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Department of Homeland Security

Jodi Lieberman
American Physical Society

HIGHLIGHTS

– The FY 2013 Department of Homeland Security (DHS) request for R&D would see a 31.7 percent increase over FY 2012, from $617 million to $813 million. The largest increases are in the Domestic Nuclear Detection Office and the Science and Technology Directorate, which receive increases of 109 percent and 30 percent, respectively (see Table II-6 in the Agency Tables section).

– The $693.5 million request for the Science and Technology Directorate's R&D, Acquisition and Operations account would return the directorate's budget to its FY 2011 level, having sustained a 30.2 percent cut in the final FY 2012 omnibus appropriations bill.

– That budget request supports 107 ongoing projects and 12 new projects. Priority areas include: Biological Defense ($58.2 million); Explosives Defense ($44.4 million); Cyber Security ($18.1 million); and First Responders ($23.2million).

– The most significant increase is in the Research, Development and Innovation (RD&I) Counter Terrorism Thrust, the budget of which would jump from $1.6 million to $25.5 million, an increase of nearly 1,493.3 percent over FY 2012.

– S&T Laboratory Facilities funding is cut 27.8 percent from FY 2012 enacted levels, chiefly because the Administration did not request funding for construction of the National Bio and Agro-Defense Facility (NBAF) in Kansas. $50 million was appropriated for NBAF construction in FY2012.

– The DNDO Transformational Research and Development request totals $84 million, an increase of nearly 110 percent over FY 2012. The FY 2012 request was 90 percent of the FY 2011 request.

Historical Trends, Impacts and Context

The FY 2013 request clearly seeks to recoup the losses inflicted by the FY 2012 enacted R&D budget. Spending for the S&T Directorate would increase by 30.1 percent over last year's appropriated amount. The S&T research, development, acquisition and operations budget was reduced by nearly 48 percent from the FY 2012 budget request, from $1.03 billion to $533 million appropriated by Congress.

Following the House vote to cut the S&T Directorate budget in the FY2012 appropriations bill, S&T Directorate Under Secretary Tara O'Toole stated publically that the budget provided by the House would essentially drive DHS out of R&D completely, with remaining funding being used to fund mandated activities, such as keeping the labs operating, as well as shutting down test beds. It would also, according to O'Toole, freeze DHS capabilities in place since the Directorate would no longer be able to develop new technologies.

Addressing Ongoing Issues

Analyses of the S&T Directorate's record since its inception in 2003 have come down to a number of central issues, which have included: a concern over how R&D funding is allocated within the directorate's programs among basic and applied research and development; how the directorate sets priorities; the nature and effectiveness of the directorate's relationships with other federal R&D organizations, including DNDO and the Department of Energy's national laboratories; the definition of the directorate's mission, and the scope of its R&D role within DHS; the directorate's responsiveness to Congress; its financial and budgeting management; and the establishment of metrics and goals for evaluating its output.

Under Secretary O'Toole has sought to address these criticisms through a number of management reorganizations and changes. For example, in an effort to bolster support for the directorate by improving its record of developing and fielding new technologies, Under Secretary O'Toole, has restructured the S&T Directorate to be better able to rapidly field technologies needed by DHS "customer" agencies as well as first

responders. Criticism has previously been leveled at the directorate for its inability to successfully and rapidly field new technologies because of its focus on projects that never reached fruition. In response, Dr. O'Toole created an acquisition support and operational analysis group (ASOA) that would select which programs S&T would pursue, as well as to assist the 22 DHS agencies in writing requirements and strengthening their acquisition programs. DHS component agencies had previously been criticized for a lack of acquisition experience.

Dr. O'Toole also created three other new divisions: one to focus on the needs of first responders, one to coordinate R&D partnerships with universities and centers of excellence, and a third which restructured the Homeland Security Advanced Research Projects Agency (HSARPA). All divisions based on sectors such as critical infrastructure were put under HSARPA. O'Toole also scaled down the focus on basic research to a few select fields, with an emphasis on items with higher technology readiness levels or those that could be purchased "off the shelf."

A 2011 reorganization followed the reduction in the number of programs the Directorate funded and a focus on high priority technologies through the so-called Apex projects. These projects can only proceed with the approval of Under Secretary O'Toole and the head of the agency requesting the technology. The latter must certify that the program is a strategic priority, that they have managers who have the authority to see projects through, and that they will be given adequate funding. The technology must be delivered in 18-24 months.

Congress strongly supports the creation of the Apex projects, which focus on high-priority, high-value projects expected to produce results quickly, but believes the jury is still out on whether prioritizing certain projects will necessarily produce more rapid results. Therefore, the FY 2012 House appropriations report directed S&T to 1) brief the Committee before initiating any new Apex project, and to provide information on the goals and costs of the proposed effort, and to 2) provide quarterly updates on existing Apex projects, including the status of the initiative, project costs, and approximate project completion date.

Explaining the significant cuts to S&T enacted in the FY 2012 budget, Congress sought to take a "harder look at components that have had difficulty demonstrating their immediate contributions to the homeland security enterprise," forcing the directorate to better justify the "billions

Table 1. S&T Directorate Research, Development, Acquisition and Operations (budget authority in millions of dollars)

	FY 2011 Actual	FY 2012 Estimate	**FY 2013 Budget**	Change FY 12-13 Amount	Change FY 12-13 Percent
Acquisitions and Ops Support	*56*	*54*	***48***	*-6*	*-11.4%*
University Programs	*52*	*37*	***40***	*3*	*9.4%*
Laboratory Facilities	157	177	**127**	-49	-27.8%
Research Development and Innovatic	500	266	**478**	212	79.9%
Border Security R&D	- -	16	**32**	16	101.2%
Chem, Bio and Explosive Defense	- -	127	**198**	71	56.2%
Cyber Security	- -	*46*	***64***	*19*	*40.8%*
Disaster Resilience	- -	61	**144**	82	133.8%
Apex	- -	14	**15**	1	7.1%

Source: DHS S&T FY 2013 estimates by program/project activity (PPA).
Figures rounded to the nearest million. Changes calculated from unrounded figures.

of taxpayer dollars it has spent on R&D" as well as to force it to concentrate its efforts on its highest priority projects.

In addition, Congress continues to believe that the directorate needs to better identify its "good news" stories, to increase the visibility of its payoffs, and to be more transparent to Congress. As such, in the FY 2012 appropriations report, Congress states that the S&T Directorate "must more clearly demonstrate significant contributions to the homeland security mission and should prioritize the development of near-term, operational projects that promise substantive gains…"

IN-DEPTH REVIEW

Science and Technology Directorate

Over the last two years, the directorate has been reorganized into four **Research, Development, Acquisition and Operations Program/Project Activities (PPAs)**, each of which helps to implement Research, Development, Test and Evaluation (RDT&E) activities. In its FY 2012 appropriations report, Congress recommended a revised PPA structure within the RD&I construct that aligns the PPAs with the six RD&I thrust categories, and directed S&T to re-estimate how it would spread RD&I funding across those categories. It therefore requested that S&T submit its PPA funding plan not later than 30 days after enactment of the appropriations bill.

The Acquisition and Operations Support PPA provides assistance across the 22 DHS agencies to improve acquisitions programs. In FY 2013, the Administration has requested $47.9 million, down 11.4 percent from the FY 2012 enacted budget. DHS noted that the funding request would impact Cargo Security, Credentialing, Geospatial Information Systems (GIS) and Sensor Network and Alert Systems, all of which were selected for curtailment to focus on higher priority initiatives.

The Laboratory Facilities PPA manages the Laboratory Facilities programs. In addition to coordinating utilization of the Department of Energy's national labs and the homeland security-related activities and research conducted within them, this PPA oversees the planning, budgeting and management of lab infrastructure construction and upgrade projects. This includes planning and construction for the National Bio and Agro-Defense Facility (NBAF) in Manhattan, Kansas, which is expected to replace the Plum Island Animal Disease Center (PIADC) inherited from the Department of Agriculture when DHS was created. The Administration's request for the Laboratory Facilities PPA is reduced 27.8 percent from FY2012 enacted levels, chiefly because the Administration requested no funding for construction of the NBAF.

Members of Congress have criticized the S&T Directorate's decision to zero out construction funding in the FY 2013 request, arguing that the successor to PIADC should be put in place to provide a timely transition once Plum Island is shut down. However, the Administration, citing the significantly reduced appropriations provided for this activity in FY 2012, believes it would be more prudent to reevaluate the project to ensure maximum efficiency and safety going forward, particularly in light of the expected Budget Control Act funding limitations.

As a result of funding cuts for NBAF construction, S&T convened an expert and stakeholder taskforce to "conduct a comprehensive assessment of whether and for what purpose a Biosafety Level 4 facility should be stood up." The task force will also review cost, safety, and other alternatives to the current plan that would reduce costs and ensure safety within current funding constraints.

The University Programs PPA, which supports homeland security-related research and education at U.S. colleges and universities, is funded at $40 million in the FY 2013 request. This is an increase of 9.4 percent over the FY 2012 enacted budget of $36.6 million, but still

below the FY 2011 level of $51.8 million. Under this PPA, the Office of University Programs carries out activities through three program areas: the DHS S&T University Centers of Excellence (COEs); Educational programs; and the Minority Serving Institutions program. The FY 2013 funding request ensures that the COEs receive core funding. DHS recently announced the creation of a Homeland Security Academic Advisory Council (HSAAC) intended to better engage the academic community in homeland security efforts. The group was formed to provide Secretary Janet Napolitano with advice and recommendations regarding academic research, recruitment and faculty exchanges.

The Research, Development, and Innovation (RD&I) PPA, for which $478 million is requested in FY 2013, provides technology and solutions to meet the needs of the operational components of DHS and the first responder community. Overall, this amounts to a 79.9 percent increase over the FY 2012 enacted budget.

Within RD&I, work is organized into six "thrust" areas: Apex Research and Development; Border Security Research and Development; Chemical, Biological, and Explosive Defense Research and Development; Counter Terrorism; Disaster Resilience; and Cyber Security. Within those six thrust areas, the largest increases can be found in Counter Terrorism and Disaster Resilience. The former is increased by 1493.3 percent, or $23.3 million, over the FY 2012 budget, while the latter is increased by 133.8 percent, or $82 million.

Domestic Nuclear Detection Office (DNDO)

The Transformational and Applied Research (TAR) programs at DNDO support basic and applied research of systems with increased capabilities by contributing to advances in nuclear detection and technical nuclear forensics. TAR projects address advanced compact high-performance handheld systems; advanced passive standoff detection technologies; improved detection through networked and distributed detection systems; better detector materials; and improved material characterization and radiochemistry. DNDO is also pursuing targeted technologies for the detection of shielded special nuclear material through passive, active, and radiographic interrogation programs, and the development of key supporting systems for varied deployment schemes. TAR consists of three projects: the Exploratory Research Program

Table 2. DNDO Tranformational and Applied Research
(budget authority in millions of dollars)

	FY 2011 Actual	FY 2012 Estimate	**FY 2013 Budget**	Change FY 12-13 Amount	Change FY 12-13 Percent
Total TAR	96	40	**84**	44	109.8%
Exploratory Research Program	*48*	*14*	***45***	*31*	*227.2%*
Academic Research Initiative	*18*	*5*	***9***	*4*	*72.5%*
Adv Tech Demonstration Program	*30*	*21*	***31***	*9*	*43.7%*

Source: Agency budget documents.
Figures rounded to the nearest million. Changes calculated from unrounded figures.

(ERP); the Advanced Technology Demonstration (ATD); and the Academic Research Initiative (ARI).

The ERP, which would be funded at $44.5 million in the FY 2013 budget, explores innovative, high-risk, early-stage technologies, concepts and ideas that can make transformational contributions to support the Global Nuclear Detection Architecture (GNDA) and reduce the risk of nuclear terrorism. These activities are intended to transform the basic building blocks of nuclear detection technology and supporting fields for dramatic improvements in technical capabilities, with the research generally culminating in a proof of concept or proof of feasibility demonstration in a laboratory setting. Successful ERP technologies and concepts may then transition to support a subsequent near-term research project or spur commercial development. ERP also provides performance modeling, improved algorithm development, and other support capabilities for the broader DNDO mission.

One of the projects that has gotten some attention over the past year is work to identify alternatives to helium-3 neutron detectors for different applications, including portals, backpacks, handhelds, and pagers. Under the ERP, DNDO had begun exploring options for alternative neutron detection, well before the recent helium-3 shortage was identified. In August 2011, DNDO concluded an independent government test at its Radiological and Nuclear Countermeasures Test and Evaluation Complex in Nevada to evaluate the performance of several alternative neutron detection modules for radiation portal monitors that do not use helium-3. DNDO is also funding long-term research and development in

partnership with the private sector and academia, and has 15 different technologies in the pipeline that could replace helium-3.

The Academic Research Initiative was established by DNDO and the National Science Foundation (NSF) to ensure a continued pipeline for human capital development and basic research. The FY 2013 budget includes $8.8 million for this program. The ARI is intended to conduct basic and long-term research to stimulate innovation across many radiation detection sectors as well as to develop and train the next generation of researchers in nuclear detection technology. The ARI currently has awards with 30 universities through 36 grants supporting 118 students.

The Advanced Technology Demonstration Program (ATD) performs accelerated development, characterization, and demonstration of leading-edge technologies to address critical gaps in nuclear detection capabilities. The FY 2013 budget requests $30.6 million for this program.

CONCLUSION AND OUTLOOK

S&T Directorate: Doing Less With More

S&T has a wide-ranging mission, which includes conducting basic and applied research of technologies and overseeing the testing and evaluation of component acquisitions and technologies to ensure that they meet DHS acquisition requirements before implementation in the field.

Since Under Secretary O'Toole took the helm at the directorate, S&T has reorganized to better achieve its goals and provide better assistance to DHS components in developing technologies. However, S&T is also managing a decline in available R&D resources. S&T's FY 2011 appropriation decreased 20 percent from FY 2010, while in FY 2012 the Directorate took a more significant reduction, with a 30.3 percent cut. As a result, S&T has had to adjust resources and re-prioritize its efforts.

Technology foraging

Consistent with being provided fewer resources, S&T has been focused on creating efficiencies which permit the directorate to more quickly field new and innovative technologies. To do so, the directorate

established a permanent technology foraging program, which leverages the work being done elsewhere – in other federal agencies, at universities, and in industry – against possible applications to DHS needs, to look for solutions among existing ideas and technologies, and to harvest them in a cost-effective way. The FY 2013 request includes $3 million for this program.

Annual Portfolio Reviews

In order to address the criticism that the S&T Directorate has not been strategic enough in trying to attain its goals, S&T has committed to an annual review of its portfolio of basic and applied R&D and all proposed ''new start'' projects. The review process consists of written materials, an oral presentation by the project manager, and careful analysis of the project's likely impact and feasibility (or ''riskiness'') as judged against specific metrics determined by S&T with input from the operating components. These metrics are designed to address elements essential to programmatic success in the context of the DHS's Quadrennial Homeland Security Review (QHSR) missions, including: impact on the customer's mission; ability to transition the products to the field; technical positioning; whether the projects are aligned with customer requirements; level of customer involvement; and level of innovation. A review panel of S&T leaders, the DHS Component representatives, and outside experts then evaluates and rates each project.

DNDO

In contrast to the last two fiscal year budget requests, the Administration does not seek to transfer the Transformational and Applied Research and Development (TAR) program from the Domestic Nuclear Detection Office (DNDO) to the Science and Technology (S&T) Directorate. Congress turned down that transfer request in the final FY2012 appropriations bill, instead funding it at $40 million. The bill also directed DNDO to provide a detailed breakout of how it intends to fund transformational R&D activities no later than 60 days after the date of enactment of the appropriations bill. That has not yet occurred. Depending on whether or not DNDO provides a sufficient level of detail to Hill staff, it is possible that appropriators will see fit to again cut back DNDO's request for TAR in the FY 2013 budget.