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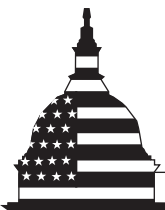
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HOMELAND SECURITY

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

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



G A O

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

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

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

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

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

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

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

Overview of Our Past DHS R&D Work

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

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

²[GAO-11-318SP](#).

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

- In September 2010, we reported that the Domestic Nuclear Detection Office (DNDO) was simultaneously engaged in the research and development phase while planning for the acquisition phase of its cargo advanced automated radiography system to detect certain nuclear materials in vehicles and containers at ports.³ DNDO pursued the deployment of the cargo advanced automated radiography system without fully understanding that it would not fit within existing inspection lanes at ports of entry and would slow down the flow of commerce through these lanes, causing significant delays. DHS spent \$113 million on the program since 2005. DHS cancelled the acquisition phase of the program in 2007.
- In June 2010, we reported that the Coast Guard placed orders for or received significant numbers of units for three programs—the Maritime Patrol Aircraft, Response Boat–Medium, and Sentinel Class Patrol Boat—prior to completing testing, placing the Coast Guard at risk for needing to make expensive changes to the design of these vessels after production had begun if significant problems were to be identified during future testing.⁴ Acquisition cost estimates for these three programs together totaled about \$6.8 billion, according to Coast Guard data.
- In October 2009, we reported that TSA deployed explosives trace portals, a technology for detecting traces of explosives on passengers at airport checkpoints, even though TSA officials were aware that tests conducted during 2004 and 2005 on earlier models of the portals suggested the portals did not demonstrate reliable performance in an airport environment.⁵ TSA also lacked assurance that the portals would meet functional requirements in airports within estimated costs. In addition, the machines were more expensive to install and maintain

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

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

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

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

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

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

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

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

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

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

Actions Needed and Potential Cost Savings

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

⁸GAO-10-128.

⁹GAO-11-318SP.

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

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

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

Contacts and Acknowledgments

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

Related GAO Products

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

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

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

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

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

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

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

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