

## DHS R&D Holds in 2008 After Steep Cuts in 2007

### AAAS R&D Funding Update on R&D in the FY 2008 DHS Budget

(This analysis is a preview of the DHS chapter in the forthcoming *AAAS Report XXXII: Research and Development FY 2008*, a comprehensive look at the President's budget for R&D in FY 2008. This analysis contains revised AAAS estimates of DHS R&D, different from figures originally presented in the President's budget. More tables and continually updated supplemental materials on R&D in the FY 2008 budget can be found on the AAAS R&D Web site at <http://www.aaas.org/spp/rd>.)

#### Highlights

- The **Department of Homeland Security's (DHS) R&D portfolio fell sharply in 2007 because of rising congressional dissatisfaction with the new department's R&D efforts, and would edge down another 0.8 percent to \$996 million in 2008, even as total DHS funding continues to increase** (see Table II-6).
- While research on radiological and nuclear countermeasures would continue to climb 17 percent to \$320 million in the newly separate Domestic Nuclear Detection Office (DNDO), R&D in the main Science and Technology Directorate would fall steeply for the second year.
- The newly restructured S&T Directorate would cut funding for most R&D areas, but the new Innovation program to develop revolutionary technological breakthroughs would see its funding jump from \$38 million to \$60 million.
- University and Fellowship Programs funding would fall again to \$39 million, down a third in two years. DHS would support 11 university-based centers by 2008.

#### DHS R&D in the FY 2008 Budget

The still-new Department of Homeland Security (DHS) continues to lead the government effort against terrorism and to coordinate government-wide responses to man-made as well as natural disasters, but is experiencing growing pains as it tries to coordinate its many activities and execute its many missions. The department's missteps in responding to the 2005 hurricane season are already well known, but the department has also struggled to ramp up its R&D activities and to link them to mission goals. After starting from virtually nothing four years ago and rapidly becoming the seventh-largest R&D funding agency, the department's Science and Technology (S&T) unit 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 new head of the DHS S&T Directorate, the entire DHS R&D operation is undergoing an extensive reorganization. Meanwhile, increasing congressional dissatisfaction over DHS' R&D programs and financial management prompted Congress to cut DHS R&D dramatically by 23 percent in 2007 after several years of equally dramatic growth. **DHS R&D would level off in 2008 at \$996 million, down 0.8 percent** (see Table II-6). But the 2008 budget as presented could be a placeholder until Cohen's reorganization is complete, so the final 2008 appropriation could look very different from this request. (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 2008*. 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.)

In FY 2006, nearly all DHS R&D programs had their home in the **Directorate of Science and Technology (S&T)**, but nearly a third of the DHS R&D portfolio would be outside S&T in the 2008 budget. This Directorate has responsibility for setting homeland-security R&D goals and priorities, coordinating homeland security R&D throughout the federal government, funding homeland security R&D, facilitating the transfer and deployment of technologies for homeland security, and advising the DHS Secretary on all scientific and technical matters. The S&T Directorate's R&D funding would total \$656 million in 2008, down 7.9 percent from 2007 and just half last year's budget as it continues to retrench from the too-rapid growth of previous years.

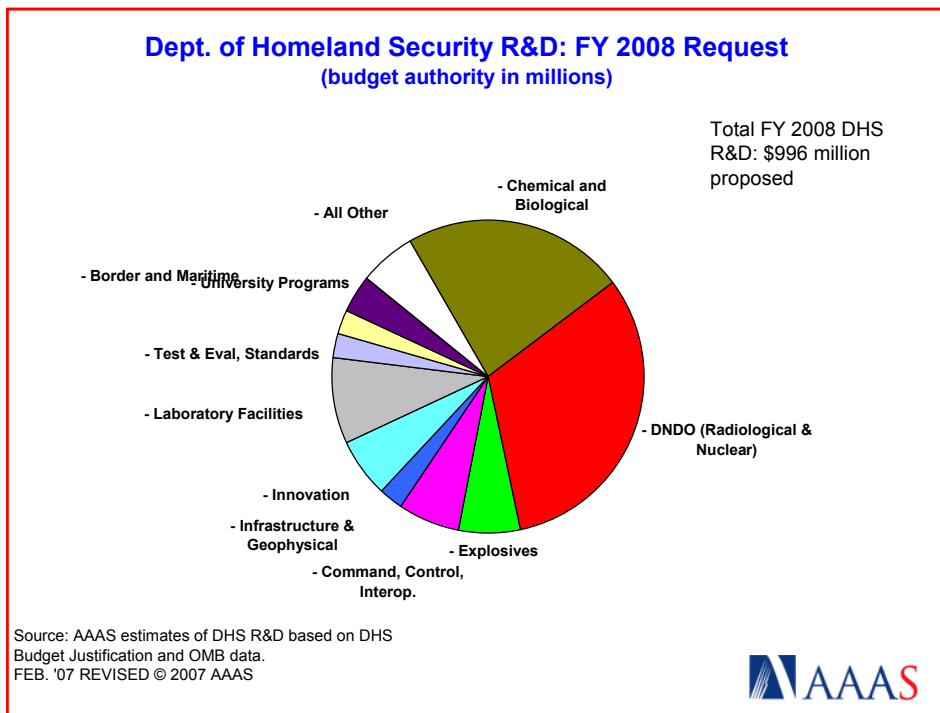


Figure 1. (click on the image for PDF)

**Radiological and nuclear countermeasures R&D in the new Domestic Nuclear Detection Office (DNDO) would be the largest part of the DHS R&D portfolio in 2008** (see Figure 1), with nearly a third of the total investment. DNDO was created out of the S&T Directorate in the middle of FY 2006 and is now a stand-alone entity devoted to radiological and nuclear countermeasures. Its mainly applied research portfolio would climb 17 percent to \$320 million in 2008 within a total budget of \$562 million, also up 17 percent. (The difference between the two totals is procurement of nuclear detection devices for U.S. ports of entry, and management costs.) The largest increases would be for transformational R&D to try to develop breakthrough methods of detecting radiological and nuclear threats in operational settings and for systems development of new Advanced Spectroscopic Portal (APS) systems.

R&D against weapons of mass destruction dominates the DHS R&D portfolio when DNDO R&D on radiological and nuclear countermeasures is combined with defenses against biological, chemical, and explosives threats in S&T (see Figure 1). The S&T reorganization in progress combines the formerly separate chemical and biological portfolios into a single program; within the program, construction of the National Biodefense Analysis and Countermeasures Center (NBACC) continues toward a target completion date of 2008. NBACC will be part of a biodefense complex of DHS, NIH, and DOD facilities at Fort Detrick, Maryland. The program would transfer operations of the BioWatch and other surveillance systems to a new unit in DHS, and would concentrate on R&D toward the next generation of biological and chemical detection and surveillance capabilities. Explosives countermeasures funding would fall nearly 40 percent to \$64 million, down nearly three-quarters from 2006 (see Table II-6) as a concentrated

burst of development activities to defend against shoulder-fired aircraft missiles winds down and transitions to deployment on commercial aircraft.

The Innovation portfolio to develop breakthrough technologies and highly innovative approaches to homeland security problems would receive the largest increase in S&T, up \$22 million to \$60 million. Among the technologies this new program will tackle are tunnel detection devices, improvised explosive devices, critical infrastructure resiliency, and new ways of defeating shoulder-fired anti-aircraft missiles.

Funding for University and Fellowship Programs would fall \$10 million to \$39 million in 2008, after a similar cut in 2007. 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, and another four (on the areas of explosives detection, mitigation, and response; border security and immigration; maritime, island, and extreme/remote environment security; and natural disasters, coastal infrastructure, and emergency management) are open for competition in the current fiscal year. Two of the existing seven centers are cooperative centers, one a DHS-EPA effort and the other a DHS-Lawrence Livermore (DOE) collaboration.

### Impacts of the DHS R&D Portfolio

Recently, DHS released its first data set on how it spent its initial R&D budgets. As shown in Figure 2, DHS R&D is concentrated geographically, with three states and the District of Columbia accounting for the majority of DHS R&D funding in 2004. Though it is likely that DC's share is due to headquarters funds that eventually went to other states, Maryland and Virginia clearly benefit from the heavy concentration of contractors in the Washington, DC area, while California and New Mexico benefit from the primarily DOE-affiliated national laboratories located in these states.

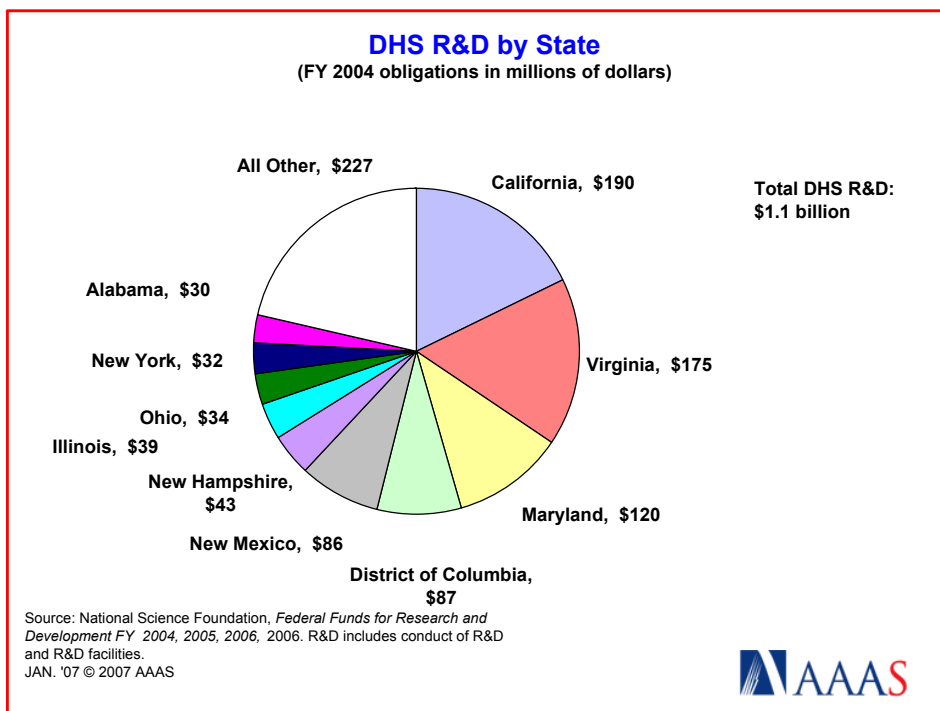


Figure 2. (click on the image for PDF)

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. Fully two-thirds of DHS investments in basic and applied research go to these two disciplines, with the remainder devoted

mostly to the physical sciences (see Figure 3). This portfolio is expected to shift in 2007 and 2008 as the emphasis shifts away from biological countermeasures toward the radiological and nuclear countermeasures portfolio. The total research portfolio is expected to grow as well, as research becomes a larger part of DHS R&D and development funding shrinks.

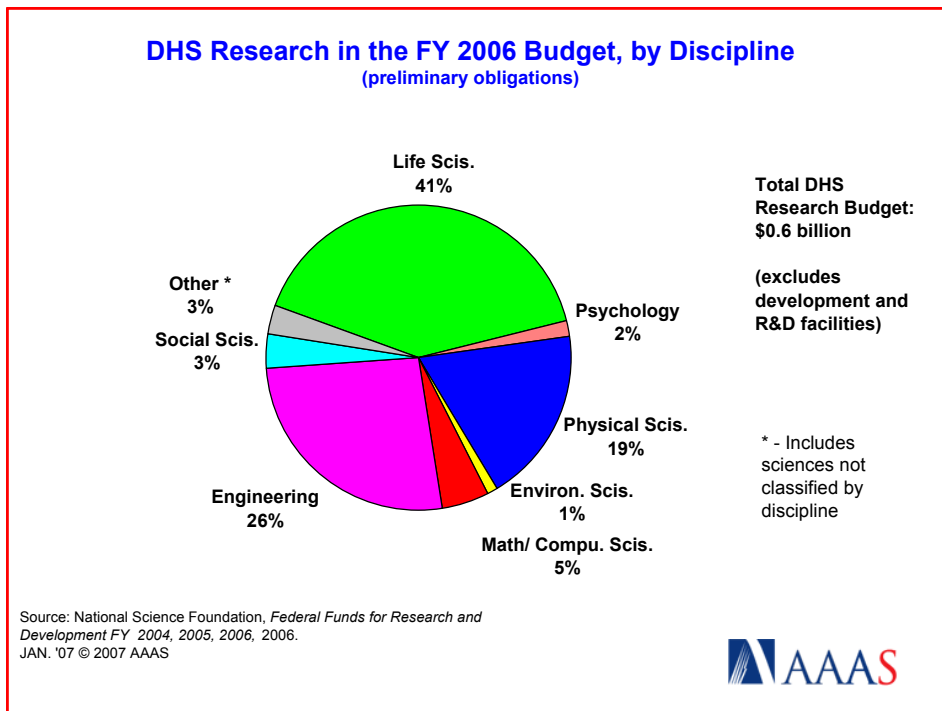


Figure 3. (click on the image for PDF)

### Recent Historical Trends in DHS R&D

DHS R&D, after a rapid ramp-up phase, by all accounts grew too rapidly and is now in retrenchment and reorganization. As shown in Figure 4, 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 began rapidly creating new R&D capabilities after its foundation in FY 2003 (see Figure 4), adding portfolios on long-neglected technology areas to address homeland security, establishing relationships with existing national laboratories and federal laboratories, and setting up new structures for funding external R&D. In the past few years, DHS has set up an Office for National Laboratories that coordinates DHS interactions with DOE national laboratories possessing expertise in homeland security. DHS has also set up its own FFRDC, the Homeland Security Institute (HSI), and has also consolidated R&D activities at laboratories it inherited from other departments. The extramural R&D portfolio in the S&T directorate is now managed by the Homeland Security Advanced Research Projects Agency (HSARPA), modeled on the Defense Advanced Research Projects Agency (DARPA) in the Department of Defense (DOD). HSARPA awards extramural grants for basic and applied research to promote revolutionary changes in homeland security technologies; develops and tests potential homeland security technologies; and accelerates or prototypes the development of homeland security technologies to get them ready for deployment. HSARPA administers DHS' Small Business Innovation Research (SBIR) program, which provides competitively awarded exploratory and development grants to small businesses.

But after DHS finished its start-up phase in 2005, budget growth slowed down in 2006 and the S&T directorate struggled, prompting Congress to slash its funding dramatically in 2007 and impose numerous restrictions and demands. In the 2007 appropriations process, a congressional report described the directorate as "a rudderless ship without a clear way to get back on course," criticized its lack of clear

research goals, absence of detailed budget information, mystifying accounting conventions, and even an inability to spend past appropriations it had been given. The final 2007 appropriations bill rescinded \$125 million previously appropriated R&D funds that have never been obligated, 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 before it could spend a \$60 million chunk of its 2007 R&D funds. Congress separately withheld \$60 million in 2007 S&T management costs funding until a detailed accounting of overhead and management costs for the R&D portfolio had been delivered.

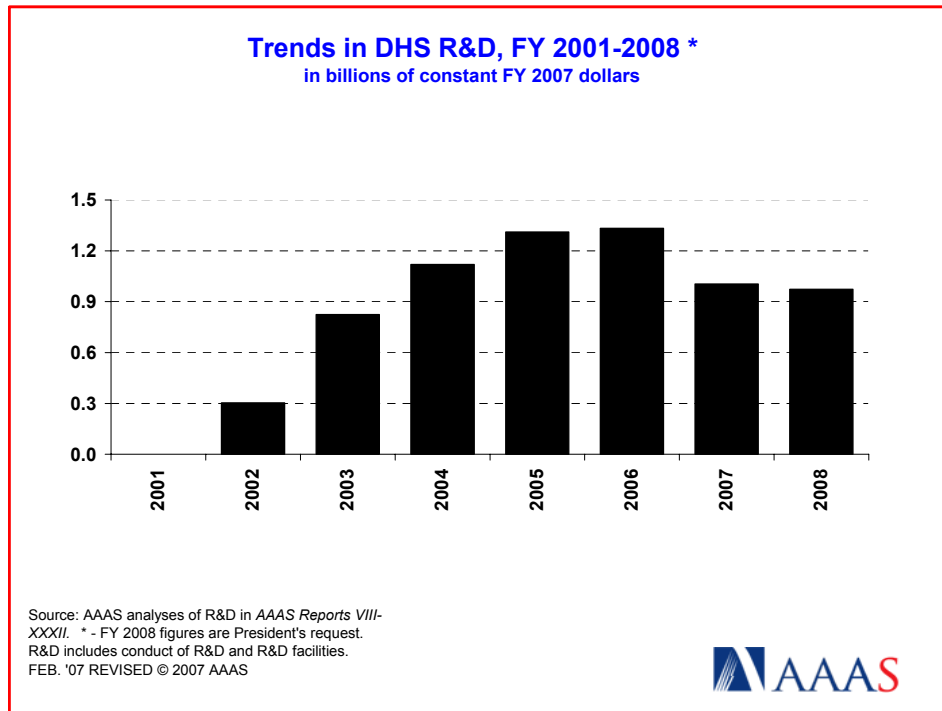


Figure 4. (click on the image for PDF)

Undersecretary for Science and Technology Jay Cohen was sworn in as the new S&T directorate leader in August 2006, midway through the bruising 2007 appropriations season and also midway through the internal deliberations on the 2008 budget. The public presentation of the 2008 budget marks the new leadership's first budget proposal, but Cohen has made it clear that his reorganization of S&T is still a work in progress. As the 2008 proposal goes to Congress, appropriators will no doubt keep a sharp eye on these reorganization efforts and will be looking for signs that S&T is better able to spend its funds wisely.

(More materials on R&D in the FY 2008 budget, historical data and charts, and more information on AAAS Report XXXII: *Research and Development FY 2008*, can be found on the AAAS R&D Web site at <http://www.aaas.org/spp/rd>.)

- February 23, 2007

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Table II-6. Department of Homeland Security R&D

**Table II-6.** R&D in the Department of Homeland Security  
(budget authority in millions of dollars)

	FY 2006	FY 2007	FY 2008	Change FY 07-08	
	Actual	Estimate	Budget	Amount	Percent
Domestic Nuclear Detection Office 1/ 2/	0	273	<b>320</b>	47	17.4%
Science and Technology 1/ 2/ 3/	1,281	713	<b>656</b>	-57	-7.9%
- <i>Chemical and Biological</i>	387	314	<b>229</b>	-85	-27.0%
- <i>Border and Maritime</i>	43	33	<b>26</b>	-8	-22.4%
- <i>Command, Control, Interop.</i>	108	63	<b>64</b>	1	1.6%
- <i>Explosives</i>	262	105	<b>64</b>	-41	-39.4%
- <i>Human Factors</i>	6	7	<b>13</b>	6	85.3%
- <i>Infrastructure &amp; Geophysical</i>	86	75	<b>24</b>	-51	-67.9%
- <i>Innovation</i>	0	38	<b>60</b>	22	57.6%
- <i>Laboratory Facilities</i>	83	106	<b>89</b>	-17	-15.9%
- <i>Test &amp; Eval, Standards</i>	35	25	<b>26</b>	0	0.3%
- <i>Transition</i>	19	24	<b>25</b>	1	2.7%
- <i>University Programs</i>	62	49	<b>39</b>	-10	-20.3%
- <i>DNDO 1/</i>	209	0	<b>0</b>	0	--
- <i>Rescissions 4/</i>	-20	-125	<b>0</b>	125	-100.0%
Coast Guard	19	19	<b>20</b>	1	5.3%
<b>Total DHS R&amp;D</b>	<u>1,300</u>	<u>1,005</u>	<u><b>996</b></u>	-8	-0.8%
<i>Total budgets (including non-R&amp;D):</i>					
Domestic Nuclear Detection Office 1/	0	481	<b>562</b>	81	16.8%
Science and Technology 1/	1,467	848	<b>799</b>	-49	-5.8%

Source: OMB data for R&D for FY 2008 and agency supporting documents.

All figures are rounded to the nearest million. Changes calculated from unrounded figures.

1/ Rad. & Nuc. Countermeasures transferred to the Domestic Nuclear Detection Office in 2007

2/ R&D items only. Non-R&D components and line items are excluded.

3/ S&T Directorate proposes new account structure in FY 2008. Previous years adjusted for comparability.

4/ Undistributed rescissions of previously appropriated funds.

**February 23, 2007 - revised**

**Please see Chapter 12 for information on DHS R&D.**