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Homeland Security Research and Development Funding and Activities in Federal Agencies: A Preliminary Inventory

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Summary

According to the Office of Management and Budget (OMB), federal agency funding for homeland security research and development (R&D) was requested at $3.6 billion for FY2005, a 5.4% increase over the enacted FY2004 level, and about 63% more than enacted for FY2003, and about double the resources used in FY2002. The Department of Homeland Security's (DHS) R&D programs constitute about one-third of total federal homeland security R&D funding. Other agencies which have substantial homeland security R&D budgets, listed in descending funding order, include the National Institutes of Health, the Department of Defense, the Department of Justice, the National Science Foundation, the Department of Agriculture, the Environmental Protection Agency, the Department of Commerce, the Department of Energy, and the Department of Transportation. The sum of $3.6 billion is a large amount and, arguably, the fastest growing component of the federal R&D budget. DHS has statutory responsibilities, mandated by the Homeland Security Act, P.L. 107-296, to coordinate federal homeland security R&D throughout the government. According to DHS's Under Secretary for Science and Technology, homeland security R&D will be coordinated by fall 2004.

Coordination and subsequent congressional oversight, depend, in part, on the quality of information about federal homeland security R&D. The little information that is available does not permit identification of the components of homeland security R&D funding nor systematic comparisons among agencies. This makes it difficult to answer questions about priority-setting and coordination. R&D seems to appear most prominently in two categories of funding OMB uses to identify types of homeland security budget accounts: the two homeland security missions of "defending against catastrophic threats,"and of "protecting critical infrastructures and key assets." However, the R&D components of these categories have not been clearly identified. It is not possible to compare across agencies to determine the actual funding for homeland security R&D in functional areas, such as countering bioterrorism, border security, information security, threat mitigation, and so forth; or for fields of science, such as chemistry, environmental science or psychology. Clearer and more consistent information about homeland security R&D might assist in eliminating unnecessary duplication, filling in gaps, identifying future R&D personnel needs, and improving the capability of different types of R&D performers.

OMB has responsibility to gather homeland security R&D data and federal agencies also publish information tailored to their needs. Section 889 of P.L. 107-296 requires OMB to report on homeland security funding and to consult at least annually with Congress to identify which activities constitute homeland security activities for budgeting purposes. There are many obstacles to obtaining consistent information and several options to improve these data. These are addressed in a companion CRS Report RL32482, *Federal Homeland Security Research and Development Funding: Issues of Data Quality,* by (name redacted). This report will not be updated.

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Homeland Security Research and Development Funding and Activities in Federal Agencies: A Preliminary Inventory

Introduction

This inventory summarizes total federal funding for homeland security research and development (R&D) and describes specific federal agency programs for such R&D. It presents some historical information, but concentrates on funding requested for FY2005.

This report is a companion piece to CRS Report RL32482, *Federal Homeland Security Research and Development Funding: Issues of Data Quality*. That report identifies the major sources of information for federal agency homeland security R&D funding, describes the Office of Management and Budget's (OMB) responsibilities in collecting such information, and summarizes strengths and weaknesses of different data sets and issues of their reliability and validity. Some of the data in this report may be used to justify some of the observations in that report.

According to OMB data, for FY2005 federal agencies requested $3.6 billion for homeland security research and development (R&D), a 5.4% increase over the enacted FY2004 level. This excludes facilities and construction budget authority. Other data show that the amount requested for FY2005 is about double the resources used in FY2002. DHS's R&D programs, requested at about $1.2 billion for FY2005, constitute about one-third of total funding. Including facilities and construction budget authority, total federal agency homeland security R&D,[1] was requested at about $4.2 billion for FY2005.[2] Other agencies with large homeland security R&D activities listed in descending order of funding responsibility, include the National Institutes of Health (NIH), the Department of Defense (DOD), the Department of Justice (DOJ), the National Science Foundation (NSF), the Department of Agriculture (USDA), the Environmental Protection Agency (EPA), the Department of Commerce (DOC), the Department of Energy (DOE), and the Department of Transportation (DOT). These agencies' programs are described and sources are identified for obtaining additional information.

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[1] At least 50 agencies support homeland security R&D according to Tom LaTourrette, "Appendix H - Developing a Strategy for Research and Development in the Department of Homeland Security," in *Forging America's New Normalcy, The Fifth Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction*, Dec. 15, 2003, p. H-8.

[2] American Association for the Advancement of Science, "Bush Administration Seeks $4.2 Billion for Homeland Security R&D in FY2005," May 12, 2004 [http://www/aaas/org/spp/rd/hs05.htm].

In a concluding section, the report raises some issues relating to setting policy and priorities that might be clarified if clearer and more consistent information were available about federal agency homeland security R&D. These include issues of eliminating unnecessary duplication, filling in gaps, identifying fields of science which warrant oversight or funding attention, correlating future R&D needs with training of personnel, developing policies to ensure availability of a variety of different types of R&D performers, including in academia, federal laboratories, and industry, and so forth.

Combating Terrorism R&D: Data and Information Sources

OMB has principal responsibility to prepare data sets on homeland security R&D funding. Although there is some overlap between data sets, as will be explained in this report, OMB prepares separate information on "combating terrorism" R&D and on "homeland security" R&D.

The most comprehensive single source of information about federal funding and agency programs for "combating terrorism" is the OMB annual series *Report to Congress on Combating Terrorism*.[3] The latest report, for 2003, was published in September 2003; it contains data for FY2002, FY2003, and the FY2004 request. The OMB report has been produced since 2001, and the series contains data starting with FY2000. Information in the OMB report gives funding levels and describes the objectives and activities of some federal agency programs to combat terrorism, of which homeland security programs are considered a subset.[4] The report does not give detailed financial or descriptive information about all programs.

The OMB 2003 *Combating Terrorism* report identified two types of activities: "antiterrorism (defensive measures used to combat terrorism) and counterterrorism (offensive measures used to combat terrorism), both domestically and abroad."[5] OMB divided the "combating terrorism" heading into two funding categories, "homeland security" (HS) and "overseas combating terrorism" (OCT).[6] The 2003 report included a summary table with data on federal R&D funding to combat terrorism, by agency. **See Table 1.**

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[3] This report is required by Section 1051 of the National Defense Authorization Act of 1998, P.L. 105-85. Reports for the fiscal years 2001 to 2003 are available at [http://www.omb.gov].

[4] Office of Management and Budget, *2003 Report to Congress on Combating Terrorism,* September 2003, pp. 2-3.

[5] OMB, *2003 Report to Congress on Combating Terrorism,* p. 3.

[6] OMB, *2003 Report to Congress on Combating Terrorism,* p. 3.

Table 1. OMB Data on Funding for R&D to Combat Terrorism, by Agency, FY2002 to FY2004, Request

(budget authority, $ in millions)

Agency	2002 Enacted	2002 Supple-mental	2003 Enacted	2003 Supple-mental	2004 Request*	Percent Change FY2003 to FY2004
Dept. of Agriculture	$28.0	$52.2	$30.4	none	$42.1	+38%
Dept. of Commerce	11.7	7.0	16.4	none	19.4	+18%
Dept. of Defense	259.0	2.0	597.0	none	157.0	-74%
Dept. of Energy	none	none	19.0	none	none	-100%
Dept. of Health and Human Srvs.	117.2	85.0	831.2	none	1,648.2	+98%
Dept. of Homeland Security	110.0	93.4	658.2	none	844.0	+28%
Dept. of Justice	13.1	76.1	173.5	$4.9	174.7	-2%
Dept. of State	1.8	none	1.8	none	1.8	0%
Dept. of Transportation	54.7	54.0	3.7	none	3.9	+5%
Corps of Engineers-Civil Works	none	3.0	none	none	none	0%
Environmental Protection Agency	2.8	1.5	49.7	none	29.0	-42%
National Science Foundation	228.8	none	268.5	none	285.7	+6%
Postal Service	none	9.5	none	none	none	0%
Total, Combating Terrorism R&D	$827.0	$383.6	$2,649.4	$4.9	$3,205.7	+21%

Source: Retyped version of a table in Office of Management and Budget, *2003 Report to Congress on Combating Terrorism,* September 2003, p. 16. The last column was calculated by CRS.
*FY2004, Request, is the latest year for which data were available in the OMB report.

Table 1 shows that, for FY2004, the latest year for which data were available for this data set of combating terrorism R&D, federal agencies requested about $3.2 billion for R&D to combat terrorism. DHHS requested the largest amount of funding and also had the largest percentage increase over the previous year.

This table did not say that it excluded OCT R&D, or that the table included only "homeland security" R&D. The report included an appendix table which gave funding levels for overseas combating terrorism (OCT) programs for agencies which

support such activities. OCT R&D program funding *per se* appeared only for four DOD budget accounts for "research, development, test, and evaluation programs (RDT&E)." For FY2004, DOD requested a total of $2.1 billion, with the Air Force requesting the largest amount. **See Table 2**.

Table 2. Overseas Combating Terrorism (OCT) Funding by Agency and Budget Account, Department of Defense — Military for Research, Development, Test, and Evaluation (RDT&E)

(budget authority, $ in millions)

Program	FY2002, enacted	FY2003, enacted	FY2004 request*
RDT&E, Defense Agencies	$304	$520	$679
RDT&E, Navy	25	139	193
RDT&E, Army	201	1	—
RDT&E, Air Force	843	1,600	1,237

Source: Excerpted by CRS from: Office of Management and Budget, *2003 Report to Congress on Combating Terrorism*, September 2003, p. 69.
*FY2004 request, is the latest year for which data were available in the OMB report.

Homeland Security R&D: Data and Information Sources

OMB's *2003 Report to Congress on Combating Terrorism* identified "homeland security" R&D as a subset of combating terrorism R&D, as noted above. It did not present any data specifically labeled homeland security R&D. The only summary data it presented was the table on combating terrorism R&D, which, by implication, may be for homeland security R&D, since it does not appear to include OCT R&D. OMB and other sources have produced other data for homeland security R&D.

Data Sources Used

The Congressional Research Service (CRS) used several sources to identify other homeland security R&D funding data including *unpublished* OMB data; OMB appendix tables on homeland security; federal agency data, including websites, budget documents, performance plans, and strategic plans; the *Report on Maximizing the Contribution of Science and Technology Within the New Department of Homeland Security*, by The President's Council of Advisors on Science and Technology (PCAST), July 23, 2002;[7] data prepared by the American Association for the Advancement of Science (AAAS); secondary literature; and congressional documents and testimony.

[7] The PCAST report is available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf]. Last viewed in Dec. 2003.

OMB's *Unpublished* Data. In early 2004, OMB provided CRS with an unpublished table arraying total federal agency funding for homeland security R&D *per se* for FY2003, FY2004, and the FY2005 request. The *unpublished* data table was prepared using an internal OMB database that identified agency programs and data for homeland security R&D.[8] The table gave only totals for each agency; funding data were not reported for budget accounts within an agency, program or unit within an agency, or homeland security missions. **See Table 3.**

Table 3. *Unpublished* OMB Data on Homeland Security R&D Funding by Agency

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Agriculture	$11.8	—	$21.8	$50.0
Commerce	16.4	—	16.5	22.6
Defense	212.0	—	267.0	340.2
Energy	18.9	—	19.5	8.0
Health/Human Services	834.2	—	1,643.8	1,557.2
Homeland Security	619.2	—	959.2	1,111.4
Justice	160.5	25.2	179.5	194.5
Transportation	3.7	—	—	4.1
Environmental Protection Agency	52.9	—	28.8	22.8
National Science Foundation	268.5	—	305.6	315.8
Total Homeland Security R&D	**2,198.2**	**25.2**	**3,441.7**	**3,626.6**
Total Non-defense Homeland Security R&D	$1,986.2	$25.2	$3,174.7	$3,286.4

Source: Information provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction. According to OMB staff, these data will not be updated (Interview, April 2004).

According to this table, for FY2005, federal agencies requested about $3.6 billion in funding for homeland security R&D. This is almost 6% more than enacted for FY2004, about 63% more than enacted for FY2003, and, according to data in a table below from the American Association for the Advancement of Science, more than double the resources used in FY2002. For FY2005, DHHS requested the largest amount of funding, at almost $1.6 billion; DHS was the second largest agency sponsor of homeland security R&D, requesting about $1.1 billion. Both DOD and NSF requested funding between $300 to $350 million. The agency with the next largest homeland security R&D request was the DOJ, at about $194 million;

[8] OMB staff gave CRS permission to use this table. Staff explained: "OMB collected this data on homeland security R&D as part of its data collection for the Report to Congress on Combating Terrorism. The R&D numbers are the sum of programs identified as "R&D" through the data collection process." This data table was not printed in the referenced report to Congress.

followed by USDA at $50 million; EPA and Commerce, both approaching $23 million; DOE, at $8 million; and DOT, at about $4 million. The table depicted increases from the FY2004 enacted level for USDA, Commerce, DOD, DHS, DOT, Justice, and NSF; decreases were shown for DOE, DHHS, and EPA.

Data From OMB Appendix Tables. OMB's *2003 Report to Congress on Combating Terrorism* included an appendix that gave details on homeland security funding, by agency, for FY2002 enacted, FY2003 enacted, and the FY2004 request. These data were updated in an appendix on agency funding for homeland security programs for the years FY2003 enacted, FY2004 enacted, and the FY2005 request, that is accessible electronically via a CD-ROM and at the OMB website for the report, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2005*.[9] It is not possible to identify accurately all agency programs for homeland security R&D using these data. In these appendix tables, OMB arrayed funding information (budget authority) by what it called "budget account" line-items[10] for homeland security activities for federal agency units or programs. Data for each budget account was subdivided further according to homeland security missions, as defined in President Bush's *National Strategy for Homeland Security*, July 2002.

This CRS report used these appendix data in an attempt to identify agency programs or units with responsibilities for science or R&D. Specifically, data for homeland security budget accounts (offices or programs) that mentioned science or R&D were identified. Identified next were programs or units that served the homeland security mission of "defending against catastrophic threats," the category that included most R&D in the President's *Strategy* document.[11] Because it was obvious that some agencies reported R&D in the mission category of "protecting critical infrastructures and key assets," some budget accounts for R&D programs or units that used this category were also counted.[12] It should be pointed out that the

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[9] According to the Congressional Budget Office, OMB's publication of these data are responsive to section 889 of the Homeland Security Act of 2002, P. L. 107-296. The CD-ROM material for homeland security is available at 3. Homeland Security Funding Analysis , Appendix — Homeland Security Mission Funding by Agency and Budget Account (PDF), [http://www.whitehouse.gov/omb/budget/fy2005/pdf/ap_cd_rom/homeland]. pdf.

[10] These budget account categories are different from those that appear in the President's budget.

[11] OMB's *2003 Report to Congress on Combating Terrorism*, p. 4, defined "Defending Against Catastrophic Threats" as "This mission area includes homeland security programs that involve protecting against, detecting, deterring, or mitigating the terrorist use of weapons of mass destruction, including understanding terrorists' efforts to gain access to the expertise, technology, and materials needed to build chemical, biological, radiological, and nuclear (CBRN) weapons. In addition, this mission area includes funding for efforts or planning to decontaminate buildings, facilities, or geographic areas after a catastrophic event."

[12] OMB's *2003 Report to Congress on Combating Terrorism*, p. 4, defined "Protecting Critical Infrastructures and Key Assets" as "An attack on one or more pieces of our critical infrastructure may disrupt entire systems and cause significant damage. Programs that (continued...)

2003 Combating Terrorism report noted that some funding for "protecting critical infrastructure and key assets" may be for cyber security and physical security improvements to agency facilities or infrastructure.[13] OMB did not give enough information to differentiate between R&D and physical protection activities. Therefore, when attempting to estimate R&D funding, this CRS report included the full amount as constituting R&D if funding was requested in a budget account that encompassed science or R&D responsibilities. Although such cyber and physical security improvements to facilities and infrastructure may be for R&D, R&D funding may or may not be included in these amounts. It is clear, as will be shown below, that for some agencies with large homeland security R&D budgets, such as the National Science Foundation, OMB reported large amounts of funding, or even most homeland security R&D funding, in the mission category of "protecting critical infrastructure and key assets."

American Association for the Advancement of Science (AAAS) Data. **Table 4** provides an alternative cut on the data, as presented by the American Association for the Advancement of Science (AAAS), which also includes funding for construction related to R&D.

Table 4. AAAS Data on "Federal Homeland Security R&D in the FY2005 Budget" Including Funding for R&D Facilities

(budget authority, $ in millions)

Department/Agency	FY2002 Actual	FY2003 Actual	FY2004 Estimate	FY2005 Request
Agriculture	$175	$155	$39	$262
Commerce	20	16	24	24
Defense	259	212	267	340
Energy	50	38	47	68
Homeland Security	266	737	1,053	1,216
Health and Human Services	177	1,653	1,725	1,804
Justice	—	—	—	—
Environmental Protection Agency	95	70	60	31
National Aeronautics and Space Administration	73	73	65	55
National Science Foundation	229	271	308	31

[12] (...continued)
improve protection of the individual pieces and the interconnecting systems that make up our critical infrastructure belong in this mission area. Any funding for programs associated with the physical or cyber security of federal assets also belongs in this mission area. This mission area also includes programs designed to protect America's key assets, which are those unique facilities, sites, and structures whose disruption or destruction could have significant consequences, including national monuments and icons."

[13] OMB, *2003 Report to Congress on Combating Terrorism*, p. 4.

Department/Agency	FY2002 Actual	FY2003 Actual	FY2004 Estimate	FY2005 Request
Transportation	106	7	3	2
All Other	48	47	34	80
Total	1,499	3,290	3,625	4,200

Excerpted from data provided by AAAS, Mar. 11, 2004. Prepared by AAAS based on OMB data from OMB's *2004 Report to Congress on Combating Terrorism* and Budget of the U.S. Government FY2005. "Figures adjusted from OMB data by AAAS to include conduct of R&D and R&D facilities, and revised estimates of DHS R&D. Figures do not include non-R&D homeland security activities, nor do they included DOD R&D investments in overseas combating terrorism. Funding for all years includes regular appropriations and emergency supplemental appropriations." Prepared by AAAS Feb. 6, 2004-preliminary.

Federal Agency Homeland Security R&D Budget Accounts and Activities

This section gives details about federal agencies' homeland security R&D funding and programs.

Department of Agriculture (USDA)

Total USDA funding for homeland security R&D was $21.8 million enacted for FY2004 and $50.0 million requested for FY2005, according to OMB's *unpublished* data. These data do not identify the agency programs or units which support homeland security R&D. **See Table 5.**

Table 5. USDA Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Agriculture	$11.8	—	$21.8	$50.0

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

OMB's *published* data on homeland security funding, with potential R&D funding accounts identified for this CRS report, show that the Agricultural Research Service (ARS) appears to support the largest amount of USDA's homeland security R&D, and its funding has more than doubled between FY2004 and the FY2005 request, to $49 million. ARS also supports homeland security-related buildings and facilities activities, with funding requested at $178 million for FY2005. **See Table 6.** According to the USDA FY2005 budget request, this entire amount is for modernizing the National Centers for Animal Health in Ames, Iowa. Some of this

may be for R&D, while most is probably for cyber and physical security improvements. Thus, FY2005 total funding for USDA's ARS homeland security R&D and facilities was requested at approximately $227 million ($49 million plus $178 million). The Animal Plant and Health Inspection Service (APHIS) does diagnostic work related to the USDA inspection functions. These activities generally are not categorized as R&D.

USDA's homeland security R&D activities focus on protecting the food supply and agricultural production from intentional threats, and on upgrading of security at research laboratories.[14] ARS conducts R&D in support of meat and poultry inspection. Its current R&D programs in support of the homeland security mission of "defending against catastrophic terrorism" include protection of plant and animal resources, rapid detection of diseases, research on specific diseases such as African swine fever, avian influenza, hog cholera and exotic Newcastle disease. USDA also funds improvements in research facilities to enhance research and animal diagnostic capability,[15] creation of new bio-security database systems, and security-related research and cyber security.[16]

ARS conducts homeland security-related R&D on rapid detection methods for threats to plants and animals, both separately and in cooperation with the Animal and Plant Health Inspection Service (APHIS). Through its Cooperative State Research, Education, and Extension Service (CREES), USDA also supports research and laboratory security activities at land grant universities.[17] Other ARS homeland security project descriptions may be viewed at [http://www.ars.usda.gov/research /projects.htm], using the search term "homeland."

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[14] "USDA Homeland Security Efforts September 2002," at [http://www.usda.gov/ homelandsecurity/hs-efforts.pdf]. Last viewed in Jan. 2004.) For the main USDA homeland security page, see [http://www.usda.gov/homelandsecurity/homeland.html]. (Last viewed in Jan. 2004.) For additional information regarding funding programs, see [http://www.ars. usda.gov/business/business.htm]. (Last viewed in Jan. 2004.)

[15] OMB, *2003 Report to Congress on Combating Terrorism*, Sept. 2003, p. 33. For additional information, see [http://www.ars.usda.gov/Research/Research.htm], which was last viewed in Jan. 2004. This contains the FY2004 R&D project lists.

[16] Testimony of Secretary of Agriculture Ann M. Veneman Before the Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies, Committee on Appropriations, U.S. House of Representatives, Feb. 27, 2003.

[17] Among its projects, it supports three multimillion dollar homeland security collaborative projects, scheduled to be finished in 2005, that involve university, industrial and other extramural research performers:

— Development and Validation of Rapid Diagnostic Tests for Avian Influenza and Newcastle Disease: [http://www.ars.usda.gov/research/projects /projects.htm?ACCN_NO=405127];

— Development of a Pathogen Sequence Database: [http://www.ars.usda.gov/research/projects/projects.htm?ACCN_NO=405364; and]

— Development of Rapid Real Time PCR-Based Assays for Selected ...Class A Diseases: [http://www.ars.usda.gov/research/projects/projects.htm?ACCN_] NO=405692.

P.L. 107-296, the Homeland Security Act, which created DHS, transferred the border inspection function of APHIS's Agricultural Quarantine Inspection (AQI) program to DHS. The act also transferred the jointly administered ARS/APHIS Plum Island Animal Disease Center to DHS. Several memoranda of understanding (MOU) govern ARS's use of the facility and APHIS's "access to AQI employees in the event of future outbreaks of plant and animal pests and diseases."[18]

Table 6. USDA Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003, Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Agricultural Research Service/Salaries and expenses (005-18-1400)						
Protecting Critical Infra-structure and Key Assets	$28.0	$32.2	*$30.4*	—	—	— -
Defending Against Catastrophic Threats	—	—	11.8	—	$20.8	$49.0
Budget Account: Agricultural Research Service/Building and facilities (0005-18-1401)						
Defending Against Catastrophic Threats			32.8	110.0	—	178.0
Protecting Critical Infra-structure and Key Assets	40.0	75.0	—	—	10.5	—
Budget Account: Animal and Plant Health Inspection Service/Salaries and expenses (005-32-1600) (This account is not generally classified as R&D.)						
Protecting Critical Infra-structure and Key Assets	—	—	43.3	—	52.0	107.0

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-Rom, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

USDA's Food Safety Inspection Service (FSIS), which is a regulatory agency responsible for inspecting meat, poultry and eggs to ensure their safety and proper labeling, had budget authority for homeland security activities categorized as "Protecting Critical Infrastructure and Key Assets" totaling $3.4 million for FY2004 and it requested$5.9 million for FY2005. ARS performs R&D in support of FSIS with funds transferred from FSIS. The exact amount for homeland security-related R&D is not readily available. FSIS has science-based homeland security

[18] Testimony of Secretary of Agriculture Ann M. Veneman, Feb. 27, 2003, op. cit.

responsibilities, including an Office of Food Security and Emergency Preparedness whose scientific and technical support staff "provides science-based support for emergency response and prepares contingency plans for minimizing risk to the safety and security of the food supply, as well as to first responders."[19] FSIS has also conducted vulnerability assessments and, in the area of biosecurity, maintains working relationships in epidemiology and laboratory facilities with the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA).[20]

USDA participates in the interagency Food and Agriculture Defense Initiative created as a result of the Homeland Security Council's Biodefense End-to-End Assessment. The objective is to improve national surveillance capabilities in human health, food, agriculture, and environmental monitoring. USDA requested $30 million for an enhanced diagnostic network and $5 million for Higher Education Capacity Building and Professional Development. The initiative's activities include research to develop diagnostic tools to quickly identify pathogens and contaminated foods and improve research laboratory capacity.[21]

Department of Commerce (DOC)

According to OMB's *unpublished* data, budget authority for Department of Commerce homeland security R&D activities was $16.5 million for FY2004, and was requested at $22.6 million for FY2005, a 36% increase. **See Table 7.**

Table 7. DOC Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Commerce	$ 16.4	—	$16.5	$22.6

Source: Information provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

OMB's *published* appendix data on homeland security funding for DOC do not include the category of "defending against catastrophic threats," for any budget accounts that appear to be for R&D, so it was assumed that such activities are reported under the homeland security mission of "protecting critical infrastructure and key assets." This CRS report identified likely R&D budget account information. Such funding increased 22% between FY2004 enacted and the FY2005 request, to

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[19] "Food Safety and Inspection Service, Submitted for the Record, Statement of Dr. Garry L. McKee, Administrator before the Senate Subcommittee on Agriculture, Rural Development and Related Agencies, May 22, 2003.

[20] Food Safety and Inspection Service, United States Department of Agriculture, "Biosecurity and the Food Supply," Backgrounders/Key Facts, June 2002.

[21] USDA FY2005 Budget Summary, pp. 21, 22.

$30.5 million ($11.2 million plus $19.3 million). **See Table 8**. This may include funding for cyber-and physical security upgrades. OMB may not count these activities as R&D, although such upgrades may support DOC's homeland security R&D activities in the National Oceanic and Atmospheric Administration (NOAA) and the National Institute of Standards and Technology (NIST).

National Institute of Standards and Technology (NIST). NIST's activities to "protect critical infrastructure and key assets" include cyber security work to develop standards and guidelines in support of federal responsibilities for information technology (IT) security.[22] In its *FY2003 Report to Congress on Combating Terrorism* report, OMB reported that NIST also supports R&D to "defend against catastrophic threats," including developing standards for devices that address chemical, biological, radiological, and nuclear (CBRN) threats, for buildings, for structures and fire safety, for materials for structures, for threat detection and protection, for tools for law enforcement. Additional R&D focuses on emergency response, biometric identification, and buildings and fires.[23] No funding was reported as having been requested for FY2005.

Several memoranda of understanding (MOU) were signed between Department of Commerce agencies and DHS and its constituent agencies. For example, NIST and the Federal Insurance and Mitigation Administration of the Federal Emergency Management Agency (FEMA) signed an MOU, effective March 29, 2002, to establish "a framework for NIST to serve as a research resource for FEMA in the areas of fire, disaster prevention, and homeland security" and to "serve to improve and enhance the effectiveness of cooperation between FEMA and NIST." Specific purposes are "to further the reduction of loss of life and property and protect the nation's buildings and infrastructure from all types of hazards, ... aid the development of technology and methods to evaluate equipment for use by the Nation's fire, rescue, civil defense services, and other first responders, and ... to assist FEMA with scientific and technological services in disaster investigations, recovery planning and support technologies."

DHS also has an MOU with the DOC's Technology Administration to allow the DHS Science and Technology Directorate and the Technology Administration, specifically NIST, "to collaborate on research and planning activities, and share, where appropriate, facilities, personnel, and scientific information" in order to allow DHS to take advantage of the NIST's expertise in measurement science and in the development of standards to assist DHS in developing, testing, evaluating, and deploying technologies to protect homeland security.[24]

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[22] OMB, *FY2003 Report to Congress on Combating Terrorism*, p. 34-37.

[23] For additional information about NIST homeland security programs and funding, see [http://www.nist.gov/public_affairs/factsheet/homeland.htm#tools] (last viewed in Jan. 2004) or [http://www.bfrl.nist.gov/goals_programs/HS_goal.htm], which was viewed last in Jan. 2004. See also Technology Administration Performance Plan FY2004 at [http://www.osec.doc.gov/bmi/budget/04APP/04ta.pdf], which was viewed last in Jan. 2004.

[24] Memorandum of Understanding between the Director of Science and Technology, U.S. Department of Homeland Security and the Technology Administration, National Institute (continued...)

Table 8. DOC Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: National Oceanic and Atmospheric Administration/Operations, research, and facilities (006-48-1450)						
Protecting Critical Infrastructure and Key Assets	$7.7	$0.8	$6.4	—	$6.1	$11.2
Budget Account: National Institute of Standards and Technology/ Scientific and technical research and services (006-55-0500)						
Defending Against Catastrophic Threats	—	—	—	—	*Requested at 5.0*	—
Protecting Critical Infrastructure and Key Assets	8.4	9.0	11.4	—	18.8	19.3

Source: FY2002 data and data for FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism,* September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

National Oceanic and Atmospheric Administration (NOAA). Of all the OMB data sources used, funding for NOAA appeared only in OMB's *published* appendix data. This CRS report identified information that showed that NOAA requested $11.2 million for FY2005 for homeland security activities from a budget account for operations, research and facilities, for the homeland security mission of "protecting critical infrastructure and key assets." NOAA has told Congress that its "... core missions of environmental prediction and management are manifested in more than eighty capabilities that support America's efforts to prepare for and, if necessary, respond to terrorist attacks."[25] This includes developing science and technology relating to hazardous materials spill response, atmospheric and waterborne dispersion forecasting, vessel monitoring systems, weather forecasting, and observing systems.

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[24] (...continued)
of Standards and Technology, U.S. Department of Commerce, May 22, 2003.

[25] NOAA FY2005 Budget Request to Congress, p. I-4 and passim. See also: Statement by Conrad C. Lautenbacher, Jr., Vice Admiral, U.S. Navy (Ret.) Under Secretary of Commerce for Oceans and Atmosphere, Annual Guidance Memorandum FY2006 [http://www.spo.noaa.gov/pdfs/FY%2706%20Memorandum-Lautenbacher-AGM.pdf].

Department of Defense (DOD)

DOD's homeland security R&D was requested at $340.2 million for FY2005, a 27% increase over the FY2004 enacted totaled of $267.0 million, according to OMB's *unpublished* data. **See Table 9.**

Table 9. DOD Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Defense	$212.0	—	$267.0	$340.2

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

Data compiled for this CRS report, that identified likely R&D accounts in OMB's *published* homeland security electronic appendix data attached to the *Analytical Perspectives* volume of the FY2005 budget request, show that DOD's funding for the homeland security mission of "defending against catastrophic threats" appeared only in the budget account of research development, test, and evaluation (RDT&E) for "defense-wide," that is the defense agencies, and totaled $161.3 million requested for FY2005. Thus, the remaining $175.8 million requested for FY2005 for the RDT&E accounts of the homeland security mission category of "protecting critical infrastructures and key assets." The figure of $175.8 million sums the defense-wide and armed services programs at $23.2 million, $29.4 million, $80.1 million and $43.1 million. See **Table 10.** The defense agencies' programs include the Defense Advanced Research Projects Agency (DARPA), which supports cutting-edge R&D.

OMB also reported that DOD had overseas combating terrorism (OCT) RDT&E funding (not homeland security R&D funding) that totaled $1,600 million in FY2003 and was requested at $1,237 million in FY2004. The amount of funding requested for this category for FY2005 is not available. See **Table 2.**

DOD's homeland security R&D focuses largely on chemical, biological, radiological, and nuclear incident response.[26] Reportedly, DOD and DHS maintain close working relationships, with DOD assigning some 65 employees to work with

[26] The Department of Defense (DOD), Office of Defense Research and Engineering has an electronic gateway to descriptions of DOD agencies/programs that support homeland security-related R&D and related programs. See [http://www.defenselink.mil/ddre/opportunities/opportunities.htm], which was viewed last in Jan. 2004. A portal to such information may be found in the DOD publication *U.S. Department of Defense Homeland Security* which is available at [http://www.defenselink.mil/specials/homeland/armedservices.html], which was viewed last in Jan. 2004.

DHS "to ensure close and seamless cooperation between the departments" in relation to DOD activities to support homeland defense.[27] The Army has response and R&D activities that include the U.S. Army Soldier and Biological-Chemical Command, and several of its constituent units, including the U.S. Army Edgewood Chemical and Biological Center, the U.S. Army Medical Research Institute for Infectious Diseases,

Table 10. DOD Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Research, Development, Test, and Evaluation/Air Force (007-20-3600)						
Protecting Critical Infrastructure and Key Assets	$17.0	—	$7.0	—	$5.7	$23.2
Budget Account: Research, Development, Test, and Evaluation/ Army (007-20-2040)						
Protecting Critical Infrastructure and Key Assets	—	—	42.0	—	28.4	29.4
Budget Account: Research, Development, Test, and Evaluation/ Defense-wide (007-20-0400)						
Defending Against Catastrophic Threats	133.0	—	105.0	—	146.8	161.3
Protecting Critical Infra-structure and Key Assets	95.0	—	*420.0* 35.0	—	38.2	80.1
Budget Account: Research, Development, Test, and Evaluation/ Navy (007-20-1319)						
Protecting Critical Infrastructure and Key Assets	3.0	—	22.0	—	45.9	43.1

Source: FY2002 data and data for FY2003 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism,* September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

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[27] Jim Garamone, "Homeland Defense Efforts Taking Off, Officials Say," *American Forces Information Service, News Article,* Oct. 17, 2003. Homeland Defense is defined as "...the *military* protection of United States territory, domestic population and critical defense infrastructure against external threats and aggression. It also includes routine, steady state activities designed to deter aggressors and to prepare US. military forces for action if deterrence fails." (Emphasis in original.) Statement by Mr. Paul McHale, Assistance Secretary of Defense for Homeland Defense, Before the Subcommittee on Readiness, House Armed Services Committee, March 13, 2003.

and related units.[28] There are no readily available data to describe precisely these units' R&D funding accounts. DHS uses Army R&D units to administer some of its R&D solicitation and awards processing and selection activities that are managed by the Technical Support Working Group (TSWG).

The Air Force created a Bio-Defense Task Force "chartered to identify biological warfare threats and defense capabilities and shortfalls. It also develops strategies and tactics for use both overseas and in homeland defense."[29] Participants in the short-term task force have included Air Force research and medical units and cooperation with other agencies, such as the Los Alamos and Lawrence Livermore National Laboratories, CDC, DHHS and the Defense Threat Reduction Agency (DTRA).[30] DTRA's homeland security R&D funding level has not been reported. The Navy's primary role in support of homeland security appears to be to "support the Coast Guard, primarily in areas, like air defense, where the Coast Guard has little or no capability."[31] The Coast Guard, now part of DHS, had been appropriated $15 million for FY2004 for homeland security R&D activities. The Naval Undersea Warfare Center (NUWC) Division, Newport, Rhode Island, and the Coast Guard Research and Development Center, Groton, Connecticut signed a memorandum of understanding for homeland security and technical support for the Coast Guard's underwater security program, which is "an R&D initiative to provide the Coast Guard with information, technology assessments, system engineering, and a one-stop knowledge brokering service for underwater inspection, detection, response, and training development needs in its homeland security mission."[32] For additional information about these and other DOD homeland security R&D activities, see the inventory compiled by the President's Council of Advisors on Science and Technology.[33] Additional sources of information about some DOD programs are given in Table 11.

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[28] For additional information, see (name redacted), *Homeland Security: The Department of Defense's Role*, CRS Report RL31615.

[29] Bio-defense Task Force Works to Ensure Survivability, Operability," *Air Force Print News Today*, Oct. 8, 2002.

[30] *Air Force Print News Today*, Ibid.

[31] See Ronald O'Rourke, *Homeland Security: Navy Operations — Background and Issue for Congress*, CRS Report RS21230, p. 1.

[32] "NUWC Newport, Coast Guard to Collaborate on Homeland Security," *Navy Newsstand*, Jan. 14, 2003.

[33] The PCAST report is available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf]. Last viewed in Dec. 2003.

Table 11. Examples of DOD Homeland Security-related R&D Activities

Program	Activity	Information Sources
U.S. Army, National Protection Center (NPC)	With other federal agencies, sponsors RDT&E for advanced/multi-threat protective clothing and equipment for military and civilians in high risk occupations or in missions in extreme environments.	[http://www.natick.army.mil/soldier/NPC], which was viewed last in Jan. 2004.
U.S. Army Medical Research and Materiel Command (USAMRMC)	Supports intramural and extramural R&D in at least two laboratories with homeland security relevant activities.	[http://chemdef.apgea.army.mil], which was viewed last in Jan. 2004, or [http://mrmc.detrick.army.mil/index.asp?EntryURL=/mrdlabs.asp], which was viewed last in Jan. 2004.
U.S. Army, Medical Research Institute of Chemical Defense (USAMRICD)	R&D to develop medical countermeasures to chemical warfare agents and training medical personnel to manage chemical casualties.	[http://chemdef.apgea.army.mil], which was viewed last in Jan. 2004, or [http://mrmc.detrick.army.mil/index.asp?EntryURL=/mrdlabs.asp], which was viewed last in Jan. 2004.
U.S. Army, Medical Research Institute of Infectious Diseases (USAMRIID)	R&D to develop strategies, products, and procedures for medical defense against biological warfare threats and naturally occurring infectious diseases that require containment.	[http://www.usamriid.army.mil], which was viewed last in Jan. 2004.
Center for Commercialization of Advanced Technology	A partnership of academia, government, and industry, funded largely by DOD, in San Diego and other parts of California that supports innovative technologies related to defense and homeland security in areas such as explosive detection, chemical and biological detection, border-intrusion sensors, encryption recording devices, and language translation.	[http://ccatsandiego.org/index.shtml], which was viewed last in Jan. 2004. There was a solicitation dated July 2003, with applications due by Sept. 9, 2003, one scheduled for Oct. 2003, and others to be announced for 2004..
Defense Advanced Research Projects Agency (DARPA)	Supports basic and applied projects where risk and payoff are both high and where success may provide dramatic advances. FY2003 programs focused on information awareness and biowarfare defense.	Information about funding programs is at [http://www.darpa.mil/baa/#dso], which was viewed last in Jan. 2004, and [http://www.darpa.mil/body/pdf/darpastrategicplanfinal.pdf], which was viewed last in Jan. 2004.. Information about awards processing is at [http://www.darpa.mil/cmo/], which was viewed last in Jan. 2004.

Department of Energy (DOE)

OMB's *unpublished* data show that DOE had budget authority for homeland security R&D totaling $18.9 million for FY2003, $19.5 million for FY2004, and requested $8.0 million for FY2005. **See Table 12**. However, there is conflicting information about what R&D DOE supports relating to homeland security.

Table 12. DOE Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Energy	$18.9	—	$19.5	$8.0

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

OMB's published data table on combating terrorism R&D reported that DOE received $19 million for combating terrorism R&D in FY2003 and requested no funding for FY2004. **See Table 1.** Information identified in this CRS report from OMB's *published* electronic appendix data on homeland security included funding for DOE under the budget account of "Energy Programs/Science," for the homeland security mission of "protecting critical infrastructure and key assets." This is the only clearly discernable budget account line and homeland security mission category that appears to include funding for homeland security R&D. Funding was stable for FY2003 and FY2004 at about $47.0 to $48.0 million, with the FY2005 request increased to $67.9 million. **See Table 13.** As emphasized above, much of this amount may support agency and laboratory infrastructure improvements, but likely also encompasses R&D programs in the Office of Science. It is not possible to isolate the amount of R&D funding from the data given. In addition, it is possible that other DOE R&D, while not specifically labeled "homeland security R&D" may, in fact, support this mission. This may be reported in other homeland security mission categories in OMB's published appendix data. OMB and DOE may be reluctant to report precisely DOE responsibilities for some homeland security R&D given that many, but not all, DOE R&D homeland security R&D-related responsibilities were transferred to the Department of Homeland Security. The transferred responsibilities included major laboratory functions, activities related to nuclear smuggling that had been part of the DOE Proliferation Detection program, the DOE Nuclear Assessment Program, the DOE Environmental Measurements Laboratory, and the National Infrastructure Simulation and Analysis Center, a joint program of Sandia National Laboratories and Los Alamos National Laboratory.[34]

DOE's Office of Science's programs are oriented towards fundamental and long-range basic research. Regarding homeland security and counter terrorism R&D functions, an Office of Science document said that,

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[34] See *Research and Development in the Department of Homeland Security*, by (name redacted), CRS Report RL31914

> More than any other agency, the Office of Science is positioned to bridge the gap between unclassified basic research and classified "behind the fence" research associated with homeland security and countering terrorism. The Office of Science, with its combination of laboratory and university research coupled with world-class facilities for scientific discovery, can assume a major role in scientific research for countering terrorism.[35]

Table 13. DOE Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Energy Programs/Science (019-20-0222)						
Protecting Critical Infra-structure and Key Assets	$50.2	—	*$43.7* 43.8	*$4.6* 4.3	$47.2	$67.9

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

The Office's R&D activities include work on " ... chemical and biological sensors, radiation detectors, chemlab on a chip, and genomic analysis ...."[36] In addition,

> Prevention of terrorist acts could be enhanced through improved methods for controlling and tracking radiological materials and the development of new manufacturing methods that minimize the creation of hazardous industrial chemicals. Likewise, protection against terrorism could be increased through improved filters and membranes and the development of new protective fabrics. Improvements in our ability to respond to a terrorist event could be made by developing methods to immobilize and neutralize hazardous materials, to detect exposure to toxic or infectious agents, or to carry out rapid forensic analyses associated with attribution."[37]

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[35] Department of Energy (DOE) Office of Science, "Scientific Foundations for Countering Terrorism," non-dated, [http://www.science.doe.gov/Sub/Occasional_Papers/10-Occ-Scientific-Foundations-for-Countering-Terrorism.PDF]. The main URL from which the search was conducted is: [http://www.science.doe.gov]. These websites were viewed last in Jan. 2004.

[36] DOE, Office of Science, "Scientific Foundations for Countering Terrorism," non-dated, op. cit.

[37] DOE, Office of Science, "Scientific-Foundations for Countering Terrorism," non-dated, op. cit. See also the aforementioned PCAST report available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf].

Two of DOE's counter terrorism R&D goals were illustrated in the DOE *Annual Performance Plan, FY2004*,[38]

- under the science heading:

> By 2010, develop the basis for biotechnology solutions for clean energy, carbon sequestration, environmental cleanup, and bioterrorism detection and defeat by characterizing the multiprotein complexes that carry out biology in cells and by determining how microbial communities work as a system....[39]

- under the energy supply heading:

> developing a next-generation nuclear system after 2010 but before 2030 that provides significant improvements in proliferation and terrorism resistance, safety and reliability....[40]

DOE's FY2005 budget request noted that DOE and DHS had signed an MOU "to assure their timely and efficient access to DOE national laboratories and facilities" and that DOE does homeland security work relating to cyber security and nuclear waste.[41] DHS awards funds to industry, universities, other agencies, and national laboratories to meet its R&D needs in biological, chemical, radiological and nuclear science and technology and computer and information science in order to help prevent, deter, detect, and mitigate the use of weapons of mass destruction. DHS and DOE use several types of funding mechanisms to tap the scientific and technical resources of DOE's laboratories, which include Argonne National Laboratory, Brookhaven National Laboratory, Oak Ridge National Laboratory, and Pacific Northwest National Laboratory. Some of these laboratories have dedicated homeland security R&D offices and programs which provide collaborative opportunities for other agencies and nongovernmental researchers. An inventory drawn up by the President's Council of Advisors on Science and Technology described the homeland security R&D activities of several of the laboratories and other parts of DOE: the Pacific Northwest National Laboratory National Security Division, the Remote Sensing Test and Evaluation Center, the New Brunswick Laboratory (NBL), DOE's Office of Security, the Nonproliferation and National Security Institute, and potential R&D programs in fossil energy.[42] A source for additional information about these and other DOE activities is given in **Table 14**.

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[38] DOE, *Annual Performance Plan, FY2004*, Available at : [http://www.mbe.doe.gov/budget/04budget/content/perfplan/perfplan.pdf], which was viewed last in Jan. 2004.

[39] DOE, *Annual Performance Plan, FY2004*, op. cit., p. 9

[40] DOE, *Annual Performance Plan, FY2004*, op. cit., p. 18.

[41] *Department of Energy FY2005 Congressional Budget Request*, DOE/ME00-35, Vol 4. pp. 550 and 616.

[42] The PCAST report is available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf].

Table 14. Example of DOE Homeland Security R&D Activities

Program	Activity	Information Sources
Dept. of Energy, Office of Science	Supports R&D programs relevant to counter terrorism or homeland security, but there is no funding designated specifically for homeland security R&D.	[http://www.sc.doe.gov/grants/grants.html], which was viewed last in Jan. 2004, or [http://www.osti.gov]; which was viewed last in Jan. 2004. For specific information, see, Department of Energy, Office of Basic Energy Sciences, *Basic Research Needs for Countering Terrorism*, [2002] at [http://www.science.doe.gov/bes/DOE_CTreport.pdf], which was viewed last in Jan. 2004.

National Nuclear Security Administration (NNSA). According to the homeland security appendix data in OMB's *Analytical Perspectives on the FY2005 Budget*, DOE's semi-autonomous agency, the National Nuclear Security Administration (NNSA), requested funding totaling $887.3 million for FY2005 for homeland security-related weapons activities for the mission "Protecting critical infrastructure and key assets." It is not known how much, if any, funding goes to R&D activities.

Recently the three DOE/NNSA laboratories, Los Alamos, Sandia and Lawrence Livermore National Laboratory, created a Tri-Lab council to "present a unified position in their interactions with DHS." Reportedly, "the concept, under which a Tri-Lab Council will deal directly with DHS on key issues, is designed to eliminate turf protection, duplication of effort, red tape, and confusion about channels of communication."[43] For additional information about NNSA homeland security-related activities, **see table 15.**

[43] Bill Murphy, Successful Homeland Security Visit Lays Next Stage for Budding Relationship," *Sandia Lab News*, May 16, 2003.

Table 15. NNSA Counterterrorism/Homeland Security Activities

Program	Activity	Information Sources
National Nuclear Security Administration (NNSA), [a semi-autonomous Dept. of Energy agency]	R&D supported in NNSA's affiliated laboratories and by extramural performers relates to reducing threats to national security and world peace posed by nuclear, chemical, and biological weapons proliferation	For a description of NNSA, see, [http://www.doe.gov/engine/content.do?BT_CODE=OF_NNSA], which was viewed last in Jan. 2004.; For research opportunities, see, [http://e-center.doe.gov/doebiz.nsf/MAiips?OpenForm], which was viewed last in Jan. 2004. Additional information regarding NNSA's counterterrorism R&D activities is available in DOE's *FY2004 Performance Plan* , [http://www.mbe.doe.gov/budget/04budget/content/perfplan/perfplan.pdf], which was viewed last in Jan. 2004.
NNSA National Laboratories		
Dept. of Energy, Los Alamos Laboratory	The Center for Homeland Security conducts R&D in chemical and biological weapons, radiological and nuclear threats, and threats to critical infrastructure.	[http://www.lanl.gov/orgs/chs/], which was viewed last in Jan. 2004.
Dept. of Energy, Lawrence Livermore National Laboratory Homeland Security Organization	R&D to develop capabilities to detect, interdict, and defend against catastrophic weapons and other threats; some programs mirror the research programs set by DHS; also funds the Nuclear Emergency Search Team.	[http://www.llnl.gov/hso/about.html], which was viewed last in Jan. 2004.
Program	**Activity**	**Information Sources**
Dept. of Energy, Sandia National Laboratory	R&D on threat and vulnerability assessment; physical security; nuclear material identification; and chemical and biological weapons detection.	[http://www.sandia.gov/programs/homeland-security/index.html], which was viewed last in Jan. 2004.

Department of Health and Human Services (DHHS)

OMB's *unpublished* data reported DHHS budget authority for homeland security R&D at $1,643.8 million for FY2004 and at $1,557.2 million requested for FY2005. **See Table 16**. At least three DHHS agencies support counterterrorism defense and homeland security-related R&D: the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), and the National Institutes of Health (NIH), primarily its National Institute of Allergy and Infectious Diseases (NIAID). It is not clear if all these activities are represented in DHHS's

unpublished data on homeland security R&D funding since only the total agency figure was given.

Table 16. DHHS Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Health/Human Services	$834.2	—	$1,643.8	$1,557.2

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

Data compiled for this CRS report, that identified likely R&D accounts in OMB's *published* homeland security appendix data, show that DHHS's funding for research-related budget accounts totaled about $1,996 million for FY2005 requested.

NIH is the largest supporter of homeland security activities in DHHS and requested FY2005 budget authority for the homeland security mission of "defending against catastrophic terrorism" totaling almost $1.7 billion, according to data identified in this CRS report from OMB's *published* data in the appendix to the FY2005 budget request. This figure may include more than R&D. NIH's R&D includes basic and applied research related to likely bioterrorism agents, design and testing of diagnostics, therapies and vaccines; and laboratory capability relating to bioterrorism and other threats from weapons of mass destruction.[44] **See Table 17.**

Table 17. DHHS Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supplemental	FY2003 Enacted	FY2003 Supplemental	FY2004 Enacted	FY2005 Request
Budget Account: Food and Drug Administration/Salaries and expenses (009-10-9911)[a]						
Defending Against Catastrophic Threats (Salaries and expenses acct., which may not be R&D).	$0.8	$97.1	$97.1		$115.7	$180.7
Protecting Critical Infrastructure and Key Assets	$4.5	$13.3	11.6		12.3	13.0

[44] OMB, *2003 Report to Congress on Combating Terrorism*, p. 37. More information about NIAID's role in biodefense research can be found in NIAID, Biodefense: About Biodefense: NIAID's Role, available at [http://www.niaid.nih.gov/biodefense/], which was viewed last in Jan. 2004. This site also contains detailed additional information.

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Centers for Disease Control and Prevention/Disease control, research, and training (009-20-0943)						
Protecting Critical Infrastructure and Key Assets	$14.7	—	*$17.0* 19.2	—	19.9	20.5
Budget Account: National Institutes of Health (009-25-9915)						
Defending Against Catastrophic Threats	94.5	—	*1,546.3* $1,549.4	—	1,620.9	1,694.2
Protecting Critical Infrastructure and Key Assets	66.9	—	*83.9* 83.0	—	81.1	87.6

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account." Note: for additional information, see, (name redacted), *An Overview of the U.S. Public Health System in the Context of Bioterrorism*, CRS Report RL31719.
a=This is the only account noted that would fund R&D activities.

CDC's homeland security-related activities relevant to R&D were reported under the category of "protecting critical infrastructure and key assets." As reported in CDC's *FY2005 Budget Summary*, its work on homeland security focuses on improving the collection of health statistics, developing biosurveillance and warning systems, and development of standards to protect first responders against chemical, biological , and radiological attacks. In addition, CDC does work relating to laboratory and facilities security and "select agent" identification and monitoring.

According to data compiled for this report from OMB's appendix data on homeland security funding, FDA requested budget authority for the homeland security mission of "defending against catastrophic terrorism," totaling $180.7 million for FY2005, a substantial increase over the FY2004 enacted figure of $115.7 million. FDA describes its work in counterterrorism, which appears to encompass a homeland security focus as follows:

> On the counterterrorism front, FDA is facilitating the goal of "Protecting Our Homeland" by assuring the availability of new counterterrorism tools. Our drug and biologic product centers are working to adapt their approval processes to challenges of developing safer and more effective treatments for anthrax, smallpox, plague and other potential agents of bioterrorism. Our medical device center is supporting the development of methods for detecting biological agents with bioterrorism potential, and for radiological decontamination. FDA continues to strengthen its surveillance, investigation, and laboratory support for detection

and management of product contamination for foods medical products, and blood.[45]

FDA's homeland security functions also include work "to speed the development of products to diagnose, treat or prevent outbreaks from exposure to anthrax, smallpox, plague, and other biological, chemical and radiological agents that could be used by terrorists."[46] It is also "... helping develop methods to detect biological agents that terrorists might use in an attack." In toxicological research, FDA is "enhancing research facilities and technologies, and supporting "research to identify and characterize biological warfare agents using technologies involving DNA and proteins"...and supporting work to develop "... sensor technologies to detect nitrogen-based explosives in airline cargo by refining its patented methodology currently used to detect and identify deteriorating food."

Additional information about DHHS homeland security R&D information sources appears in **Table 18**. In addition, PCAST's inventory includes further information about CDC and FDA homeland security R&D programs.[47]

Table 18. Examples of DHHS Homeland Security R&D Activities

Program	Activity	Information Sources
Centers for Disease Control (CDC)	Supports R&D and information dissemination on bioterrorism, infectious agents, laboratory security.	General information is available at [http://www.bt.cdc.gov], last viewed Dec. 2003. See also "CDC Announces New Biodefense and Emerging Infectious Disease Research Grant Program and Training Grants [totaling $9 million]," Press Release, Oct. 3, 2003, at [http://www.cdc.gov/od/oc/media/pressrel/r031003a.htm], last viewed Nov. 2003. It describes funding for "research in innovative surveillance systems, enhanced detection systems, environmental sampling and pathogen detection systems, and innovative approaches for prophylaxis and treatment."
Food and Drug Administration (FDA)	Supports R&D on food security and related issues.	"FDA's Counterterrorism Role," [http://www.fda.gov/oc/bioterrorism/role.html], last viewed Jan. 2004. See also [http://www.fda.gov/oc/opacom/hottopics/bioterrorism.html, which was viewed last in Oct. 3003.

[45] Source: *FY 2004 FDA Budget In Brief*, [http://www.fda.gov/oc/oms/ofm/budget/2004/BIB.htm], which was viewed last in Jan. 2004.

[46] Department of Health and Human Services, Food and Drug Administration (FDA), *FDA's Counterterrorism Role*, Available via [http://www.fda.gov/oc/bioterrorism/role.html])

[47] The PCAST report is available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf].

Program	Activity	Information Sources
National Institutes of Health (NIH)'s programs include Biodefense Research at the National Institute of Allergy and Infectious Diseases (NIAID)	R&D on agents of bioterrorism, including viruses that cause smallpox and hemorrhagic fevers; bacteria that cause anthrax, the plague, and botulism; and research on tularemia; focuses on basic biology, immunology, vaccines, drugs, diagnostics.	[http://www.niaid.nih.gov/biodefense/about/niaids_role.htm], which was viewed last in Jan. 2004. Current funding opportunities are listed at [http://www.niaid.nih.gov/biodefense/research/default.htm], which was viewed last in Jan. 2004.

Department of Homeland Security (DHS)

According to OMB's *unpublished* data on homeland security R&D, the Department of Homeland Security's FY2005 funding for budget accounts that support R&D in its Science and Technology Directorate would increase 16% from FY2004, enacted, to $1,111 million requested for FY2005. This is an 80% increase over FY2003, when the agency started implementing programs mandated by P.L. 107-296. **See Table 19.**

Table 19. DHS Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Homeland Security	$619.2	—	$959.2	$1,111.4

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

Data identified for this CRS report by the author from the *published* OMB appendix tables on homeland security, presented in **Table 20,** report DHS homeland security funding under the two missions of "defending against catastrophic terrorism" and "protecting critical infrastructures and key assets." These data do not include all of DHS's R&D activities because, for FY2005, other R&D funding was requested for the Border and Transportation Security Division, which includes the Transportation Security Administration (TSA), and other parts of DHS including telecommunications research within national communications systems and cybersecurity. **See Table 21.**

Table 20. DHS Homeland Security Budget Account That Appears to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Science and Technology/ Research, Development, Operations and Acquisitions (024-80-0800)						
Defending Against Catastrophic Threats	$70.0	$77.0	*$488.0* 491.0	—	$774.0	$886.0
Other	—	—	*3.0*	—	*Request 10.0*	—
Protecting Critical Infrastructure and Key Assets	5.0	—	*30.0* 30.0	—	100.0	101.0

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

DHS's science and technology activities for "defending against catastrophic threats" include R&D focused on "delivering operational capabilities to end-users in DHS, other federal agencies, state and local government, and the private sector," support of technological developments and of forensic methods to detect and analyze [chemical, biological, radiological, and nuclear] CBRN materials and high explosives, research and modeling to prioritize measures to address catastrophic threats, development of standards for devices that address CBRN threats, and rapid prototyping of homeland security technologies.[48] DHS also supports partnerships to promote homeland security R&D, with academic institutions and other non-federal entities.[49] The agency described its FY2005 S&T Directorate activities as follows:

> The S&T Directorate has organized its efforts into 12 portfolios. Four portfolios address specific terrorist threats: Biological, Chemical, High Explosives, and Radiological and Nuclear Countermeasures. Two portfolios crosscut these threats: Threat and Vulnerability, Testing and Assessment (TVTA) and Standards. One portfolio encompasses the special science and technology tools and capabilities needed by the Department of Homeland Security Components. The Homeland Security University and Fellowship Programs portfolio addresses the need to build an enduring S&T capability and support U.S. leadership in science and technology. Two portfolios address the need to identify Emerging Threats and to provide Rapid Prototyping of promising technologies. A separate budget line for developing the technology needed to protect commercial aircraft from the threat of man-portable anti-aircraft missiles is managed within the

[48] OMB, *2003 Report to Congress on Combating Terrorism*, pp. 37-38.

[49] OMB, *2003 Report to Congress on Combating Terrorism*, p. 44.

Directorates' Systems Engineering and Development organization and is overseen with in the Rapid Prototyping portfolio.[50]

Table 21. Department of Homeland Security R&D Budget

(budget authority, $ in millions)

Directorate (Dir.) or *Program*	FY2003 actual	FY2004 estimate	FY2005 request
Border & Transportation Security (BTS) Dir, includes TSA	$163	$170	$229
Emergency Preparedness and Response (EPR) Dir.	0	0	0
Information Analysis and Infra Protection (IAIP). Dir.	0	0	0
Science and Technology (S&T)Dir., includes	554	869	987
R&D Consolidation ($ from other DHS agencies)	*0*	*0*	*24*
Biological countermeasures, including Nat'l Biodef. Analysis &Countermeasures Cntr (NBACC)	*363*	*285 [88]*	*407 [35]*
Nuclear & Radiological countermeasures	*75*	*126*	*129*
Chemical countermeasures		*52*	*53*
High Explosives countermeasures	*7*	*10*	*10*
Threat & vulnerability assessment (TVTA)	*36*	*100*	*102*
(Critical Infrastructure Protection)	—	—	*[6]*
(Cybersecurity)	—	—	*[18]*
Conventional missions/Support to DHS Components (BTS, EPR, USGS, Secret Service, Immigration)	—	*34*	*34*
Rapid Prototyping /TSWG	*33*	*73*	*76*
Standards /state and local	*20*	*39*	*40*
Counter MANPADS (anti- aircraft missiles)	*0*	*60*	*61*
Emerging threats	*17*	*21*	*21*
University programs /HS fellowships	*3*	*69*	*30*
Salaries and Expenses for S&T	—	*44*	*[53]*
Total S&T Directorate R&D with Salaries and Expenses	**[554]**	**[913]**	**[1,039]**
Coast Guard (counted in S&T Dir. with FY2005 request)	21	14	[14]
Total DHS R&D	**$737**	**$1,053**	**$1,216**

Sources and notes: The symbol " — " means is not given separately. Items in [ ]are shown for comparison and are not additive. Since comparable trend data were not in the DHS FY2005 justification, FY2003 and FY2004 data are from American Association for the Advancement of Sciences (AAAS), "DHS R&D Wins Big Increase in FY2005 Budget," Mar. 2, 2004. FY2005 data are from primarily DHS, *Science and Technology*, FY2005 Congressional Budget Justification. The term "estimate," that AAAS uses is the agency estimate of appropriations and allocations that will be used. AAAS figures are based on OMB R&D data and supplemental agency budget data. Data are rounded to the nearest million, and may not total.

Additional information about DHS science and technology activities is available at [http://www.dhs.gov/dhspublic/theme_home5.jsp]. See also:

- *Research and Development in the Department of Homeland Security*, CRS Report RL31914, by (name redacted).

[50] DHS, *Science and Technology Congressional Budget Justification, FY2005*, p. 18.

- *Homeland Security and Combating Terrorism Research and Development: Funding, Organization, and Oversight*, CRS Report RS21270, by Genevieve Knezo.
- Statement for the Record, Dr. Charles E. McQueary, Under Secretary for Science and Technology, Department of Homeland Security, Before the U.S. House of Representatives, Committee on Appropriations, Subcommittee on Homeland Security, March 30, 2004.

Department of Justice (DOJ)

According to the Department of Justice, its National Institute of Justice's Technology program funds technology research, development, and assessment to improve public safety, including programs for homeland security R&D.[51] The *unpublished* OMB data on homeland security R&D funding show that, for FY2004, budget authority totaling $179.5 million was enacted for homeland security R&D activities in the Justice Department, and $194.5 million was requested for FY2005. **See Table 22.** The *published* data on homeland security in the homeland security electronic appendix to the FY2005 budget request do not include clearly discernable DOJ R&D activities, except for data for "Defending Against Catastrophic Threats" in the Federal Bureau of Investigation's budget account for salaries and expenses, totaling $41.0 million requested for FY2005.

Table 22. DOJ Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Justice	$160.5	$25.2	$179.5	$194.5

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

The report of the President's Council of Advisors for Science and Technology said that DOJ's homeland security R&D programs include work in the Border Research and Technology Center (BRTC); the Office of Law Enforcement Technology Commercialization (OLETC); and the Office of Law Enforcement Standards (OLES). For additional information, see the PCAST report.[52] DOJ makes available descriptions of its awards in this area.[53]

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[51] See [http://www.ojp.gov/nij/sciencetech/highlights.htm], which was viewed last in Jan. 2004, or [http://www.ojp.usdoj.gov/nij/sciencetech/projects.htm], which was viewed last in Jan. 2004.

[52] The PCAST report is available at [http://www.ostp.gov/PCAST/FINAL DHS REPORT WITH APPENDICES.pdf].

[53] An illustration of a DOJ homeland security R&D award is given next.

(continued...)

Department of Transportation (DOT)

Unpublished OMB homeland security R&D data put the FY2005 Department of Transportation's (DOT) homeland security R&D budget request at $4.1 million, while reporting that no funding was enacted for FY2004 for R&D. **See Table 23.**

Table 23. DOT Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
Transportation	$3.7	—	—	$4.1

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

Using the *published* data in the homeland security electronic appendix to OMB's *FY2005 Budget* report, this CRS report identified funding for DOT's Research and Special Programs Administration (RSPA) as the account most likely to support R&D. This account did not report any funding for the homeland security mission categories of "defending against catastrophic threats" or for "protecting critical infrastructures and key assets." Funding for the other homeland security mission in RSPA is requested at $0.4 million for FY2005. **See Table 24.** DOT's homeland security R&D funding may be reported under other budget accounts, which are not *prima facie* R&D- related.

DOT requested funding for FY2004 totaling $623.3 million for its homeland and national security goal. The department's *FY2004 Performance Plan* identified the following homeland and national security R&D programs, which totaled $63.7 million:

- Federal Highway Administration (FHWA), transportation research, $21.7 million;

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[53] (...continued)
Award Title: The Institute for Security Technology Studies at Dartmouth College, Award Number: 2000DTCXK001, Awardee: Dartmouth College, Awardee Contact: Dr. John F. Kavanaugh, Original Funds: Year: 2000, Amount: $14,550,000.00. Categories: Counterterrorism/Critical Incidents, Learning/Education/Training of Practitioners, Surveillance and Detection Project Description: The Institute for Security Technology Studies (ISTS) at Dartmouth will serve as a principal center for counterterrorism technology research, development, assessment and technical support for the National Institute of Justice Office of Science and Technology. In fulfilling this function, ISTS will study and develop technologies to address counterterrorism issues in the extensive areas of threat characterization and intelligence, threat detection and interdiction, preparedness and protection, response and recovery. In addition, ISTS will provide technical support to NIJ in service of the comprehensive agency counterterrorism mission. The source is [http://nij.ncjrs.org/portfolio/XSearch_Details.asp?strGrantNumber=2000DTCXK001], which was last viewed in Nov. 2003.

- Federal Railroad Administration, (FRA), railroad research and development, $0.4 million;
- Federal Transit Administration (FTA), formula grants and research, urbanized area programs, $35.1 million; national research, $ 4.8 million;
- Research and Special Programs Administration (RSPA), emergency transportation, $ 1.3 million; program support, $0.4 million.[54]

Table 24. DOT Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Research and Special Programs Administration/Research and special programs (021-50-0104)						
Border and Transportation Security	$0.2	—	*$0.2* 0.2	—	$0.4	$0.4
Protecting Critical Infra-structure and Key Assets	1.0	—	*1.0* 1.0	—	—	—

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

For additional sources of information, **see table 25**.

Table 25. Examples of DOT Homeland Security R&D Activities

Program	Activity	Information Sources
Dept. of Transportation	— Research and Special Programs R&D activities in pipeline safety and other areas of homeland security; — Volpe Center homeland security activities in transportation/logistics; — Additional security-related R&D procurement information for DOT agencies is available.	[http://www.rspa.dot.gov/contracts.html]; [http://www.volpe.dot.gov/procure/current.html#rfp]; or [http://www/dot.gov/PerfPlan2004/homelandperf.html].

[54] Department of Transportation, *FY2004 Performance Plan*, Budget crosswalk, Appendix ii. See also: additional links to DOT's homeland security activities that include [http://ops.fhwa.dot.gov/OpsSecurity/homeland_agencies.htm], which was viewed last in Jan. 2004, and [http://www.rspa.dot.gov/oet/], which was viewed last in Jan. 2004. DOT's homeland security strategic goals, including research, are discussed at [http://www.dot.gov/PerfPlan2004/homelandperf.html], which was viewed last in Jan. 2004.

Environmental Protection Agency (EPA)

The Environmental Protection Agency's FY2005 homeland security R&D budget request totals $22.8 million, according to *unpublished* OMB data. This is 21% less than the FY2004 enacted level. **See Table 26.**

Table 26. EPA Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
EPA	$52.9	—	$28.8	$22.8

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

Published data in OMB's homeland security electronic appendix to the *FY2005 Budget*, with likely R&D identified by CRS, put EPA's funding for the only science and technology activity listed, that is "protecting critical infrastructure and key assets" at $51.5 million for FY2004 enacted and at $31.0 million requested for FY2005. **See Table 27.** The reductions come largely from cuts in EPA's programs relating to buildings contamination research.

For FY2005, EPA reported to Congress that it will conduct research and provide guidance and technical support for federal, state, and local governments and other institutions in the areas of biological agents, water security, and rapid risk assessment. R&D work focuses on preparedness, risk assessment, detection, containment, decontamination, and disposal of chemical and biological agents related to threats to water systems. It conducts radiation monitoring, works to develop acute exposure guidelines, rapid risk assessment to emergency personnel and the public form potential homeland security threats.[55] An emphasis in FY2005 will be new biologicals R&D to develop sampling and analysis methods and decontamination and clean up of biological agents.

[55] *FY 2005 Annual Performance Plan and Congressional Justification*, (EPA's Proposed Budget), Section IV and p. i-8.

Table 27. EPA Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Science and technology (020-00-0107)						
Protecting Critical Infrastructure and Key Assets	$4.7	$90.3	$20.6	—	$51.5	$31.0

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted from OMB, *2003 Report to Congress on Combating Terrorism,* September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

EPA's National Homeland Security Research Center (NHSRC) is the focal point for the agency's homeland security R&D. The center funds intramural and extramural performers to conduct R&D and provide technical assistance on buildings, water, and rapid risk assessment; collaborates on homeland security research authorized by memoranda (MOUs) between the Air Force Research Laboratory at Wright-Patterson Air Force Base (for collaborative R&D on water protection and improving risk assessment techniques),[56] the FDA, and the Department of Energy. For additional information, see EPA's description of the work of its Homeland Security Research Center.[57] NHSRC also works with DHS "to provide support and guidance to DHS in the startup of their University Centers of Excellence program."[58] "The NHSRC works with the CDC in conducting biological agent research, and with the Department of Energy "to access research conducted by DOE's National Laboratories as well as to obtain data related to radioactive materials."[59] The center also collaborates with other federal agencies and state and local emergency response personnel.

EPA's homeland security R&D program was reviewed in hearings on "Homeland Security Research and Development at the EPA: Taking Stock and

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[56] J. Elaine Hunnicutt, "Air Force 'Lab', EPA Sign Homeland Security Agreement," *Army Public Affairs Link,* Mar. 1, 2003, Army News Service Release 0302.

[57] Found at [http://www.epa.gov/ordnhsrc/]. Last viewed in Jan. 2004. See also *FY 2005 Annual Performance Plan and Congressional Justification(EPA's Proposed Budget),* p. IV-75 and p. IV-161. See also EPA, *Strategic Plan for Homeland Security,* Available at [http://www.epa.gov/epahome/] downloads/epa_homeland_security_strategic_plan.pdf. Last viewed January 2004.

[58] *FY 2005 Annual Performance Plan and Congressional Justification(EPA's Proposed Budget),* p. IV-75 and p. IV-161.

[59] *FY 2005 Annual Performance Plan and Congressional Justification(EPA's Proposed Budget),* p. IV-75 and p. IV-161.

Looking Ahead," held by the Environment, Technology, and Standards Subcommittee of the House Science Committee on May 19, 2004.[60]

National Aeronautics and Space Administration (NASA)

In *unpublished* data on homeland security R&D funding for FY2005, OMB did not report NASA as having any funding for homeland security R&D. No funding was reported in OMB's data table on combating terrorism R&D that appeared in its *2003 Report to Congress on Combating Terrorism.* OMB's *published* homeland security electronic appendix data, which this CRS report used to identify likely R&D, included information that NASA requested funding totaling $81 million for FY2005 ($2 million more than in FY2004) for "protecting critical infrastructure and key assets" in the budget account "NASA/Science, aeronautics and exploration." **See Table 28.** The AAAS, in alternative data, reported NASA's homeland security FY2005 R&D budget request at $66 million, $1 million more than in FY2004, and $7 million less than the amounts for FY2002 and FY2003.

Table 28. NASA Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Science, Aeronautics and Technology (026-00-0110)						
Protecting Critical Infrastructure and Key Assets	$40.0	$33.0	*$65.0* 83.0	—	—	—
Budget Account: Science, Aeronautics, and Exploration (026-00-0114)						
Protecting Critical Infrastructure and Key Assets	—	—	—	—	$79.0	$81.0

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

Homeland security R&D activities, according to NASA's FY2004 budget request, deal with improving the use of satellites and earth sciences research and applications for improving global measurements for weather monitoring. In addition, NASA reported that it serves "... the Nation through partnerships with the Department of Homeland Security and other national organizations to benchmark processes of monitoring air and water quality, tracking the spread of dangerous

[60] Available at [http://www.house.gov/science/hearings/ets04/index.htm].

plumes and particulates, and planning for evacuation scenarios, for integration into a Situation Center for decision support."[61]

Given the conflicting information, but, nevertheless, the considerable evidence from AAAS and NASA itself that the agency does fund homeland security R&D, it is likely that OMB's *unpublished* homeland security R&D data and published counterterrorism data may have erroneously not reported any such funding for NASA. It is probably likely that the actual amount of NASA's homeland security R&D for FY2005 is below the total of $81 million requested for the homeland security mission of "protecting critical infrastructure and key assets" for the budget account "Science, Aeronautics, and Exploration."

National Science Foundation (NSF)

According to OMB's *unpublished* data on homeland security R&D funding, NSF requested $315.8 million for FY2005, 3.3% more than the $305.6 million enacted in FY2004. **See Table 29.** Using *published* data in OMB's *2003 Report to Congress on Combating Terrorism,* and in the homeland security appendix to OMB's *FY2005 Budget, Analytical Perspectives,* this CRS report identified different information for NSF's R&D on this topic. These appendix data put NSF's FY2005 request for homeland security activities at $343.6 million, slightly more than the $327.9 million enacted for FY2004. (The figure of $343.6 million is the sum of $16.2 million, $27.0 million, $290.2 million, and $10.2 million.) For FY2005, NSF requested a total of $317.2 million for the homeland security mission budget account, "research and related activities," mostly for "protecting critical infrastructure and key assets," with $27 million for "defending against catastrophic threats." It also requested $16.2 million for education and human resources, and $10.2 million for salaries and expenses for homeland security R&D accounts, both for the mission of "protecting critical infrastructure and key assets." **See Table 30.**

Table 29. NSF Homeland Security R&D Based on *Unpublished* OMB Data

(budget authority, $ in millions)

Agency	2003 Enacted	2003 Supplemental	2004 Enacted	2005 Request
NSF	$268.5	—	$305.6	$315.8

Source: Information Provided by OMB, Jan. 27, 2004. OMB characterized these data as "discretionary budgetary resources," which, according to OMB staff is "budget authority," the term used in the table. Data exclude facilities and construction.

[61] NASA, FY2004 budget request, p. SAE 9-3. Available at [http://www.nasa.gov/pdf/1967main_2004_full_budget.pdf], which was viewed last in Dec. 2003.

Table 30. NSF Homeland Security Budget Accounts That Appear to Contain R&D Activities, FY2002 to FY2005

(budget authority, $ in millions)

Homeland Security Mission	FY2002 Enacted	FY2002 Supple-mental	FY2003 Enacted	FY2003 Supple-mental	FY2004 Enacted	FY2005 Request
Budget Account: Education and human resources (422-00-0106)						
Protecting Critical Infrastructure and Key Assets	$11.2	$19.3	*$11.5* 11.5	—	$16.5	$16.2
Budget Account: Research and related activities (422-00-0100)						
Defending Against Catastrophic Threats	9.0	—	*27.0* 27.0	—	27.0	27.0
Protecting Critical Infrastructure and Key Assets	219.8	0.3	*244.3* 244.3	—	281.3	290.2
Budget Account: Salaries and expenses (422-00-0180)						
Protecting Critical Infrastructure and Key Assets	—	—	*1.7* 1.7	—	3.1	10.2

Source: FY2002 data and data for FY2003 and FY2004 in italics are excerpted by CRS from OMB, *2003 Report to Congress on Combating Terrorism*, September 2003, "Appendix — Homeland Security Mission Funding by Agency and Budget Account (budget authority in millions of dollars)," pp. 47-67. Data in Roman for FY2003, FY2004 and FY2005 are from: OMB, FY2005 Budget, *Analytical Perspectives* CD-ROM, "Appendix- Homeland Security Mission Funding by Agency and Budget Account."

NSF's FY2005 homeland security R&D program includes fundamental research encompassing an "Ecology of Infectious Diseases program," co-sponsored by NSF and NIH, a "Microbial Genome Sequencing program," jointly sponsored by NSF and USDA geared to understanding potential bioterrorism threats and how to combat them. It supports a "Critical Infrastructure Protection" program with research "to identify potential vulnerabilities and strengthen protection for the nation's infrastructure," such as power grids, transportation, and water supply systems. It supports information technology research to improve the security of information-technology systems. It also funds a "Scholarship for Service program, to educate students in information security and assurance "in exchange for service in federal government agencies."[62] NSF's FY2005 budget request also describes its specific homeland security research support activities for cybersecurity and infrastructure R&D; sensor technology; social, behavioral and economic sciences; robotics; and laser diode research.[63]

The following issue may be raised: both NSF and NIH support the conduct of R&D, yet most of NSF's homeland security R&D activities are categorized under the

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[62] National Science Foundation, *FY 2005 Budget Request to Congress*, p. 6.

[63] Ibid., pp.234, 299, 321, 361.

homeland security mission of "protecting critical infrastructure and key assets" while most of NIH's homeland security R&D activities are categorized under the heading of "defending against catastrophic threats." NSF programs were not described in the OMB document. Other sources indicate that NSF funds homeland security-related awards in all scientific areas that the agency supports. The foundation also funds specific applications-oriented homeland security R&D and training in intelligence, biotechnology, and critical infrastructure. See **Table 31.** NSF's homeland security webpage describes its activities and lists all grants awarded in support of homeland security R&D.[64] It is not clear what the differences are between the kinds of research which may be supported under the two different headings of "defending against catastrophic terrorism," and "protecting critical infrastructure and key assets." These may require clarification to assist in presenting DHS and Congress with a complete and accurate understanding of federally supported homeland security R&D.

Table 31. Examples of NSF R&D Programs for Homeland Security and Counterterrorism R&D

Program	Activity	Information Sources
National Science Foundation (NSF) Homeland Security Page	Includes news, synopses of grants and contracts awarded, etc. Current grants are for Data Mining and Homeland Security Applications, and those in: Engineering; Social, Behavioral and Economic Sciences; Biology; Computer/ Information Science & Engineering; Geosciences; Mathematical & Physical Sciences; Education & Human Resources; Office of Integrative Activities, and National Hazards Center	[http://www.nsf.gov/od/lpa/news/media/01/nsf_response.htm#grants] [http://www.nsf.gov/od/lpa/news/03/fact030124.htm] and [http://www.nsf.gov/od/lpa/news/media/01/nsf_response_awards.htm] (continues to inventory NSF awards made in response to 9/11 attacks)
NSF Small Business Innovation Research Support Program	Programs for homeland security	[http://www.eng.nsf.gov/sbir/homeland.htm]
Other NSF support programs for "Approaches to Combat Terrorism" (ACT)	Includes: "Opportunities in Basic Research in the Mathematical and Physical Sciences with the Potential to Contribute to National Security: A Partnership Between The NSF Directorate of Mathematical and Physical Sciences and The Intelligence Community," Program Solicitation NSF 03-569	[http://www.nsf.gov/pubs/2003/nsf03569/nsf03569.htm]

[64] See [http://www.nsf.gov/od/lpa/news/03/fact030124.htm], which was viewed last in Jan. 2004.

Program	Activity	Information Sources
Other NSF homeland security-related research support programs	- Fundamental research on Ecology of Infectious Diseases jointly with NIH and a separate Microbial Genome Sequencing program that NSF says will contribute to a better understanding of potential bioterrorism threats. - Scholarship for Service program, trains students in information security and assurance in exchange for service in federal government agencies. - Critical infrastructure protection programs to identify vulnerabilities and strengthen protection for grids, transportation networks and water supply systems. NSF also supports security-related information technology research.	[http://www.nsf.gov]

Concluding Observations

The request for FY2005 federally funded homeland security R&D totals about $3.6 billion, exclusive of facilities and construction. This is a large amount of funding and arguably the fastest growing component of the federal R&D budget. DHS has statutory responsibilities, mandated by the Homeland Security Act, P.L. 107-296, to coordinate federal homeland security research and development (R&D). DHS's Under Secretary for Science and Technology announced that homeland security R&D will be coordinated by fall 2004. Implementation of these responsibilities depends, in part, on the quality of information about homeland security R&D programs in DHS and in other agencies. The data that are now available on homeland security R&D do not appear sufficiently detailed, accurate, or consistent to answer questions about priority-setting, policy and coordination among federal agencies.

OMB prepares several different types of homeland security R&D data sets for different purposes. Agencies also produce their own data. It is a difficult task to collect comparable cross-agency data and OMB has made considerable progress in constructing data sets. While there are some similarities in these data sets, there are also major differences among them, making it difficult to have confidence in the accuracy of any one data set or in comparisons over time. In its reports to Congress on *Combating Terrorism*, OMB publishes summary data on federal agencies' budgets for R&D for combating terrorism and gives short descriptions of some agency programs. These data are current only through the budget request for the fiscal year when the report is published. OMB describes homeland security R&D as a subset of combating terrorism R&D. OMB has not published data on homeland security R&D funding, *per se*, but, using an internal cross-walk budget data base, it has produced an unpublished table on homeland security R&D. Also, in data appended to the FY2005 budget request and available electronically, OMB published information on homeland security funding by agency, subdivided by programs and units. According to the Congressional Budget Office (CBO), OMB's publication of these data are responsive to section 889 of the Homeland Security Act of 2002, P. L. 107-296, which directed OMB to produce an annual report on homeland security funding to accompany the President's annual budget submission.[65] OMB is also required by that statute to consult with Congress annually about ways to identify and report homeland security information.

R&D would appear to be included in two funding categories OMB uses to identify types of homeland security budget accounts: the two homeland security missions of "defending against catastrophic threats,"and of "protecting critical infrastructures and key assets." However, the R&D components of these categories have not been clearly identified.

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[65] Congressional Budget Office, "Federal Funding for Homeland Security," Economic and Budget Issue Brief, Apr. 30, 2004, p. 3 (html version.) Available at [http://www.cbo.gov/showdoc.cfm?index=5414&sequence=0] or [ftp://ftp.cbo.gov/54xx/doc5414/homeland_security.pdf].

Coordination of homeland security R&D requires an ability to identify and compare funding and activities supported by separate federal agencies in relation to homeland security R&D needs. The inventory of agency programs identified in this report suggests certain issues for which more adequate data may be needed in order to determine policy, priorities, and accountability measures to coordinate homeland security R&D programs. Such possible issues include

- Are the funding amounts reported for homeland security R&D mutually exclusive? Or does the R&D reported as "homeland security" by agencies and OMB also serve other civilian or defense science and technology needs? That is, is some homeland security R&D funding data also reported under other categories of R&D, or does some homeland security R&D support dual-use purposes? Is there double counting of such R&D? Are agencies' programs for homeland security R&D new programs, or are agencies simply re-labeling R&D that was previously conducted and categorized for other purposes?
- What are the government's priorities for homeland security R&D, divided by application or functional area, such as countering bioterrorism, border security, information security, and threat mitigation?
- What fields of science does federal agency homeland security R&D support? What is the breakdown by discipline (such as, by chemistry, biology, psychology, social sciences, and so forth) and by type of R&D such as basic, applied, and development?
- Is there unnecessary duplication or, on the other hand, major gaps in homeland security R&D?
- Who are the major performers of homeland security R&D , such as by type, including academia, federal laboratory, and industrial performers?
- In order to meet future homeland security R&D needs, should plans be put in place to strengthen performer or scientific personnel capacity for selected fields?
- Is there an opportunity, or need, to promote dedicated information exchange or technology transfer among researchers who receive federal homeland security R&D funding to allow researchers to easily learn about the R&D accomplishments of others in order to hasten discoveries and to prevent unnecessary redundancy?
- What are the similarities and differences in the R&D conducted by different agencies in similar areas? An example is the biodefense R&D conducted by DHHS and DOD; what is NSF's role in supporting such work? Which agencies support R&D on information security? How are priorities determined?

Clearer and more consistent information about homeland security R&D might assist in eliminating unnecessary duplication, filling in gaps, identifying future R&D personnel needs, and improving the capability of different types of R&D performers. A detailed list of strengths and weaknesses in the various federal homeland security R&D data sets and options to ameliorate problems are discussed in companion CRS

Report RL32482, *Federal Homeland Security Research and Development Funding: Issues of Data Quality*, by (name redacted).