some cases there have been delays in filling these vacancies. As a result, this turnover may limit the retention and depth of institutional memory.

According to DNDO, approximately $2.8 billion was budgeted in fiscal year 2007 for the 74 programs included in the global nuclear detection architecture. Of this $2.8 billion, approximately $1.1 billion was budgeted for programs designed to combat nuclear smuggling and secure materials internationally. Approximately $220 million was devoted to programs to support the detection of radiological and nuclear material at the U.S. border; and an additional $900 million funded security and detection activities within the United States. Finally, approximately $575 million was used to fund a number of cross-cutting activities that support many different layers of the architecture, such as those focused on research and development or technical support to users of the detection equipment. In addition to these programs, DNDO and other federal agencies are pursuing future initiatives to address the gaps identified in the initial architecture. The costs to implement and sustain these and other future programs and equipment are not yet known or included in these figures. We are in the process of reviewing this cost information and will provide more detailed analysis in our final report.

## Background

According to IAEA, between 1993 and 2006, there were 1,080 confirmed incidents of illicit trafficking and unauthorized activities involving nuclear and radiological materials worldwide. Eighteen of these cases involved weapons-usable material—plutonium and highly enriched uranium (HEU)—that could be used to produce a nuclear weapon. IAEA also reported that 124 cases involved materials that could be used to produce a device that uses conventional explosives with radioactive material (known as a "dirty bomb"). Past confirmed incidents of illicit trafficking in HEU and plutonium involved seizures of kilogram quantities of weapons-usable nuclear material but most have involved very small quantities. In some of these cases, it is possible that the seized material was a sample of larger quantities available for illegal purchase. IAEA concluded that these materials pose a continuous potential security threat to the international community, including the United States.

Nuclear material could be smuggled into the United States in a variety of ways: hidden in a car, train or ship; sent through the mail; carried in personal luggage through an airport; or walked across an unprotected border. In response to these threats, U.S. agencies, including DHS, DOD, DOE, and State, implemented programs to combat nuclear smuggling in foreign countries and the United States. DOD, DOE, and State fund, manage, and implement the global nuclear detection architecture's international programs. Many international detection programs were operating for several years before DNDO was created. For example, DOE's Materials Protection, Control, and Accounting program, initiated in 1995, provides support to the Russian Federation and other countries of concern to secure nuclear weapons and weapons material that may be at risk of theft of diversion. In addition, during the 1990s, the United States began deploying radiation detection equipment at borders in countries of the former Soviet Union. DOD's Cooperative Threat Reduction (CTR) program launched a variety of programs in the early 1990s to help address proliferation concerns in the former Soviet Union, including helping secure Russian nuclear weapons. Two other DOD programs have provided radiation portal monitors, handheld equipment, and radiation detection training to countries in the former Soviet Union and in Eastern Europe. Similarly, State programs have provided detection equipment and training to numerous countries. DHS, in conjunction with other federal, state, and local agencies, is responsible for combating nuclear smuggling in the United States and has provided radiation detection equipment, including portal monitors, personal radiation detectors (known as pagers), and radioactive isotope identifiers at U.S. ports of entry.

All radiation detection devices have limitations in their ability to detect and identify nuclear material. Detecting attempted nuclear smuggling is difficult because there are many sources of radiation that are legal and not harmful when used as intended. These materials can trigger alarms—known as nuisance alarms—that may be indistinguishable in some cases from alarms that could sound in the event of a true case of nuclear smuggling. Nuisance alarms can be caused by patients who have recently had cancer treatments; a wide range of cargo with naturally occurring radiation (e.g., fertilizer, ceramics, and food products) and legitimate shipments of radiological sources for use in medicine and industry.

## DNDO Has Begun to Develop Programs to Enhance the Initial Architecture, but It Lacks an Overarching Strategic Plan for Achieving Future Architecture Improvements

In October 2005, a few months after its inception, DNDO completed its initial inventory of federal programs associated with detecting the illicit transport of radiological and nuclear materials. As part of this effort, DNDO defined the architecture's general approach: a multilayered detection framework of radiation detection equipment and interdiction activities to combat nuclear smuggling in foreign countries, at the U.S. border, and inside the United States. DNDO, in collaboration with other federal agencies, such as DOD, DOE, and State, analyzed the gaps in current planning and deployment strategies to determine the ability of individual layers of the architecture to successfully prevent illicit movement of radiological or nuclear materials or devices. DNDO identified several gap areas with respect to detecting potential nuclear smuggling, such as (1) land border crossings into the United States between formal points of entry, (2) small maritime craft (any vessel less than 300 gross tons) that enter the United States, and (3) international general aviation.

In November 2006, DNDO completed a more detailed analysis of programs in the initial architecture. DNDO identified 72 programs across the federal government that focused on combating radiological and nuclear smuggling and nuclear security and it discussed these programs in depth by layer. The analysis also included a discussion of the current and anticipated budgets associated with each of these programs and each of the layers. In June 2008, DNDO released the *Joint Annual Interagency Review of the Global Nuclear Detection Architecture*. This report provides an updated analysis of the architecture by layer of defense and a discussion of the 74 programs now associated with each of the layers, as well as an estimate of the total budgets by layer.

To address the gaps identified in the domestic portions of the architecture, DNDO has initiated pilot programs to address primary areas of concern or potential vulnerability. For example:

- For the land border in between ports of entry, DNDO and CBP are studying the feasibility of equipping CBP border patrol agents with portable radiological and nuclear detection equipment along the U.S. border.
- For small marine vessels, DNDO is working with the Coast Guard to develop and expand the coverage of radiological and nuclear detection capabilities that can be specifically applied in a maritime environment.
- For international general aviation, DNDO is working with CBP, the Transportation Security Administration, and other agencies to develop and

implement radiological and nuclear detection capabilities to scan international general aviation flights to the United States for possible illicit radiological or nuclear materials.

To date, we have received briefings on each of these programs from DNDO, but we have not yet fully reviewed how they are being implemented. We will examine each of these more closely during the course of our review.

Our preliminary observation is that DNDO's pilot programs appear to be a step in the right direction for improving the current architecture. However, these efforts to address gaps are not being undertaken within the larger context of an overarching strategic plan. While each agency that has a role in the architecture may have its own planning documents, DNDO has not produced an overarching strategic plan that can guide its efforts to address the gaps and move to a more comprehensive global nuclear detection architecture. Our past work has discussed the importance of strategic planning.[4] Specifically, we have reported that strategic plans should clearly define objectives to be accomplished, identify the roles and responsibilities for meeting each objective, ensure that the funding necessary to achieve the objectives is available, and employ monitoring mechanisms to determine progress and identify needed improvements. For example, such a plan would define how DNDO will achieve and monitor the goal of detecting the movement of radiological and nuclear materials through potential smuggling routes, such as small maritime craft or land borders in between ports of entry. Moreover, this plan would include agreed-upon processes and procedures to guide the improvement of the architecture and coordinate the activities of the participating agencies.

[4]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); GAO, *Combating Terrorism: Observations on National Strategies Related to Terrorism*, GAO-03-519T (Washington, D.C.: Mar. 3, 2003); and GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, GAO/GGD-96-118 (Washington, D.C.: June 1996).

## DNDO and Other Agencies Face Coordination, Technological, and Management Challenges

DNDO and other agencies face a number of challenges in developing a global nuclear detection architecture, including (1) coordinating detection efforts across federal, state, and local agencies and with other nations, (2) dealing with the limitations of detection technology, and (3) managing the implementation of the architecture.

### Federal Agencies Have Experienced Difficulties Coordinating Radiation Detection Efforts

Our past work on key aspects of international and domestic programs that are part of the architecture have identified a number of weaknesses. In order for the architecture to be effective, all parts need to be well thought out, managed, and coordinated. As a chain is only as strong as its weakest link, limitations in any of the programs that constitute the architecture may ultimately limit its effectiveness. Specifically, in past work, we have identified the following difficulties that federal agencies have had coordinating and implementing radiation detection efforts.

- We reported that DOD, DOE, and State had not coordinated their approaches to enhance other countries' border crossing.[5] Specifically, radiation portal monitors that State installed in more than 20 countries are less sophisticated than those DOD and DOE installed. As a result, some border crossings where U.S. agencies had installed radiation detection equipment were more vulnerable to nuclear smuggling than others.[6] Since issuing our report, a governmentwide plan encompassing U.S. efforts to combat nuclear smuggling in other countries has been developed; duplicative programs have been consolidated; and coordination among the agencies, although still a concern, has improved.
- In 2005, we reported that there is no governmentwide guidance for border security programs that delineates agencies' roles and responsibilities, establishes regular information sharing, and defines procedures for

[5] GAO, *Combating Nuclear Smuggling: Efforts to Deploy Radiation Detection Equipment in the United States and in Other Countries*, GAO-05-840T (Washington, D.C.: June 21, 2005).

[6] Portal monitors installed by State do not have the ability to detect neutron radiation, which translates into a decreased ability of those monitors to be able to detect plutonium, one of the nuclear materials of greatest proliferation concern.

resolving interagency disputes.[7] In the absence of guidance for coordination, officials in some agencies questioned other agencies' roles and responsibilities.

- More recently, in 2008, we found that levels of collaboration between U.S. and host government officials varied at some seaports participating in DHS's Container Security Initiative (CSI).[8] In addition, we identified hurdles to cooperation between CSI teams and their counterparts in the host government, such as a host country's legal restrictions that CBP officials said prevent CSI teams from observing examinations.

Furthermore, many international nuclear detection programs rely heavily on the host country to maintain and operate the equipment. We have reported that in some instances this reliance has been problematic. For example:

- About half of the portal monitors provided to one country in the former Soviet Union were never installed or were not operational. In additional, mobile vans equipped with radiation detection equipment furnished by State have limited usefulness because they cannot operate effectively in cold climates or are otherwise not suitable for conditions in some countries.[9]
- Once the equipment is deployed, the United States has limited control over it, as we have previously reported.[10] Specifically, once DOE finishes installing radiation equipment at a port and passes control of the equipment to the host government, the United States no longer controls the equipment's specific settings or its use by foreign customs officials. Settings can be changed, which may decreased the probability that the equipment will detect nuclear material.

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[7]GAO, *Weapons of Mass Destruction: Nonproliferation Programs Need Better Integration*, GAO-05-157 (Washington, D.C.: Jan. 28, 2005).

[8]GAO, *Supply Chain Security: Examinations of High-Risk Cargo at Foreign Seaports Have Increased, but Improved Data Collection and Performance Measures Are Needed*, GAO-08-187 (Washington, D.C.: Jan. 25, 2008).

[9]GAO-05-840T.

[10]GAO, *Preventing Nuclear Smuggling: DOE Has Made Limited Progress in Installing Radiation Detection Equipment at Highest Priority Seaports*, GAO-05-375 (Washington, D.C.: Mar. 31, 2005).

Within the U.S. borders, DNDO faces coordination challenges and will need to ensure that the problems with nuclear detection programs overseas are not repeated domestically. Many pilot programs DNDO is developing to address gaps in the architecture will rely heavily on other agencies to implement them. For example, DNDO is working closely with the Coast Guard and other federal agencies to implement DNDO's maritime initiatives to enhance detection of radiological and nuclear materials on small vessels. However, maritime jurisdictional responsibilities and activities are shared among federal, state, regional, and local governments. As a result, DNDO will need to closely coordinate activities related to detecting radiological and nuclear materials with these entities, as well as ensure that users are adequately trained and technical support is available. DNDO officials told us they are closely coordinating with other agencies, and our work to assess this coordination is still underway. We will continue to explore these coordination activities and challenges as we continue our review.

## Limitations in Detection Technology Hamper the Architecture's Effectiveness

The ability to detect radiological and nuclear materials is a critical component of the global nuclear detection architecture; however, current technology may not able to detect and identify all smuggled radiological and nuclear materials. In our past work, we found limitations with radiation detection equipment.[11] For example:

- In a report on preventing nuclear smuggling, we found that a cargo container containing a radioactive source was not detected as it passed through radiation detection equipment that DOE had installed at a foreign seaport because the radiation emitted from the container was shielded by a large amount of scrap metal. Additionally, detecting actual cases of illicit trafficking in weapons-usable nuclear material is complicated: one of the materials of greatest concern in terms of proliferation—highly enriched uranium—is among the most difficult materials to detect because of its relatively low level of radioactivity.

- We reported that current portal monitors deployed at U.S. borders can detect the presence of radiation but cannot distinguish between harmless radiological materials, such as ceramic tiles, fertilizer, and bananas, and dangerous nuclear materials, such as plutonium and uranium. DNDO is currently testing a new generation of portal monitors. We have raised continuing concerns about DNDO's efforts to develop and test these

[11] GAO-05-375.

advanced portal monitors.[12] We currently have additional work underway examining the current round of testing and expect to report on our findings in September 2008.

- Environmental conditions can affect radiation detection equipment's performance and sustainability, as we also have previously reported. For example, wind disturbances can vibrate the equipment and interfere with its ability to detect radiation. In addition, sea spray may corrode radiation detection equipment and its components that are operated in ports or near water. Its corrosive nature, combined with other conditions such as coral in the water, can accelerate the degradation of equipment.

It is important to note that radiation detection equipment is only one of the tools that customs inspectors and border guards must use to combat nuclear smuggling. Combating nuclear smuggling requires an integrated approach that includes equipment, proper training, and intelligence gathering on smuggling operations. In the past, most known interdictions of weapons-useable nuclear materials have resulted from police investigations rather than by radiation detection equipment installed at border crossings.

## DNDO Faces Challenges in Managing the Global Nuclear Detection Architecture

The task DNDO has been given—developing an architecture to keep radiological and nuclear materials from entering the country—is a complex and large undertaking. DNDO has been charged with developing an architecture that depends on programs implemented by other agencies. This lack of control over these programs poses a challenge for DNDO in ensuring that all individual programs within the global nuclear detection architecture will be effectively integrated. Moreover, implementing and sustaining the architecture requires adequate resources and capabilities to meet needed commitments. However, the majority of the employees in DNDO's architecture office are detailees on rotation from other federal agencies or are contractors. This type of staffing approach allows DNDO to tap into other agencies' expertise in radiological and nuclear detection. However, officials told us that staff turnover may limit the retention and depth of institutional memory since detailees return to their home organizations after a relatively short time. In some cases, there have been

[12] 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).

delays in filling these vacancies. We will continue to examine this potential resource challenge as we complete our work.

In spite of these challenges, DNDO's efforts to develop a global nuclear detection architecture have yielded some benefits, according to DOD, DOE, and State officials. For example, an official from the State Department told us that DNDO is working through State's Global Initiative to Combat Nuclear Terrorism to develop model guidelines that other nations can use to establish their own nuclear detection architectures and recently sponsored a related workshop. In addition, DOE officials said that DNDO's actions have helped broaden their perspective on the deployment of radiation detection equipment overseas. Previously, the U.S. government had been more focused on placing fixed detectors at particular sites, but as a result of DNDO's efforts to identify gaps in the global detection network, DOE has begun to work with law enforcement officials in other countries to improve detection capabilities for the land in between ports of entry. Finally, DNDO, DOD, DOE, and the Office of the Director of National Intelligence for Science and Technology are now formally collaborating on nuclear detection research and development and they have signed a memorandum of understanding (MOU) to guide these efforts. The MOU will integrate research and development programs by, for example, providing open access to research findings in order to leverage this knowledge and to reduce conflict between different agency programs. In addition, the MOU encourages joint funding of programs and projects and calls on the agencies to coordinate their research and development plans. In our ongoing work, we will examine DNDO's progress in carrying through on these initiatives.

## Approximately $2.8 Billion in Fiscal Year 2007 Funded Programs Associated with Detecting the Transport of Radiological and Nuclear Weapons or Materials

DNDO reported that approximately $2.8 billion was budgeted in fiscal year 2007 for 74 programs focused on preventing and detecting the illicit transport of radiological or nuclear materials.[13] These programs were primarily administered by DHS, DOD, DOE, and State and spanned all layers of the global nuclear detection architecture. Specifically:

- $1.1 billion funded 28 programs focused on the international aspects of the architecture;
- $221 million funded 9 programs to support detection of radiological and nuclear material at the U.S. border;
- $918 million funded 16 programs dedicated to detecting and securing radiological or nuclear materials within the U.S. borders; and
- $577 million funded 34 cross-cutting programs that support many different layers of the architecture by, for example, research and development or technical support to users of the detection equipment.

The fiscal year 2007 budget of $2.8 billion will not sustain the architecture over the long term because additional programs and equipment will be implemented to address the gaps. For example, this amount does not include the cost estimates related to acquiring and deploying the next generation of advanced portal monitors that are currently being tested. In addition, DNDO is just beginning new efforts to mitigate gaps in the architecture and budget estimates for these activities are limited. We are in the process of reviewing this cost information and will provide more detailed analysis in our final report.

## Conclusions

DNDO has been given an important and complex task—develop a global nuclear detection architecture to combat nuclear smuggling and keep radiological and nuclear weapons or materials from entering the United States. This undertaking involves coordinating a vast array of programs and technological resources that are managed by many different agencies and span the globe. Since its creation 3 years ago, DNDO has conceptually mapped the current architecture and identified how it would like the architecture to evolve in the near term. While DNDO's vision of a more

[13]The total number of programs reported by DNDO as being related to the architecture is 74. However, the sum of the programs by layer is more than 74 because some programs are relevant to more than one layer of detection.

comprehensive architecture is laudable, to achieve this goal, it will need to address a number of key challenges including building close coordination and cooperation among the various agencies involved and developing and deploying more advanced radiation detection technology. Although DNDO has taken some steps to achieve these ends, it has not done so within the larger context of an overarching strategic plan with clearly established goals, responsibilities, priorities, resource needs, and mechanisms for assessing progress along the way. Developing and implementing a global nuclear detection architecture will likely take several years, cost billions of dollars, and rely on the expertise and resources of agencies and programs across the government. Moving forward, DNDO should work closely with its counterparts within DHS, as well as at other departments, to develop a comprehensive strategic plan that helps safeguard the investments made to date, more closely links future goals with the resources necessary to achieve those goals, and enhance the architecture's ability to operate in a more cohesive and integrated fashion.

## Recommendations for Executive Action

We recommend that the Secretary of Homeland Security, in coordination with the Secretary of Defense, the Secretary of Energy, and the Secretary of State, develop a strategic plan to guide the development of a more comprehensive global nuclear detection architecture. Such a plan should (1) clearly define objectives to be accomplished, (2) identify the roles and responsibilities for meeting each objective, (3) identify the funding necessary to achieve those objectives, and (4) employ monitoring mechanisms to determine programmatic progress and identify needed improvements.

## Agency Comments

We provided a draft of the information in this testimony to DNDO. DNDO provided oral comments on the draft, concurred with our recommendations, and provided technical comments, which we incorporated as appropriate.

Mr. Chairman, this concludes my prepared statement. We will continue our review and plan to issue a report in early 2009. I would be pleased to answer any questions that you or other Members of the Committee have at this time.

## GAO Contacts and Staff Acknowledgments

For further information on this testimony, please contact me at (202) 512-3841 or maurerd@gao.gov. Glen Levis, Assistant Director, Elizabeth Erdmann, Rachel Girshick, Sandra Kerr, and Tommy Williams made key contributions to this statement. Additional assistance was provided by Omari Norman and Carol Herrnstadt Shulman. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement.

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