

R&D in the Department of Homeland Security

Kei Koizumi, AAAS

HIGHLIGHTS

- The Department of Homeland Security (DHS) R&D portfolio shrank in 2007 because of congressional dissatisfaction with the new department's R&D efforts, but would expand by 4.1 percent or \$41 million to \$1.0 billion in FY 2009 (see Table II-6). The increase would be almost 14 percent excluding a bumper crop of 2008 R&D earmarks.
- R&D on radiological and nuclear countermeasures in the Domestic Nuclear Detection Office (DNDO) would continue to gain slightly with a \$5 million or 1.8 percent boost to \$279 million, while chemical and biological countermeasures in the Science and Technology Directorate would fall (down 3.7 percent to \$200 million).
- University Programs funding would fall from \$49 million in both 2007 and 2008 down to \$44 million in 2009.
- In addition, DHS will receive \$2.2 billion in already-appropriated funds for Project Bioshield in 2009, to procure promising biodefense countermeasures from the private sector for the national stockpile.

DHS R&D IN THE FY 2009 BUDGET

After starting from virtually nothing four years ago and rapidly becoming the seventh-largest R&D funding agency, the Department of Homeland Security (DHS) ran into trouble spending money, knowing where the money went, and linking R&D to the technology requirements of DHS operating units. Under the leadership of Undersecretary of S&T Jay Cohen, the head of the DHS S&T Directorate for the past 18 months, the entire DHS R&D operation is still reorganizing. Cohen proposed an extensive restructuring of the DHS R&D portfolio in the 2008 budget

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request, consolidating many program lines and reshuffling others to create new program portfolios. The FY 2009 budget request would continue this new structure and would boost funding after two years of retrenchment. The DHS R&D portfolio for FY 2009 would be \$1.0 billion, an increase of \$41 million or 4.1 percent over 2008. Adjusting for \$82 million in 2008 R&D earmarks that DHS would cut out in 2009 results in a nearly 14 percent increase for DHS core R&D programs. R&D remains a small but significant part of the overall DHS budget, which would total \$50.5 billion in 2009, an apparent cut but actually an increase when emergency disaster relief funds in 2008 are excluded (see Table II-6).¹

Radiological and nuclear countermeasures R&D in the Domestic Nuclear Detection Office (DNDO) continues to be the largest part of the DHS R&D portfolio in 2009. DNDO was carved out of the S&T Directorate in 2006 and is now a stand-alone entity devoted to radiological and nuclear countermeasures. Its basic and applied research portfolio would increase slightly by 1.8 percent or \$5 million to \$279 million in 2009 within a total budget of \$564 million. (The difference between the two totals is procurement of nuclear detection devices for U.S. ports of entry, management costs, and operations support costs.) In 2009, the largest increases for DNDO would go to the procurement side instead of the research side. But within the research portfolio the Transformational Research and Development program, tending toward the basic research end with a focus on transformative breakthroughs, would receive a large \$17 million increase to \$113 million.

The chemical and biological countermeasures portfolio, which remains in the S&T directorate, would receive \$200 million, down 3.7 percent from the current year to remain the second-largest part of the DHS R&D portfolio. Although this portfolio has been larger in previous years, in 2007 DHS spun off non-R&D programs such as the BioWatch surveillance system to other DHS units, leaving behind only purely R&D programs. Separately, in the Laboratory Facilities appropriation (\$147 million, up \$43 million), construction of the National Biodefense Analysis and Countermeasures Center (NBACC) would be finished in

¹ Note: The AAAS estimates of DHS R&D in Table II-6 differ significantly from R&D data in the *Budget of the U.S. Government FY 2009*. AAAS has corrected inaccurate codings of non-R&D programs as R&D, added back some R&D funding left out of the Budget, and removed some non-R&D programs from the R&D data after examination of DHS budget documents.

R&D IN THE DEPT. OF HOMELAND SECURITY

2008 and the FY 2009 request of \$33 million, double this year's funding, would be used to start operations. NBACC will be part of a biodefense complex of DHS, NIH, and DOD facilities at Fort Detrick, Maryland. There would also be \$36 million, more than triple 2008 funding, for detailed design of the National Bio and Agrodefense Facility, working toward the beginning of construction in 2010 after a site selection later this year.

Funding for University Programs would fall \$6 million down to \$44 million in 2009. This program funds university-based Centers of Excellence that are multi-year university consortia to perform R&D on homeland security-related topics and also fellowships to encourage U.S. students to pursue scientific and technical degrees in areas of study related to homeland security. There are now seven DHS Centers of Excellence, one funded jointly with EPA and another with the Lawrence Livermore National Laboratory, and five more were recently awarded in February focusing on border security and immigration, explosives detection, mitigation and response, maritime and port security, natural disasters and emergency management, and transportation security.

The Innovation portfolio, to develop breakthrough technologies and highly innovative approaches to homeland security problems, would expand 36 percent to \$45 million in the DHS request, but Congress last year failed to approve a similar increase. Among the technologies this program will tackle are liquid explosives detection, container security, mobile screening technologies, tunnel detection devices, improvised explosive devices, and critical infrastructure resiliency.

THE 2009 DHS R&D REQUEST IN HISTORICAL CONTEXT

DHS R&D, after a rapid ramp-up phase, grew too rapidly and is now in retrenchment and reorganization. DHS began life with only a few R&D laboratories and programs that it inherited from USDA, DOE, and DOD, unlike the massive transfer of personnel and capabilities that happened in the rest of the new department. From a transfer of less than \$300 million of programs in 2002, DHS expanded rapidly after its foundation in FY 2003 (see Table I-11), adding portfolios on long-neglected technology areas, establishing relationships with existing national laboratories and federal laboratories, and setting up new structures for funding external R&D.

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But the S&T directorate struggled to ramp up its capabilities, staffing, and spending, prompting Congress to slash its funding dramatically in 2007 and impose numerous restrictions and demands. The final 2007 appropriations bill rescinded \$125 million in these unspent R&D funds, made program cuts in most areas, and required S&T to submit a five-year research plan with priorities, performance measures, and resource needs for each R&D area. Undersecretary for Science and Technology Jay Cohen was sworn in as the new S&T directorate leader in August 2006. Although the 2007 and 2008 R&D totals were well below appropriations of previous years, DHS was still working through its backlog of unspent funds; at the end of FY 2007, even after rescissions and budget cuts, the S&T Directorate still had nearly \$300 million in unspent funds to carry over to FY 2008. So while DHS' appropriations history is uneven, the actual outflow of money will be smoother as appropriations get stretched out into outlays over several years; now, S&T estimates only \$65 million in unspent funds by the end of FY 2008.

IMPACTS OF THE DHS R&D PORTFOLIO

DHS spends its R&D in roughly equal thirds devoted to intramural laboratories, industrial firms, and FFRDCs (national laboratories, mostly DOE labs). To date, only a small portion of DHS R&D has gone to universities, just 3 percent in the most recent year for which figures are available.

DHS research, excluding development funding, is heavily oriented to the life sciences and engineering, not surprising since biological countermeasures dominated the early days of DHS R&D, but the portfolio is diversifying as DHS ramps up its efforts in several new research topics. Initially, two-thirds of DHS investments in basic and applied research went to the life sciences and engineering, but the latest data show increasing investments in the physical sciences as the emphasis shifts away from biological countermeasures toward the DNDO radiological and nuclear countermeasures portfolio. The total research portfolio is expected to keep growing, as research becomes a larger part of DHS R&D and development funding shrinks.