

CRS Issue Brief for Congress

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Federal Research and Development Funding: FY2005

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Federal Research and Development Funding: FY2005

SUMMARY

The Bush Administration requested \$131.9 billion in federal research and development (R&D) funding for FY2005. This was \$5.9 billion above the estimated \$126 billion that was appropriated for federal R&D in FY2004. Based on Congressional actions, CRS estimates that federal R&D funding will reach \$132.9 billion in FY2005, a 5.5% increase over FY2004. CRS estimates that 78% of this increase was for defense R&D. CRS estimates that defense R&D will reach \$75.4 billion, a 7.4% increase over FY2004, while civilian R&D is estimated to reach \$57.5 billion, a 2.7% increase over FY2004.

Congress passed four individual appropriations bills, but only two of them, Defense and Homeland Security, have R&D programs. Congress approved a record \$69.853 billion for DOD's RDT&E program, including a 10.4% increase for DOD's S&T programs (P.L. 108-287). Congress approved a 26% increase, or \$1.3 billion for Department of Homeland Security's (DHS) R&D programs (P.L. 108-334). The remaining nine appropriations bills are contained in the Consolidated Appropriations Act of FY2005, (P.L. 108-447, H.R. 4818). All funding estimates derived from that Act reflect a 0.80% across-the-board rescission. Further, programs in the Commerce appropriations bill reflect an additional 0.54% across-the-board reduction, while programs in the Interior appropriations bill reflect an additional 0.594% reduction.

Funding for USDA would increase agricultural research 1.6% over FY2004. Most of this increase is the related to congressionally directed projects that USDA requested be removed from the bill. Congress approved an estimated \$8.783 billion for R&D at DOE,

a 1.2% increase over FY2004. DOE's basic science programs would increase 2.8%, to \$3.6 billion.

P.L. 108-447 does not provide a specific number for NASA R&D funding. Instead, it states that NASA has "unrestrained" authority to transfer funding among its various programs. Despite passing an authorization bill two years ago to double NSF's budget over five years (P.L. 107-368), Congress approved a 1.9% reduction in funding for FY2005, including the first decline for NSF's Research and Related Activities account since 1986. NSF's Education and Human Resources programs would decline 10% below FY2004 levels.

Funding for NIH would increase 2% to \$28.452 billion, \$560 million over FY2004. Most NIH institutes would receive increases between 1.6 and 2.5 percent.

Within the Department of Commerce, Congress funded NIST at an estimated \$699 million, a 14.5% increase over FY2004. It funded the Manufacturing Extension Program at \$108 million, but instructed the Secretary not to re-compete the program until FY2007. Congress also approved \$136 million to complete work on current Advanced Technology Programs, with no new projects to be competed in FY2005. In response to the findings of a new Ocean Commission Initiative, Congress funded NOAA at \$681 million, a 7.2% increase over FY2004 levels.

Congress did not renew the research and experimentation (R&E) tax credit, which expired on June 30, 2004, despite the introduction of a number of bills aimed at extending the R&E tax credit either permanently or for a specified period of time (see CRS Report RL31181).

MOST RECENT DEVELOPMENTS

On December 8, 2004, President Bush signed P.L. 108-447, the Consolidated Appropriations Act of FY2005. The Bush Administration requested \$131.5 billion in federal research and development funding for FY2005. Based on current Congressional actions, CRS estimates that Congress has approved a record \$132.9 billion for federal R&D in FY2005.

BACKGROUND AND ANALYSIS

Department of Agriculture (USDA)

The FY2005 budget request for research and education in the U.S. Department of Agriculture (USDA) is \$2,435 million, a 2.6% decrease (\$65.3 million) from the FY2004 level of \$2,500.3 million (see **Table 1**). The FY2005 request provides support for several continuing research priority areas: new uses for agricultural products, global climate change, agricultural genomes, biosecurity, agricultural information services, and homeland security supplemental. Other priority areas include competitive research for fundamental and applied sciences in agriculture, and advancing agricultural genomic research. The FY2005 budget request supports programs on emerging and exotic diseases as part of the infrastructure to enhance homeland security. The USDA is concerned with training and educating the next generation of agricultural scientists and supporting core university-based research. Increased funding is provided to several higher education programs.

The USDA conducts in-house basic and applied research. The Agricultural Research Service (ARS) is the lead federal agency for nutrition research, operating five major laboratories in this area, including the world's large multi-disciplinary agricultural research center located at Beltsville, Maryland. ARS laboratories focus on efficient food and fiber production, preservation of genetic resources, development of new products and uses for agricultural commodities, development of effective biocontrols for pest management, and support of USDA regulatory and technical assistance programs. The FY2005 request provides \$1,189 million for ARS, \$19.7 million above the FY2004 estimate. Reductions are proposed in all projects earmarked by Congress in order to finance high priority program increases. The FY2005 request proposes a \$3.5 million increase for animal genomics and an increase of \$8.3 million for emerging diseases and biosecurity. There is also an increase proposed for information technology cyber security and animal waste related problems. The ARS reports that the majority of its facilities are functionally obsolete. The FY2005 request for ARS includes \$23 million for buildings and facilities.

The Cooperative State Research, Education, and Extension Service (CSREES) distributes funds to State Agricultural Experiment Stations, State Cooperative Extension Systems, land-grant universities, and other institutions and organizations that conduct agricultural research. Included in these partnerships is funding for research at the 1862 institutions, 1890 historically black colleges and universities, and 1994 tribal land-grant colleges. Funding is distributed to the states through competitive awards, statutory formula funding, and special grants. The FY2005 request for CSREES is \$1,028 million, a decrease of \$104 million from FY2004. Funding for formula distribution in FY2005 to the State

Agricultural Experiment Stations (and other eligible institutions) would be \$275.9 million, a \$1.8 million below FY2004. The request proposes a slight increase for the 1890 formula programs. The FY2005 request funds the National Research Initiative (NRI) Competitive Grants Program at \$180 million, \$16 million above the FY2004 estimate.

Table 1. U.S. Department of Agriculture
(\$ in millions)

	FY2004 Estimate	FY2005 Request	FY2005 Omnibus
Agric. Research Service (ARS)			
Product Quality/Value Added	\$108.4	\$99.4	
Livestock Production	96.7	79.9	
Crop Production	180.8	153.9	
Food Safety	95.4	90.1	
Livestock Protection	65.5	60.5	
Crop Protection	178.3	151.7	
Human Nutrition	81.5	80.5	
Environmental Stewardship	216.3	182.1	
National Agricultural Library	20.9	22.4	
Funds for Homeland Security	20.8	49.0	
Repair & Maintenance	18.1	18.1	
Subtotal	1,082.5	987.6	1,048.5
Buildings & Facilities	63.8	178.0	186.3
Trust Funds	23.0	23.0	0.0
Total, ARS^a	1,169.3	1,189.0	1,243.8
Coop. St. Res. Ed. & Ext. (CSREES) Research and Education			
Hatch Act Formula	179.1	180.1	178.7
Cooperative Forestry Research	21.8	21.8	22.2
1890 Colleges and Tuskegee Univ.	35.8	36.0	12.3
Special Research Grants	110.7	3.3	135.5
NRI Competitive Grants	164.0	180.0	179.6
Animal Health & Disease Res.	4.5	5.1	5.1
Federal Administration	37.5	7.5	42.6
Higher Education ^b	41.4	52.8	51.5
Total, Coop. Res. & Educ.^c	618.4	516.0	655.5
Extension Activities			
Smith-Lever Sections 3b&c	277.7	275.9	275.5
Smith-Lever Sections 3d	80.6	83.4	86.7
Renewable Resources Extension	4.0	4.1	4.1
1890 Research & Extension	31.7	32.1	32.8
Other Extension Prog. & Admin.	36.0	25.7	28.5
Total, Extension Activities^c	440.1	421.2	445.7
Total, CSREES^c	1,132.0	1,028.0	1,101.2
Economic Research Service	71.0	80.0	74.2
National Agric. Statistics Service	128.0	138.0	128.5
TOTAL, Research, Education & Economics	\$2,500.3	\$2,435.0	\$2,538.7

a. The total for ARS excludes trust funds and support for Counter-Drug Research and Development and for Anti-Drug Research and Related Matters. Program levels in the House-passed version are not available.

b. Higher education includes payments to 1994 institutions and 1890 Capacity Building Grants program.

c. Program totals may reflect set-asides (non-add) or contingencies. Includes support for integrative activities (which have both research and extension components).

The Economic Research Service (ERS) is the principal intramural economic and social science research agency in USDA. The request for ERS in FY2005 is \$80 million, a \$9 million increase over the previous fiscal year. The majority of the increase will support a consumer data and information system, with the remaining funds directed at pay costs. The National Agricultural Statistics Service (NASS) conducts the Census of Agriculture and provides current data on agricultural production and indicators of the farm sector. The FY2005 request is \$138 million, \$10 million above the FY2004 level. Funding will support Presidential and Department e-Government initiatives. NASS will continue the development of the USDA Enterprise Architecture and the USDA Enablers initiatives.

On November 20, 2004, the House adopted H.R. 4818 (H.Rept. 108-792), Omnibus Appropriations for FY2005, funding the government through December 8. (A vote on the technical corrections resolution, H.Con.Res. 528, has been delayed until Congress returns on December 6). Included in the omnibus is an across-the-board cut of 0.8% in all discretionary funded programs and activities. H.R. 4818 funds research and education in USDA at a total of \$2,538.7 million, \$103.7 million (4.3%) above the FY2005 request, and \$38.4 million (1.5%) above the FY2004 estimate. (**CRS Contact: Christine Matthews**)

Department of Energy (DOE)

For FY2005, DOE requested \$8.5 billion for R&D, including activities in each of the department's four business lines: Science, National Security, Energy Supply, and Environmental Quality. This request was 2% below the FY2004 level. The final appropriation was \$8.8 billion, an increase of 1% over FY2004. (See **Table 2**).

The requested funding for Science was \$3.4 billion, a 2% decrease from FY2004. Increases were requested for all Science programs except Biological and Environmental Research, which received approximately \$140 million in FY2004 as congressionally directed funding for specific projects. The Administration noted that if this \$140 million were set aside, the FY2005 request would be an increase of 2% rather than a decrease. The final bill provided \$3.6 billion, including increases of \$80 million for Biological and Environmental Research (almost entirely for specific projects), \$41 million for Basic Energy Sciences, and \$28 million for Advanced Scientific Computing Research.

The requested funding for R&D in National Security was \$3.3 billion, almost the same as the FY2004 appropriation.¹ The request for the Naval Reactors program, which last year began development of a new nuclear reactor design for future navy ships, was an increase of 5%. The final appropriation was an increase of 1%, with the most notable adjustment being the elimination of requested funds for the Robust Nuclear Earth Penetrator.

The requested funding for R&D in Energy Supply was \$1.7 billion, down 6% from FY2004. Within this total, Energy Conservation R&D was reduced by 10%, primarily to make increased funding available for weatherization assistance grants, and Nuclear Energy R&D was reduced by 26%, primarily in the area of advanced fuel cycle technologies. The

¹ This does not include National Security R&D activities in subprograms devoted to specific nuclear weapon systems, because detailed funding schedules that identify the R&D portion of those activities are classified. See notes to **Table 2**.

final bill restored Energy Conservation R&D almost to the FY2004 level and increased Nuclear Energy R&D by 31% over FY2004 or 78% over the request. Fossil Energy R&D, which was reduced by both the House and the Senate, ultimately received 10% less than the request, with a decrease of \$217 million for FutureGen partially offset by increases in several other fossil energy programs. The goal of FutureGen is technology that co-produces electricity and hydrogen from coal with essentially zero emissions.

The requested funding for R&D in Environmental Quality was \$60 million. This was a 9% reduction from FY2004, following two years of reductions in excess of 40% that resulted from a reorientation of the program. The House provided a \$22.5 million increase for evaluation of advanced private-sector remediation technologies, but the final appropriation was slightly less than the request. **(CRS Contact: Daniel Morgan.)**

Table 2. Department of Energy
(\$ millions)

	FY2004 Estimate ^a	FY2005 Request	FY2005 House ^b	FY2005 Senate ^b	FY2005 Final ^c
National Security	3,264.5	3,263.5	3,188.4		3,301.4
Weapons Activities ^d	2,270.6	2,245.6	2139.0		2,276.0
Naval Reactors	761.9	797.9	807.9		801.4
Nonprolif. & Verific. R&D	232.0	220.0	241.5		223.9
Science	3,500.2	3,431.7	3,600.0		3,599.9
Basic Energy Sciences	1,010.6	1,063.5	1,076.5		1,104.6
High Energy Physics	733.6	737.4	753.4		735.7
Biological & Env'tl. Research	641.5	501.6	571.6		581.9
Nuclear Physics	389.6	401.0	415.0		404.8
Fusion Energy Sciences	262.6	264.1	276.1		273.9
Advanced Sci. Computing	202.3	204.3	234.3		232.5
Other	260.0	259.8	273.1		266.5
Energy Supply	1,836.7	1,726.2	1754.3		1,822.7
Energy Conservation R&D	606.9	543.9	611.0	580.5	599.5
Fossil Energy R&D	672.8	635.8	601.9	542.5	575.3
Renewable Energy	357.5	374.8	343.2		386.0
Elec. Transm. & Distrib. R&D	69.5	75.7	75.7 ^e		91.4
Nuclear Energy R&D	130.0	96.0	122.5		170.6
Environmental Quality	66.1	60.1	82.6		59.7
Technology Devel. & Deploy.	66.1	60.1	82.6		59.7
Total	8,666.5	8,481.5	8,625.3		8,783.7

- a. Figures for FY2004 are adjusted to reflect program transfers, reprogramming of funds by the Department, and rescissions and additional appropriations made by the Consolidated Appropriations Act, 2004 (P.L. 108-199).
- b. DOE programs are funded in two appropriations bills: Energy and Water (H.R. 4614, H.Rept. 108-554; no bill in Senate) and Interior (H.R. 4568, H.Rept. 108-542; S. 2804, S.Rept. 108-341).
- c. Adjusted to reflect the general reduction of 0.80%.
- d. Includes Stockpile Services (R&D Certification and Safety, Advanced Concepts, Reliable Replacement Warhead, and Robust Nuclear Earth Penetrator R&D only), Science Campaigns, Engineering Campaigns (except Enhanced Surety and Enhanced Surveillance), Inertial Confinement Fusion, Advanced Simulation and Computing, and a prorated share of Readiness in Technical Base and Facilities. Additional R&D

activities may take place in the subprograms of Directed Stockpile Work that are devoted to specific weapon systems, but these funds are not included in the table because detailed funding schedules for those subprograms are classified.

- e. Includes funds requested for Electricity Transmission and Distribution R&D that the House provided under Energy Assurance in the Other Defense Activities account.

Department of Defense (DOD)

Nearly all of what the Department of Defense spends on Research, Development, Test and Evaluation (RDT&E) is appropriated in Title IV of the defense appropriation bill (see **Table 3**). For FY2005, the Bush Administration originally requested \$68.9 billion for Title IV RDT&E. This was later reduced to \$67.8 billion after the Army decided to terminate its Comanche helicopter development program. The amended request is \$3.3 billion above the amount made available in Title IV dollars for FY2004. The five-year budget plan estimates \$352.9 billion for RDT&E through FY2009. This is about \$20.5 billion more than what the Administration budgeted for RDT&E in FY2004. RDT&E funds are also requested as part of the Defense Health Program (\$72 million) and the Chemical Agents and Munitions Destruction Program (\$154 million).

While the FY2005 RDT&E request would boost RDT&E funding overall, the proposed increases are focused on development activities. Basic research and applied research are proposed at levels below FY2004 funding in absolute terms, declining 5% and 12% respectively. The decline is greater when factoring in inflation. Over half of DOD's basic research budget is spent at universities and represents the major contributor of funds in some areas of science and technology. Much of the support of research at DOD laboratories comes from applied research accounts. The S&T funding request, which consists of basic and applied research and advanced development (6.1, 6.2 and 6.3 activities in the RDT&E account) is 2.6% of the overall Department of Defense budget request of \$401.7 billion. This is below the 3% target that both the Bush Administration and Congress have set. The budget request for Missile Defense RDT&E was \$9.1 billion (an increase of \$1.5 billion over the amount available for Missile Defense in FY2004). The budget request for the Defense Advanced Research Projects Agency (DARPA) was \$3.1 billion, an increase of about \$300 million.

The House passed its appropriation bill (H.R. 4613) on June 22. The House appropriated \$68.9 billion for Title IV RDT&E, \$12.8 billion of which would go toward S&T. The S&T appropriation represents 3.1% of the total Department's appropriation. The House also appropriated \$8.7 billion for missile defense, about \$400 million below what the administration requested. DARPA received \$3.2 billion in appropriations. The House appropriated \$446 million in RDT&E for the Defense Health Program (including \$150 million for breast cancer research and \$85 million for prostate cancer research), and \$154 million in RDT&E for the Chemical Agents and Munitions Demilitarization program.

The Senate Appropriation Committee passed its appropriation bill (S. 2559) on June 23. The Committee recommended an appropriation of \$68.5 billion for Title IV RDT&E, this includes a general reduction of \$250 million to be made in advisory and assistance services for the Army and defense agencies, but not RDT&E's share of a general reduction to made associated with improved economic assumptions. The Committee recommended an appropriation of \$12.2 billion for S&T. The S&T amount represents 2.9% of the

department's total appropriation recommended by the Committee. The Committee recommended \$9.2 billion for missile defense, \$399 million for RDT&E within the Defense Health Program, and \$206 million for RDT&E in the Chemical Agents and Munitions Destruction Program. The House approved and the Senate Appropriation Committee recommended increasing the administration's basic research request by \$1 billion, an increase of approximately \$80 million above what was appropriated last year.

Table 3. Department of Defense
(\$ millions)

	FY2004 Estimate	FY2005 Request ^e	House Apprn. (H.R. 4613)	Senate Apprn. ^f (S. 2559)	Conf. (P.L. 108-287)
Accounts					
Army	10,201	9,266	10,220	10,259 ^g	10,695
Navy	14,969	16,346	16,532	16,748	17,033
Air Force	20,294	21,115	21,034	21,002	20,887
Defense Agencies	18,927	20,740	20,851	20,205 ^g	20,923
(DARPA)	(2,831)	(3,090)	(3,163)	(2,849)	(3,042)
(MDA ^h)	(7,625)	(9,147)	(8,689)	(9,162)	(8,969)
Dir. Test & Eval	302	305	309	305	315
Total Ob. Auth.	\$64,693	\$67,772	\$68,946	\$68,519	\$69,853^h
Budget Activity					
Basic Research	1,404	1,330	1,486	1,478	1,513
Applied Res.	4,423	3,878	4,652	4,563	4,948
Advanced Dev.	6,254	5,343	6,653	6,167	6,881
Advanced Component Dev. and Prototypes	13,306	15,355	14,771	14,934	15,157
Systems Dev. and Demo	15,902	18,061	17,362	17,795	17,500
Mgmt. Support ^b	3,278	3,261	3,440	3,345	3,511
Op. Systems Dev. ^c	20,126	20,545	20,582	20,486	20,652
Adjustments					
financial info. systems advisory/assist. services economic assumptions info tech cost growth mgmt improvements anticipated set-asides				-250	-78 -211 -350
Total Ob. Auth.^d	\$64,693	\$67,773	\$68,946	\$68,519^g	\$69,293
Other Defense Programs					
Defense Health Program	486	72	446	399	507
Chemical Agents and Munitions Destruction	241	154	154	206	205

Source: Figures based on Department of Defense Budget, Fiscal Year 2005 RDT&E Programs (R-1), February 2004. Figures for Defense Health Program and Chemical Agents and Munitions Destruction Program come from OMB's FY2005 Budget Appendix. Totals may not add due to rounding.

- a. Includes only BMD RDT&E. Does not include procurement and military construction.
- b. Includes funds for Developmental and Operational Test and Evaluation.
- c. Includes classified programs.
- d. Numbers may not agree with Account Total Obligational Authority due to rounding.
- e. Reflects Administration's amended budget request after canceling the Army's Comanche program.

- f. The numbers in this column do not reflect a general reduction associated with improved economic assumptions (Section 8062 of S. 2559)
- g. These figures do reflect a general reduction to the Army and the Defensewide accounts associated with advisory and assistance services.
- h. This figure does not include the general reductions for management improvements and anticipated set-asides. It does include reductions associated with cost growth in information technology development.

The conference committee recommended \$69.3 billion for Title IV RDT&E. This includes a number of general reductions that must be allocated to individual accounts. In addition, the conference committee recommended \$507 million for RDT&E in the Defense Health Program and \$205 million for RDT&E in the Chemical Agents and Munitions Destruction Program. Missile defense received \$8.97 billion in RDT&E. S&T received \$13.3 billion (with basic receiving \$1.6 billion), but this does not include S&T's share of general Title IV reductions. **(CRS Contact: John Moteff)**

National Aeronautics and Space Administration (NASA)

NASA's FY2005 total budget request was \$16.244 billion, a 5.6% increase over its FY2004 appropriation of \$15.378 billion. Congress appropriated \$16.200 billion (or \$16.07 billion if adjusted for the 0.80% across-the-board rescission) in the FY2005 Consolidated Appropriations bill (H.R. 4818, Division I). For the purposes of this report, NASA's "R&D budget" is NASA's total budget minus the space shuttle program and space flight support. Using that definition, the FY2005 R&D request was \$11.4 billion, compared to \$11 billion in FY2004. Conferees on H.R. 4818 gave NASA what they called "unrestrained" authority to transfer funding among programs and budget accounts. Thus, it is not possible to determine how much of the \$16.2 billion will be for R&D, especially since NASA notified Congress in November 2004 that it needs \$762 million more than requested in FY2005 for the space shuttle program. Congress appropriated the \$4.3 billion that NASA had requested for the shuttle, so where NASA will get the additional \$762 million is unclear. If it is reprogrammed from other NASA activities, the amount of R&D funding at NASA would likely decrease. See CRS Report RS21744 for more on NASA's FY2005 budget.

In January 2004, President Bush directed NASA to focus its efforts on returning humans to the Moon by 2020, and someday sending them to Mars and "worlds beyond." Under the plan, the space shuttle program would be terminated in 2010, when space station construction is expected to be completed; U.S. space station research would focus only on that which is needed to support extended stays by humans on the Moon and eventual trips to Mars instead of the multi-disciplinary program that was planned; and NASA would end its involvement in the space station program by FY2017. NASA would build a Crew Exploration Vehicle (CEV) whose primary purpose is sending astronauts to the Moon, but could also be used to take them to the space station by 2014. U.S. astronauts would have to rely Russia to take them to and from the space station between 2010 and 2014. Most of the funding for this "Vision for Space Exploration" comes from redirecting money from other NASA activities. For example, NASA said that \$12.6 billion would be "added" to its budget for FY2005-2009 for the Vision, but \$11.6 billion of that is taken from other NASA programs.

The President's announcement came 11 months after the space shuttle *Columbia* accident sparked a review of U.S. goals in space, and the role of the space shuttle in accomplishing them. The House and Senate Appropriations Committees each voiced support

for the goals, but cited the constrained budgetary climate as a factor in their decisions to cut many of the related projects. In H.R. 4818, however, conferees did not make specific funding recommendations for most NASA programs. Instead, Congress is allowing NASA to determine how to spend most of its FY2005 funding, with notification requirements to Congress. (CRS Contact: Marcia Smith)

**Table 4. National Aeronautics and Space Administration
R&D Budget**
(\$ millions)

Category	FY2004 (Est.)	FY2005 Request	H. App. Cmte	S. App. Cmte	Final (H.R. 4818)
Exploration, Science & Aero.^a	7,830	7,760	7,621	7,760	7,743^b
Space Science	3,971	4,138	**	**	
Earth Science	1,613	1,485	**	**	
Biol. & Phys. Research	985	1,049	**	**	
Aeronautics	1,034	919	**	**	
Education	226	169	**	**	
Exploration Capabilities (R&D only)^a			**	**	**
Exploration Systems ^a	1,646	1,782	**	**	**
Space Flight					
— Space Station*	*1,498	*1,863	*1,673	*1,603	**
Total NASA R&D	10,972	11,405	**	**	**
Total NASA	15,378	16,244	15,149	16,379	16,200^b

Source: NASA's FY2005 budget estimate, House and Senate Appropriations Committee reports, and conference report on H.R. 4818. Columns may not add due to rounding.

*Does not include funding for space station research (\$578 million in FY2004; \$549 million in FY2005), which is embedded in the Biological and Physical Research line.

**The House and Senate reports, and H.R. 4818, do not provide the level of detail necessary to determine how much is allocated for the subcategories in this table, and therefore to calculate an R&D subtotal.

^a In FY2004, "Exploration, Science & Aeronautics" was called "Science, Aeronautics and Exploration"; "Exploration Capabilities" was called "Space Flight Capabilities"; and "Exploration Systems" was called "Crosscutting Technologies."

^b These figures do not reflect the 0.80% across-the-board rescission. It is not clear how NASA will allocate that cut to its programs. The total for NASA, with the rescission, is \$16,070 million.

National Institutes of Health (NIH)

The conference report on the Consolidated Appropriations Act, 2005 (H.R. 4818, H.Rept. 108-792) provided an estimated total of \$28.451 billion to NIH in discretionary budget authority after the across-the-board rescission of 0.8% (see **Table 5**). The amount is a 2.1% increase (\$573 million, pending further adjustments) over the comparable FY2004 appropriation of \$27.878 billion, and is \$156 million below the President's revised request of \$28.607 billion (the request was a 2.6% increase over FY2004). The bulk of NIH's budget comes through the appropriation for the Departments of Labor, Health and Human Services, and Education (L-HHS), with an additional small amount from the VA-HUD appropriation for environmental work related to Superfund. In addition, NIH receives \$150 million pre-appropriated in separate funding for diabetes research, and has other funds transferred to and from other appropriations. The total NIH program level in the President's

revised request was \$28.724 billion, while the estimated conference level is \$28.557 billion, an increase of 2.4% over FY2004.

FY2003 was the final year of the five-year effort to double the NIH budget from its FY1998 base of \$13.6 billion to the FY2003 level of \$27.1 billion. The annual increases for FY1999 through FY2003 were in the 14%-15% range each year. Since then, faced with competing priorities and a changed economic climate, Congress and the President have given increases of between 2% and 3%, despite pleas from the research advocacy community that the NIH budget should grow by about 10% per year in the post-doubling years. Advocates have warned that the momentum of scientific discovery made possible by the increased resources of the doubling years could be compromised by a marked slowdown in funding, particularly if support of research grants started to falter.

Under the President's request for FY2005, research project grants, representing 54% of the NIH budget, would have reached record numbers, both in dollars and in the total number of grants. Cost increases on grants, however, were held considerably below the expected 3.5% rise in the biomedical inflation index. The conferees urged NIH, within available resources, to follow its cost principles of providing full funding for commitments to existing grantees and increases in the average cost of competing grants. No target for the number of grants was provided. Congress does not specify levels for other forms of research support that were increased in the request, such as research centers, training awards, and intramural research, except that the agreement provides \$30 million for non-biodefense extramural facilities construction, which had been eliminated in the request. It also boosts funding for the Neurosciences Center in the intramural buildings account. The agreement increases the size of the Public Health Service Program Evaluation Transfer, a budget "tap" of 2.4% (up from 2.2% in FY2004) to which NIH and other PHS agencies are subject.

Specific priorities highlighted in the budget request and by Congress include biodefense, HIV/AIDS, obesity research, and the initiatives collectively known as the NIH Roadmap for Medical Research. The Roadmap, launched in September 2003, has identified critical scientific gaps that may be constraining rapid progress in biomedical research, and has set out a list of NIH-wide priorities and initiatives to address them. Three core themes focus on new paths to biological discoveries, building multidisciplinary research teams, and improving the clinical research infrastructure. (For more information, see the "Biomedicine Issues" section of CRS Report RL31846, *Science and Technology Policy: Issues for the 108th Congress, 2nd Session.*) **(CRS Contact: Pamela Smith)**

Table 5. National Institutes of Health (NIH)
(\$ millions)

Institutes and Centers (ICs)	FY2004 comp ^a	FY2005 rev req ^b	FY2005 conf (est) ^c	FY04-05 % change
Cancer (NCI)	\$4,736.0	\$4,865.5	\$4,826.6	1.9%
Heart/Lung/Blood (NHLBI)	2,878.1	2,965.5	2,941.7	2.2%
Dental/Craniofacial Research (NIDCR)	383.0	394.1	391.9	2.3%
Diabetes/Digestive/Kidney (NIDDK)	1,671.2	1,727.7	1,713.9	2.6%
Neurological Disorders/Stroke (NINDS)	1,500.7	1,547.1	1,539.7	2.6%
Allergy/Infectious Diseases (NIAID) ^d	4,303.0	4,440.0	4,404.5	2.4%
General Medical Sciences (NIGMS)	1,904.8	1,959.8	1,944.1	2.1%
Child Health/Human Development (NICHD)	1,241.8	1,280.9	1,270.7	2.3%
Eye (NEI)	652.7	671.6	669.2	2.5%
Environmental Health Sciences (NIEHS)	631.1	650.0	644.8	2.2%
Aging (NIA)	1,024.6	1,055.7	1,052.2	2.7%
Arthritis/Musculoskeletal/Skin (NIAMS)	500.9	515.4	511.3	2.1%
Deafness/Communication Disorders (NIDCD)	381.9	393.5	394.3	3.2%
Nursing Research (NINR)	134.7	139.2	138.1	2.5%
Alcohol Abuse/Alcoholism (NIAAA)	428.4	441.9	438.4	2.3%
Drug Abuse (NIDA)	990.8	1,012.8	1,006.6	1.6%
Mental Health (NIMH)	1,381.3	1,420.6	1,412.2	2.2%
Human Genome Research (NIHGR)	478.8	492.7	488.7	2.1%
Biomedical Imaging/Bioengineering (NIBIB)	288.8	297.6	298.2	3.3%
Research Resources (NCRR)	1,179.0	1,094.1	1,115.1	-5.4%
Complementary/Alternative Medicine (NCCAM)	116.9	121.1	122.1	4.4%
Minority Health/Health Disparities (NCMHD)	191.5	196.8	196.2	2.5%
Fogarty International Center (FIC)	65.3	67.2	66.6	2.0%
Library of Medicine (NLM)	308.5	316.9	315.4	2.2%
Office of Director (OD) ^e	327.1	359.6	358.3	9.5%
Buildings & Facilities (B&F)	99.0	99.5	110.3	11.4%
Subtotal, (L-HHS Appropriation)	\$27,800.0	\$28,526.9	\$28,371.2	2.1%
Superfund (VA-HUD Approp to NIEHS) ^f	78.3	80.5	79.8	2.0%
Total, NIH Discretionary Budget Authority	\$27,878.3	\$28,607.4	\$28,451.1	2.1%
Pre-appropriated Type 1 diabetes funds ^g	150.0	150.0	150.0	0%
Program Evaluation, ONDCP, and/or PHSSEF ^h	12.7	66.4	55.2	334.8%
Global HIV/AIDS Fund transfer ^d	-149.1	-100.0	-99.2	-33.5%
Total, NIH Program Level	\$27,891.9	\$28,723.8	\$28,557.1	2.4%

Source: Conference report on the Consolidated Appropriations Act, 2005 (H.R. 4818, H.Rept. 108-792, November 19, 2004).

- FY2004 reflects across-the-board rescission of \$165,459,000 and L-HHS reduction of \$17,492,000, and is comparable for transfers to NIBIB and B&F, and for transfer for Public Health Reports (\$70,000).
- FY2005 revised request reflects reallocation of \$14.5m to NIAID for HIV vaccine research (\$6.3m from NIDA and \$8.2m from NLM) and reallocation of \$4.5m from NCI to NHLBI, NIDDK, and NINDS (\$4.5m each) for increased stem cell research funding. The requested reallocations did not change total NIH discretionary budget authority, but they did increase the total NIH program level because evaluation funds were requested for NIDA, NLM, and NCI (see note h below).
- FY2005 estimated conference level reflects the 0.8% across-the-board rescissions totaling about \$229m, but does not reflect NIH's share (about \$6.3m) of a mandated \$18m salaries and expenses reduction.
- NIAID totals include funds for transfer to the Global Fund to Fight HIV/AIDS, Malaria, and Tuberculosis.
- OD total includes Roadmap funds for distribution to ICs (\$34.8m in FY2004 and \$59.5m in FY2005).
- Separate account in the VA-HUD appropriation for NIEHS activities mandated in Superfund legislation.
- Funds available to NIDDK for diabetes research in accordance with P.L. 106-554 and P.L. 107-360.
- Additional funds available: From the program evaluation set-aside (sec. 241 of the Public Health Service Act), \$8.2m for NLM in FY2004 and FY2005, and, in the FY2005 request, \$6.3m for NIDA and \$4.5m

for NCI; transfer to NIDA from ONDCP (Office of National Drug Control Policy), \$4.5m in FY2004; and funding from the Public Health and Social Services Emergency Fund for NIH research on nuclear and radiological countermeasures, \$47.0m in FY2005.

National Science Foundation (NSF)

The FY2005 request for the National Science Foundation (NSF) is \$5,745 million, a 2.9% (\$167.2 million) increase over the FY2004 level of \$5,577.8 million. The FY2005 request provides support for several interdependent priority areas: biocomplexity in the environment (\$99.8 million), human and social dynamics (\$23.3 million), mathematical sciences (\$89.1 million), and nanoscale science and engineering (\$305.1 million). The NSF acknowledges that researchers need not only access to cutting-edge tools to pursue the increasingly complexity of research, but funding to develop and design the tools critical to 21st century research and education. Approximately 26% of the FY2005 request (\$1,472.1 million) represents an investment in infrastructure of all types.

Increasing grant size and duration has been a long-term priority for NSF. The FY2005 request devotes \$40 million to increase the annual award size to an annual average of \$142,000, a \$3,000 increase over the FY2004 level. The request provides \$80 million for the President's Math and Science Partnerships program (MSP). The MSP is a five-year investment to improve the performance of U.S. students in science and mathematics at the precollege level. Additional FY2005 highlights include funding for graduate fellowships and traineeships (\$240.7 million), National Nanotechnology Initiative (\$305.1 million), continued support of plant genome research (\$89.5 million), investments in Climate Change Research Initiative (\$25 million), continued support for multi-disciplinary, multi-institutional Science of Learning Centers (\$20 million), and support for major international collaborations in science and engineering (\$34 million).

Included in the FY2005 request is \$4,452.3 million for Research and Related Activities (R&RA), a 4.7% increase (\$200.9 million) over the FY2004 level of \$4,251.4 million. R&RA funds research projects, research facilities, and education and training activities. Partly in response to concerns in the scientific community about the imbalance between support for the life sciences and the physical sciences, the FY2005 request provides increased funding for the physical sciences. Research in the physical sciences often leads to advances in other disciplines. R&RA includes Integrative Activities (IA), created in FY1999. IA is the source of funding for the acquisition and development of research instrumentation at U.S. colleges and universities and funds also Partnerships for Innovation, disaster research teams, and the Science and Technology Policy Institute. The FY2005 request for IA is \$240 million, a 66.5% increase (\$95.9 million) over the FY2004 estimate. The FY2005 request for IA reflects the proposed transfer of the MSP from the Education and Human Resources (EHR) Directorate to the IA.

Research project support in the FY2005 request totals \$2,845.1 million. Support is provided to individuals and small groups conducting disciplinary and cross-disciplinary research. Included in the total for research projects is support for centers, proposed at \$457.3 million. NSF supports a variety of individual centers and center programs. The FY2005 request provides \$72.4 million for Science and Technology Centers, \$58.9 million for Materials Centers, \$63.5 million for Engineering Research Centers and Groups, \$15.4

million for Physics Frontiers Centers, \$36 million for the Plant Genome Virtual Centers, and \$75 million for Information Technology Centers.

The Major Research Equipment and Facilities Construction (MREFC) account is funded at \$213.3 million in FY2005, a 37.6% increase (\$58.3 million) over the FY2004 level. The MREFC supports the acquisition and construction of major research facilities and equipment that extend the boundaries of science, engineering, and technology.

Table 6. National Science Foundation

(\$ millions)

	FY2004 Estimate	FY2005 Request	FY2005 Omnibus^d
Research & Related Activities			
Biological Sciences	\$586.9	\$599.9	
Computer & Inform. Sci. & Eng.	6047	618.1	
Engineering	461.5	471.8	
Geosciences	713.1	728.5	
Math & Physical Sci.	1,091.5	1,115.5	
Social, Behav. & Econ. Sci.	175.7	190.7	
U.S. Polar Programs	342.2	349.7	347.2
Integrative Activities	144.1	240.0 ^b	
Subtotal Research & Related Activities	\$4,251.4	\$4,452.3	\$4,220.6
Ed. & Hum. Resr.	939.0	771.4 ^c	841.4
Major Res. Equip. & Facil. Constr.	155.0	213.3	173.7
Salaries & Expenses	218.7	294.0	223.2
National Science Board	3.9	4.0	3.9
Office of Inspector General	10.0	10.1	10.0
Total NSF^a	\$5,577.8	\$5,744.7	\$5,472.8

a. The totals do not include carry overs or retirement accruals. Totals may not add due to rounding.

b. Reflects the movement of MPS from Research and Related Activities to Integrative Activities.

c. Program and activity totals within the R&RA have not been determined.

d. Funding levels account for the across-the-board rescission of 0.80%.

The FY2005 request for the Education and Human Resources Directorate (EHR) is \$771.4 million, a 17.9% decrease (\$167.6 million) from the FY2004 level. Support at the various educational levels in the FY2005 request is as follows: precollege, \$172.8 million; undergraduate, \$158.9 million; and graduate, \$173.9 million. Funding for the Experimental Program to Stimulate Competitive Research (EPSCoR) is \$75 million in the FY2005 request. An additional \$30 million for co-funding activities in EPSCoR is provided through R&RA, bringing the total FY2005 request for EPSCoR to \$114 million.

H.R. 4818 funds the NSF at \$5,472.8 million, \$272.2 million below the request, and \$105 million below the FY2004 estimate. Included in the total is \$4,220.6 million for R&RA, \$231.7 million below the request, and \$30.8 million below FY2004. The omnibus legislation funds other programs at the following levels for FY2005 — EHR, at \$841.4 million (\$97.6 million below the FY2004 estimate), and the MREFC, at \$173.7 million (\$18.7 million above the FY2004 level). **(CRS Contact: Christine Matthews)**

Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

NOAA's "FY2005 Congressional Preparation: Research and Development" estimates that total NOAA R&D, including R&D facilities costs, will be \$584.5 million for FY2005. The R&D Bureau of the Office of Management and Budget (OMB) earlier reported \$611 million for "R&D programs, facilities, and major equipment," at the agency. (See **Table 7.**) The NOAA total is \$70.6 million, or 10.8%, less than the \$655.1 appropriated for R&D for FY2004. NOAA reported a cut of almost \$9 million for Ocean Resources, Conservation, and Assessment R&D in the National Ocean Service (NOS) budget. NOAA Fisheries (NMFS) R&D would be cut by \$14.6 million from terminating programs at the Joint Institute for Marine & Atmospheric Research; however, funding for Fisheries Information & Analysis R&D activities would increase by \$6 million. The NOAA Research (OAR) would receive an increase of \$30 million for Climate Observations & Services R&D. In total, R&D in OAR would be cut by about \$30 million, and by \$60 million in OAR "Plant" (R&D facilities) costs.

The House-passed appropriations bill (H.R. 4754) would provide about \$545 million for R&D, about \$39 million below FY2004 appropriations. The Senate Appropriations Committee report (S. 2809) would fund NOAA at \$748 million an 18% increase over FY2004, including \$475 million for a new *Ocean Commission Initiative*, which would foremost fund ocean research and observations. In response to the Commission's report, Congress (H.R. 4818) would fund NOAA at \$681 million, an 8% increase over FY2004 levels. Additional information on NOAA funding including FY2004 appropriations, the President's request, and congressional appropriations actions for FY2005, can be found on the CRS web page for *Commerce, State, Justice, the Judiciary and Related Agency Appropriations, FY2005*, at [<http://www.congress.gov/brbk/html/apcjs41.html>]. (**CRS Contact: Wayne A. Morrissey**)

National Institute of Standards and Technology (NIST)

For FY2005, the Bush Administration budget request includes \$521.5 million for the National Institute of Standards and Technology (NIST). (See Table 7) This amount is 14.6% below the FY2004 appropriation due primarily to the absence of funding for the Advanced Technology Program (ATP). Internal research and development under the Scientific and Technical Research and Services (STRS) account would receive \$422.9 million, an increase of 25.4% over the current fiscal year. Support for the Manufacturing Extension Partnership would total \$39.2 million (a small increase from FY2004) and the construction budget would be \$59.4 million. H.R. 4754, the FY2005 appropriations bill passed by the House on July 8, 2004, provides NIST with \$524.9 million, 14% less than the current fiscal year. Funding for the intermural research programs under the STRS account would increase 11.4% to \$375.8 million. The \$106 million for the Manufacturing Extension Program would bring support up to pre-FY2004 levels before the financing was reduced by 63%. There is no funding for the Advanced Technology Program. The construction budget would be \$43.1 million. The Senate Appropriations Committee (S. 2809) approved an estimated \$784.9 million for NIST in FY2005, a \$263 million increase over the Administrations' request. The majority of this increase can be attributed to the Committee funding the ATP at \$203 million

for FY2005. The Committee also approved \$383.9 million for STRS, \$112 million for MEP, and \$86.1 million for construction, \$26.6 million above the request.

H.R. 4818, H.Rept. 108-792, contains \$708.7 million, or \$699 million when the recessions are applied to NIST programs. This includes \$380 million for STRS, a 10% increase over FY2004. The act also funds MEP at \$108 million, but instructs the Secretary not to re-compete the program until FY2007. Finally Congress approved \$141 million for ATP existing projects with no new projects to be competed in FY2005. For additional information see CRS Report 95-30, *The National Institute of Standards and Technology: An Overview*, CRS Report 95-36, *The Advanced Technology Program*, and CRS Report 97-104, *The Manufacturing Extension Partnership Program: An Overview*. **(CRS Contact: Wendy H. Schacht)**

Department of Transportation (DOT)

The Bush Administration requested \$749 million for the Department of Transportation's (DOT) research and development budget in FY2005. This represents an increase of 6.9% over the FY2004 estimated funding level of \$701 million. (See Table 7.) The Federal Highway Administration would receive a large increase in R&D spending with the Administration's proposal to shift some resources away from state highway grants to highway research, an approach Congress has rejected in the past. R&D funding for the Federal Aviation Administration would decline 10.5%, to \$222 million, as more of its aviation safety related R&D activities are transferred to the DHS. The House (H.R. 5025) would provide an estimated \$749 million and the Senate (S. 2806) an estimated \$770 million for R&D. CRS estimates that H.R. 4818, provides \$718 million for DOT R&D. (CRS Contact: Mike Davey)

Department of the Interior (DOI)

According to the President's budget, the Administration requested \$648 million for R&D in the Department of the Interior.(See Table 7.) This represents a 4% decline from the \$675 million the agency received in FY2004. The U.S. Geological Survey (USGS) is the primary supporter of R&D (about two-thirds of the total) within DOI. Areas of research include mapping and research in geological resources, water quality, and biological resources. The proposed FY2005 budget for R&D within the USGS would decline from \$547 million in FY2004 to \$525 million. This proposed reduction in funding has been distributed among its four major R&D accounts. The House passed Interior Appropriations bill (H.R. 4568) would restore the proposed cuts in the U.S.G.S. R&D, approving \$548 million for FY2005, and a total of \$671 million for Interior R&D. As in FY2004, the Administration is proposing deep cuts in the Toxic Substances Hydrology Program, as well as in Mineral Resources R&D Activities. However the House also rejected these proposed cuts and restored funding for these two programs in H.R. 4568. The Senate Appropriations Committee (S. 2804) approved an estimated \$666 million for Interior research, including an estimated \$543 million for USGS. CRS estimates that Congress approved \$668 million, a \$3 million reduction for Interior R&D. **(CRS Contact: Mike Davey)**

Environmental Protection Agency (EPA)

The Science and Technology (S&T) account incorporates elements of the former research and development account (also called extramural research) and EPA's in-house research, development, and technology work. (See Table 7.) The FY2005 S&T total request of \$725.3 million is made of two parts, \$689.2 million directly for S&T, and \$36.1 million transferred from the Superfund account. The House Appropriations Committee report for the FY2005 (H.R. 4614) recommends an S&T total of \$765.1 million, composed of \$729 million directly for S&T, and \$36.1 million transferred from Superfund, which is less than the FY2004 total S&T enacted level of \$826.1 million, which was made of \$781.7 million directly for S&T, and \$44.4 million transferred from Superfund. The Senate Appropriations Committee report (S. 2825) recommends a FY2005 S&T total of \$794.3 million, made of \$758.2 million directly for S&T, and \$36.1 million transferred from Superfund. Noteworthy in the House recommendations are \$16.2 million added to fully restore to FY2004 levels EPA's Science to Achieve Results (STAR) and STAR Fellowship programs, and \$4 million added to continue EPA's building decontamination research. Noteworthy in the Senate recommendations are \$10 million for Endocrine Disruptor work (nearly \$2 million less than requested), and \$20 million for Global Change (\$0.69 million less than requested). A continuing question is the degree to which efforts to insure sound science (such as the Information Quality Act and the Office of Management and Budget's Peer Review proposal) will impact EPA's S&T work. CRS estimates that Congress approved \$744 million for EPA R&D, a 4.7% reduction from FY2004. **(CRS contact: Michael Simpson)**

Department of Homeland Security (DHS)

For FY2005, the Department of Homeland Security (DHS) requested \$1.2 billion for R&D and received \$1.3 billion. (See Table 7.) The bulk of this sum funded the Directorate of Science and Technology (\$1.039 billion requested, \$1.115 billion received). Most of the remainder funded R&D in the Transportation Security Administration (\$154 million requested, \$178 million received). Reflecting direction given in the FY2004 appropriations conference report (H.Rept. 108-280), R&D activities formerly funded by other DHS agencies, such as the U.S. Coast Guard, appeared in the request for the S&T Directorate in FY2005. The transfer of Coast Guard R&D was not made in the final bill.

The requested funding for the S&T Directorate was 14% more than the FY2004 appropriation, but only three areas included large funding changes. First, Biological Countermeasures, the directorate's largest program, requested \$407 million, versus \$285 million in FY2004. This 43% increase included \$65 million to support expanding the coverage and scope of BioWatch, an activity that seeks to detect airborne biological agents in large metropolitan areas. The House provided the requested funding for Biological Countermeasures, but transferred \$44 million of it to separate line items for staff salaries and facility construction. The Senate also transferred facility construction funds to a separate line, while providing \$26 million less than the request. The conference report concurred with the House. Second, the request of \$30 million for University Programs was a 56% reduction from FY2004. Last year, Congress increased FY2004 funding for University Programs to \$69 million from an initial request of \$10 million. For FY2005, the House provided \$70 million, the Senate provided \$69 million, and the conference report concurred with the House. Third, the S&T Directorate's FY2005 request included \$24 million for R&D

activities transferred from other DHS agencies, including \$13.5 million for Coast Guard R&D. The House provided the requested funding for these consolidated programs. The Senate provided \$18.5 million for Coast Guard R&D, a \$5 million increase above the request, and deferred approval of this activity's transfer to the S&T Directorate until completion of an independent study of Coast Guard R&D priorities. The conference report provided \$18.5 million and did not make the transfer. Overall, the House provided \$1.132 billion for the S&T Directorate (H.R. 4567, H.Rept. 108-541); the Senate provided \$1.059 billion, or \$1.078 billion including the funding provided for Coast Guard R&D (H.R. 4567 in lieu of S. 2537, S.Rept. 108-280); and the conference report provided \$1.115, not including Coast Guard R&D (H.Rept. 108-774).

The requested R&D funding for the Transportation Security Administration included \$49 million for Applied R&D on aviation passenger and baggage screening, \$50 million for development of Next Generation Explosives Detection Systems, and \$55 million for Air Cargo R&D. The House provided a \$20 million increase for additional work on air cargo screening. The Senate also provided a \$20 million increase for air cargo, along with a \$7 million increase for Next Generation EDS. The conference report provided a \$20 million increase for air cargo and a \$4 million increase for Next Generation EDS. Note that R&D on protecting commercial aircraft from shoulder-fired missiles (\$61 million requested and provided) is funded by the S&T Directorate, not the Transportation Security Administration. For more information on R&D in DHS, see CRS Report RL31914. (CRS Contact: Daniel Morgan.)

Table 7. R&D Budgets of Preceding Agencies
(\$ millions)

	FY2003 ² Actual	FY2004 Estimate	FY2005 Estimate
National Oceanic and Atmospheric Administration	\$666	\$632	\$681
National Institute of Standards & Technology	712	610	699
Department of the Interior	643	675	668
Department of Transportation	705	701	718
Department of Homeland Security	759	1,038	1,300
Environmental Protection Agency	716	781	744

² Data from Office of Management and Budget FY2005 budget documents, and individual agency FY2005 budget data.