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Federal Research and Development Funding: FY2008

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Summary

The Bush Administration has requested $142.7 billion in federal research and development (R&D) funding for FY2008. As in the recent past, the FY2008 proposed increase over the FY2007 funding level is due to significant funding increases in the Department of Defense (DOD); the National Aeronautics and Space Administration's (NASA's) space vehicles development program; and the continuation of the American Competitiveness Initiative (ACI). The President initiated the ACI in FY2007 and continues to promote it in his FY2008 R&D budget.

While the ACI is likely to be well received by lawmakers, other administration proposals for agency R&D funding are likely to encounter strong opposition in Congress. For example, the administration's proposed budget for the National Institutes of Health (NIH) is $28.5 billion, a decrease of $529 million (1.8%) below the estimated 2007 funding level. This proposed level represents the fifth year in a row the administration has proposed cutting NIH's budget.

While NASA's R&D budget would increase in FY2008, the entire increase is designated for two major initiatives: finishing the international space station and developing the crew launch vehicle/crew exploration vehicle combination. However, as a result of these priorities, funding for NASA's basic and applied research programs has declined 18% since FY2006.

Funding for the Department of Defense is proposed to increase by $765 million to $79 billion in FY2008. DOD's weapons development program would increase to an all time high of $68.1 billion. However, DOD's science and technology research programs, which include medical research and technology development, would decline 21.1% to $10.9 billion, which would negate seven years of past funding increases.

R&D funding for the U.S. Geological Survey, the lead science agency for the Department of the Interior is proposed to decline 4% in FY2008. The Environmental Protection Agency's R&D budget is proposed to be cut 3.2% from its estimated FY2007 funding level. As a result, according to the American Association for the Advancement of Science, funding for EPA's R&D budget would fall to its lowest level in two decades, in constant FY2007 dollars.

Despite Administration efforts to restrain the growth of non-defense discretionary spending, both the House and the Senate have approved funding increases for every major non-defense R&D funding agency. As a result of these actions, funding for basic and applied research would increase, in real dollars, for the first time in three years. However, these proposed increases could be short lived, because the President has indicated that he will veto any appropriations bills that exceed his FY2008 budget request.

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Overview

Congress continues to have a strong interest in supporting federal research and development (R&D) activities. The federal government has a history of playing an important role in supporting efforts that have led to emerging technologies. These include such things as cancer and AIDS research, the development of nuclear power, and nanotechnology. Most of the research funded by the federal government is in support of specific activities of the federal government as reflected by the different missions of the funding agencies. The federal government has become the largest supporter of long term fundamental basic research, primarily because the private sector asserts it cannot recapture the full cost of long-term fundamental research. Some of the major agencies funding basic research include the Department of Defense (DOD), the National Institutes of Health (NIH), the National Science Foundation (NSF), and the Department of Energy (DOE).

The Bush Administration has requested $142.7 billion in federal R&D funding for FY2008.[1] As in the recent past, the FY2008 proposed increase over the FY2007 funding level is due to significant funding increases in the DOD and in the National Aeronautics and Space Administration's (NASA's) space vehicles development program, as well as the continuation of the American Competitiveness Initiative (ACI).

The President proposed the ACI in response to growing concerns about America's ability to compete in the technological global market place. Between FY2007 and FY2015, the $136 billion initiative would commit $50 billion for research, science education, and the modernization of research infrastructure. The remaining $86 billion would finance a revised Research and Experimental (R&E)

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[1] The present FY2008 R&D request was released before final passage of the Revised Continuing Appropriations Resolution, hereafter CR, (P.L. 110-5, February 15, 2007, H.J.Res. 20), which contains estimated agencies' funding levels for FY2007. Actual FY2007 appropriations levels were not specified by the CR. Only two agencies, DOD and the Department of Homeland Security have received enacted FY2007 appropriations bills. As a result, agencies were directed by Congress to submit their FY2007 estimated funding levels and operating plans to Congress by March 15, 2007. Estimated funding levels for different agencies have become available as the agencies report their FY2007 operating plans. Tables in this report reflect the agencies' FY2007 estimates derived from the CR. Actual agencies' FY2007 R&D funding levels may not be available until the President's FY2009 budget is released. Unless otherwise indicated, all funding data are in current dollars. The FY2006 R&D numbers reflect congressionally mandatory funding rescissions.

tax incentive over the next 10 years. The current R&E tax credit expires at the end of 2007. [2]

As part of the $50 billion for research, the President, in February 2006, called for doubling federal R&D funding over 10 years. That increase included the physical sciences and engineering research in three agencies: the National Science Foundation (NSF), the Department of Energy (DOE) Office of Science, and the National Institute of Standards and Technology (NIST). According to the Administration, in FY2008, ACI funding for NSF would increase $409 million, DOE Office of Science funding would increase $296 million, and NIST's core intramural research would increase $59 million.[3]

Despite continued support for the ACI, total federal support for research (basic and applied), would decrease 2% in FY2008. A decline in research funding at NIH, the Department of Agriculture, NASA, DOD, and other agencies would offset increases proposed for the ACI. According to the American Association for the Advancement of Science (AAAS), the federal research portfolio would decline for the fourth year in a row, a decrease of 7.5% since 2004.

Support for three federal multiagency research initiatives would vary. The National Nanotechnology Initiative is proposed to increase 4% to $1.447 billion (see CRS Report RS20589, *Manipulating Molecules: Federal Support for Nanotechnology Research*, by Michael E. Davey). Funding for the Networking and Information Technology R&D Initiative would essentially remain at the same level with funding at $3.057 billion (see CRS Report RL33586, *The Federal Networking and Information Technology Research and Development Program: Funding Issues and Activities*, by Patricia Moloney Figliola). The administration is proposing $1.544 billion for the Climate Change and Science Program, a decrease of 7%, primarily due to a decrease in NASA's funding (see CRS Report RL33817, *Climate Change: Federal Funding and Tax Incentives*, by Jane A. Leggett).

Despite Administration efforts to restrain the growth of non-defense discretionary spending, both the House and the Senate have approved FY2008 funding increases for every major non-defense R&D funding agency. As a result of these actions, funding for basic and applied research would increase, in real dollars, for the first time in three years. However, these proposed increases could be short lived, because the President has indicated that he will veto any appropriations bills that exceeds his FY2008 budget request.

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[2] See *Rising Above The Gathering Storm and Energizing and Employing America for a Brighter Economic Future*, The National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, The National Academies, 500 Fifth Street, NW, Washington, DC 20001, 2005.

[3] Based on P.L. 110-5, both the House and Senate FY2007 appropriations actions would partially fund the President's ACI request. Based on House and Senate actions, in FY2007 DOE's Office of Science would receive $200 million of ACI funding, NSF an estimated $217 million, and NIST an estimated $37 million of ACI funding.

Department of Energy (DOE)

The Department of Energy has requested $9.781 billion for R&D in FY2008, including activities in three major categories: Science, National Security, and Energy. (For details, see **Table 1**.) This request is 6.1% above the FY2007 level of $9.220 billion. The House provided $10.516 billion, or $734 million more than the request. The Senate Committee recommended $10.566 billion, or $785 more than the request.

Table 1. Department of Energy R&D

($ in millions)

	FY2007 Op. Plan	FY2008 Request	FY2008 House	FY2008 S. Cmte.
Science	**$3,797.3**	**$4,397.9**	**$4,514.1**	**$4,496.8**
Basic Energy Sciences	1,250.2	1,498.5	1,498.5	1,512.3
High Energy Physics	751.8	782.2	782.2	782.2
Biological and Environmental Rsch.[a]	483.5	531.9	581.9	605.3
Nuclear Physics	422.8	471.3	471.3	471.3
Fusion Energy Sciences	319.0	427.8	427.8	427.8
Adv. Scientific Computing Research	283.4	340.2	340.2	334.9
Other	286.6	346.0	412.2	363.0
National Security	**3,235.5**	**3,131.6**	**3,245.2**	**3,284.6**
Weapons Activities[b]	2,161.9	2,036.7	1,882.5	2099.0
Naval Reactors	781.8	808.2	808.2	808.2
Nonprolifern. and Verification R&D	270.4	265.3	446.4	322.3
Defense Environmtl. Cleanup TD&D	21.4	21.4	108.1	55.1
Energy	**2,186.9**	**2,251.8**	**2,756.3**	**2,784.7**
Energy Effic. and Renewable Energy[c]	1,192.6	1,031.3	1558.9	1408.0
Fossil Energy R&D	592.6	566.8	708.8	808.1
Nuclear Energy R&D	302.6	567.7	402.6	470.6
Elec. Delivery & En. Reliability R&D	99.1	86.0	86.0	98.0
Total	**9,219.7**	**9,781.3**	**10,515.6**	**10,566.1**

Notes: FY2007 figures are from the DOE operating plan (online at [http://www.doe.gov/media/FY2007OperatingPlanForDOE.pdf]). FY2008 figures are from the budget justification (online at [http://www.cfo.doe.gov/budget/]), H.R. 2641 (H.Rept. 110-185), and S. 1751 (S.Rept. 110-127).

a. The House report would split this item into two: Biological Research for $423.8 million and Climate Change Research for $158.1 million.

b. Includes Stockpile Services R&D Support, Stockpile Services R&D Certification and Safety, Reliable Replacement Warhead, 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.

c. Excluding Weatherization and Intergovernmental Activities.

The requested funding for Science is $4.398 billion, a 16% increase from FY2007. This increase reflects the American Competitiveness Initiative (ACI), which the President announced in February 2006 in his State of the Union address. Over the next 10 years, the ACI would double R&D funding for the DOE Office of Science and two other agencies. The requested increase relative to FY2007 is enlarged because the FY2007 appropriation (under the year-long continuing resolution, P.L. 110-5) was $304 million less than the FY2007 request, even though the House and Senate regular appropriations bills for FY2007 would both have provided more than the FY2007 request. In the Basic Energy Sciences program, most of the requested $248 million increase in FY2008 would support increased facility operating time as requested in FY2007 and supported by both the House and the Senate in the regular FY2007 appropriations bills. In Fusion Energy Sciences, almost all of the requested $109 million increase in FY2008 is for the International Thermonuclear Experimental Reactor (ITER), whose estimated U.S. total cost remains at $1.122 billion through FY2014, with operating costs thereafter now estimated at $57 million per year. The House provided a total of $4.514 billion for Science, or $116 million more than the request. That increase included $30 million for biological research, $20 million for climate change research, $73 million for laboratory infrastructure (mostly at Pacific Northwest National Laboratory), and a reduction of $7 million for program direction. The Senate committee recommended $4.497 billion, or $99 million more than the request. The largest change recommended by the Senate committee was an increase of $73 million for biological and environmental research, of which $49 million would be devoted to congressionally directed projects.

The requested funding for R&D in National Security is $3.132 billion, a 3.2% decrease. Most of the reduction results from the scheduled completion of construction projects, most notably the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory. The request for the Reliable Replacement Warhead (RRW) program is $89 million, an increase of $53 million. The House provided $3.245 billion, including increases for nonproliferation and verification R&D, environmental cleanup technology development, and inertial confinement fusion, but no funding for the RRW. The Senate committee recommended $3.285 billion, including increases in the same areas and partial funding for the RRW. The Senate report noted that the committee was divided on the RRW and called for a bipartisan congressional commission "to evaluate and make recommendations on the role of nuclear weapons in our future strategic posture."

The requested funding for R&D in Energy is $2.252 billion, up 3.0% from FY2007. Within this total, R&D on nuclear, hydrogen, biomass, and solar energy would increase, while geothermal and natural gas and oil technology programs would be terminated. The requested $267 million increase for Nuclear Energy R&D would mostly go to the Advanced Fuel Cycle Initiative, which is the main U.S. component of an international partnership to develop nuclear energy technologies that minimize waste and the threat of proliferation. The House provided an overall increase of $504 million, while the Senate committee recommended an overall increase of $533 million. Both included smaller increases than requested in nuclear energy, with less emphasis on the Advanced Fuel Cycle Initiative, and both included more than the request in energy efficiency and renewable energy and in fossil energy. **(CRS Contact: Daniel Morgan.)**

Department of Defense (DOD)

Congress supports research and development in the Department of Defense (DOD) through its Research, Development, Test, and Evaluation (RDT&E) appropriation. The appropriation primarily supports the development of the nation's future military hardware and software and the technology base upon which those products rely.

Nearly all of what DOD spends on RDT&E is appropriated in Title IV of the defense appropriation bill (see **Table 2**). However, RDT&E funds are also requested as part of the Defense Health Program and the Chemical Agents and Munitions Destruction Program. The Defense Health Program supports the delivery of health care to DOD personnel and family. Program funds are requested through the Operations and Maintenance appropriation. The program's RDT&E funds support Congressionally directed research in such areas as breast, prostate, and ovarian cancer and other medical conditions. The Chemical Agents and Munitions Destruction Program supports activities to destroy the U.S. inventory of lethal chemical agents and munitions to avoid future risks and costs associated with storage. Funds for this program are requested through the Army Procurement appropriation. Typically, Congress has funded both of these programs in Title VI (Other Department of Defense Programs) in the defense appropriations bill. More recently, RDT&E funds have also been requested and appropriated as part of DOD's separate funding to support the Global War on Terror (GWOT). These appropriations have been located in Title IX of the defense appropriations bill. The Joint Improvised Explosive Device Defeat Fund, part of the GWOT funding, contains additional RDT&E monies. The Joint Improvised Explosive Device Defeat Office, which now administers the Fund, tracks, but does not report, the amount of funding allocated to RDT&E.

For FY2008, the Bush Administration requested $75.1 billion for DOD's baseline Title IV RDT&E, roughly $800 million less than the total obligational authority available for Title IV in FY2007. The FY2008 requests for RDT&E in the Defense Health Program and the Chemical Agents and Munitions Destruction program were $134 million and $221 million, respectively. This year's request for the Global War on Terror included both a FY2008 Title IX request and a FY2007 Title IX Supplemental request, with $2.9 billion and $1.4 billion being requested for RDT&E, respectively.

Since FY2001, funding for RDT&E in Title IV has increased from $42 billion to $76 billion in FY2007. In constant FY2008 dollars, the increase is roughly 58%. Historically, RDT&E funding has reached its highest levels in constant dollars, dating back to 1948.[4] Congress has appropriated more for RDT&E than has been requested, every year, since FY1996.

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[4] This historical data can be found in DOD's *National Defense Budget Estimates for the FY2008 Budget* (also known as the "Green Book"). Office of the Under Secretary for Defense (Comptroller).March 2007.pp 62-67. See [http://www.defenselink.mil/comptroller/defbudget/fy2008/fy2008_greenbook.pdf]. Last viewed May 10, 2007.

RDT&E funding can be broken out in a couple of ways. Each of the military services request and receive their own RDT&E funding. So, too, do various DOD agencies (e.g., the Missile Defense Agency and the Defense Advanced Research Projects Agency), collectively aggregated within the Defensewide account. RDT&E funding also can be characterized by budget activity (i.e. the type of RDT&E supported).Those budget activities designated as 6.1, 6.2 and 6.3 (basic research, applied research, and advanced development) constitute what is called DOD's Science and Technology Program (S&T) and represents the more research-oriented part of the RDT&E program. Budget activities 6.4 and 6.5 focus on the development of specific weapon systems or components (e.g. the Joint Strike Fighter or missile defense systems), for which an operational need has been determined and an acquisition program established. Budget activity 6.7 supports system improvements in existing operational systems. Budget activity 6.6 provides management support, including support for test and evaluation facilities.

S&T funding is of particular interest to Congress since these funds support the development of new technologies and the underlying science. Assuring adequate support for S&T activities is seen by some in the defense community as imperative to maintaining U.S. military superiority. This was of particular concern at a time when defense budgets and RDT&E funding were falling at the end of the Cold War. As part of its 2001 Quadrennial Review, DOD established a goal of stabilizing its base S&T funding (i.e., Title IV) at 3% of DOD's overall funding. Congress has embraced this goal. The FY2008 S&T funding request in Title IV is $10.8 billion, about $2.5 billion less than what was available for S&T in Title IV in FY2007 (not counting S&T funding requested as part of the GWOT request). Furthermore, the S&T request for Title IV is approximately 2.2% of the overall baseline DOD budget request (not counting funds for the Global War on Terror), short of the 3% goal. The ability for the Administration to meet its 3% goal has been strained in recent years as the overall Defense budget continues to rise. In last year's defense authorization bill (P.L. 109-364, Sec. 217), Congress reiterated its support for the 3% goal, extended it to FY2012, and stipulated that, if the S&T budget request does not meet this goal, DOD submit a prioritized list of S&T projects that were not funded solely due to insufficient resources.

Within the S&T program, basic research (6.1) receives special attention, particularly by the nation's universities. DOD is not a large supporter of basic research, when compared to the National Institute of Health or the National Science Foundation. However, over half of DOD's basic research budget is spent at universities and represents the major contribution of funds in some areas of science and technology (such as electrical engineering and material science). The FY2008 request for basic research ($1.4 billion) is roughly $140 million less than what was available for Title IV basic research in FY2007.

In Congressional action to date, Congress approved, and the President signed, the *U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007* (P.L. 110-28). The bill contained emergency supplemental funds, including additional FY2007 RDT&E funds in support of the Global War on Terror. As noted above, the RDT&E-related FY2007 GWOT supplemental request was $1.4 billion. Congress provided $1.1 billion. In

addition, the act provided supplemental FY2007 RDT&E funds for the Defense Health Program to support additional trauma-related research. See **Table 3** below.

The House passed H.R. 3222, the *Department of Defense Appropriations Act, 2008*, on August 5. The bill provided $1.1 billion more in Title IV RDT&E funding than requested. The bill provided $12.2 billion in S&T funding (2.7% of the total funds appropriated for the Department), $1.4 billion more than requested. The House chose not to address the FY2008 GWOT request in this bill. It is not possible to compare directly the House figures with FY2007 numbers in **Table 2**, since the latter include GWOT (Title IX) funds from the FY2007 appropriations bill and the House figures do not yet include any FY2008 GWOT funds. In addition to the general increases in the S&T accounts, the House made some notable changes in the President's systems development requests, providing less funds for the Army's Future Combat System ($406 million less) and providing more funds for the Joint Strike Fighter (a total of $705 million more split between the Navy and the Air Force). The House provided $319 million more in RDT&E-related funds for the Defense Health Program, including $127 million for breast cancer and $80 million for prostate cancer research. Also, Section 8105 of the bill includes a provision limiting the use of appropriations to pay negotiated indirect cost rates on basic research grants, contracts or other agreements to 20% of the direct costs. This may have an impact on university grants.

The Senate Appropriations Committee reported its version of H.R. 3222 (see S.Rept. 110-155) on September 14, 2007. The net effect of the Committee's recommendations was to reduce Title IV RDT&E by approximately $102 million. While increasing Title IV RDT&E by $265 million in the body of the bill, it reduced Title IV funds by $367 million in the General Provisions part of the bill, as part of a general reduction to account for revised economic assumptions. Similar to the House, the Committee did not include the FY2008 GWOT request in the bill. The Committee recommended $11.6 billion for the S&T portion of the program (before allocating the general reduction). This is roughly 2.6% of the total amount recommended for the Department (before accounting for the reduction). The Committee recommended roughly $196 million more than requested for the Joint Strike Fighter programs of the Navy and Air Force (reducing program funds in some areas, but increasing funding for a competitive engine development by $480 million). The Committee did not recommend cuts to the Army's Future Combat System programs. The Committee recommended $477 million for the RDT&E portion of the Defense Health Program, including $150 million for peer-reviewed breast cancer and $80 million for peer-reviewed prostate cancer research. It also included $50 million for additional unspecified peer-reviewed medical research. The Committee also increased funding for the RDT&E portion of the Chemical Agents and Munitions Destruction Program. **(CRS Contact: John Moteff.)**

Table 2. Department of Defense RDT&E

($ in millions)

	FY2007 Estimate[d]	FY2008 Request	FY2008 House	FY2008 Senate	FY2008 Conf.
Title IV					
By Account					
Army	$10,963	$10,590	$11,510	11,355	
Navy	18,880	17,076	17,719	17,472	
Air Force	24,421	26,712	26,163	26,070	
Defense Agencies	21,507	20,560	20,659	20,304	
Dir. Test & Eval	184	180	180	180	
Total Ob. Auth.[a]	**75,955**	**75,118**	**76,231**	**75,381**	
By Budget Activity					
6.1 Basic Research	1,564	1,428	1,555	1,566	
6.2 Applied Research	5,329	4,357	5,074	4,560	
6.3 Advanced Development	6,432	4,987	5,562	5,520	
6.4 Advanced Component Development and Prototypes	15,789	15,662	15,900	14,994	
6.5 Systems Dev. and Demo	19,258	18,098	18,374	18,128	
6.6 Management Support[b]	4,216	4,129	4,204	4,391	
6.7 Op. Systems Dev[c]	23,367	26,455	25,561	26,224	
Total Ob. Auth.[a]	**75,955**	**75,117**	**76,230**	**75,383**	
Title IV Adjustments				-367[g]	
Adjusted Total Ob. Auth.	**75,955**	**75,117**	**76,230**	**75,016**	
Additional Appropriations - Global War On Terror (GWOT)	see note[e]	2,857	see note[f]	see note[f]	
Other Defense Programs					
Defense Health Program	348	134	454	477	
Chemical Agents and Munitions Destruction	231	221	221	312	
Grand Total	**76,534**	**78,329**	**76,905**	**75,805**	

Source: Except as mentioned below, the budget request figures are based on Department of Defense Budget, Fiscal Year 2008 RDT&E Programs (R-1), February 2007. The FY2007 figure for Defense Health Program is based on P.L. 110-5 (H.J.Res. 20). Figures for Chemical Agents and Munitions Destruction Program are based on Department of Defense Budget, Fiscal Year 2008, Procurement Programs (P-1), February 2007. The budget request figure for the Additional Appropriations for Global War on Terror (GWOT) is based on President's Budget, Appendix, Additional 2007 and 2008 Proposals, February 2007. The House figures are based on H.Rept. 110-279 accompanying H.R. 3222, *Department of Defense Appropriations Bill, 2008*. The Senate figures are based on S.Rept. 110-155, accompanying H.R. 3222.

a. Total Obligational Authority for Account and Budget Activity may not agree due to rounding.
b. Includes funds for Developmental and Operational Test and Evaluation.

c. Includes funding for classified programs.
d. Does not include the FY2007 Supplemental, P.L. 110-28 (H.R. 2206, *U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007).* See **Table 3**, below.
e. DOD includes the RDT&E-related FY2007 GWOT funding provided in *Department of Defense Appropriations Act, 2007* (P.L. 109-289) in the FY2007 Title IV figure.
f. The House and Senate have chosen not to address the FY2008 GWOT request in its FY2008 defense appropriations bill (H.R. 3222). It will take up that request in a separate bill.
g. Section 8098 of the Senate Appropriations Committee's reported bill recommended a general reduction to various Titles based on revised economic assumptions. The reduction for Title IV RDT&E was $367 million, to be distributed proportionately across all program elements, projects, and activities.

Table 3. Department of Defense RDT&E, FY2007 Emergency Supplemental

($ in millions)

	FY2007 Supple-mental Request	FY2007 Supple-mental House	FY2007 Supple-mental Senate	FY2007 Supple-mental Enacted
Additional Appropriations — Global War On Terror (GWOT)				
By Account				
Army	$116	$61	$126	$100
Navy	460	296	308	299
Air Force	221	133	234	187
Defense Agencies	651	546	523	513
Dir. Test & Eval				
Total Ob. Auth.[a]	**1,448**	**1,035**	**1,190**	**1,098**
By Budget Activity				
6.1 Basic Research				
6.2 Applied Research				
6.3 Advanced Development	4	0	4	0
6.4 Advanced Component Development and Prototypes	73	9	42	17
6.5 Systems Dev. and Demo	86	93	98	107
6.6 Management Support[b]	16	0	10	2
6.7 Op. Systems Dev	1,269	934	1,037	973
Total Ob. Auth.[a]	**1,448**	**1,036**	**1,191**	**1,099**
Other Defense Programs				
Defense Health Program		500	72	332
Grand Total	**1,448**	**1,1536**	**1,263**	**1,431**

Source: Figures for the FY2007 Supplemental Request are based on the Office of the Secretary of Defense, Fiscal Year 2007 Emergency Supplemental Request, Exhibits for FY2007, pp. 13-14. House, Senate and Enacted figures are taken from H.Rept. 110-107. Making Emergency Supplemental Appropriations for the Fiscal Year Ending September 20, 2007, and Other Purpose. Conference Report, to accompany H.R. 1591. H.R. 1591 was vetoed by the President. The House failed to overturn the President's veto. Both houses then passed and the President signed H.R. 2206 (*U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (P.L. 110-28))*. There is, as yet, no report accompanying H.R. 2206. However, the figures approved for each account (i.e. the Services and Defense Agencies) in H.R. 2206 agree with those approved in H.R. 1591. The table assumes the breakdown of those accounts by budget activity reported in H.Rept. 110-107 are valid for H.R. 2206.

a. Account vs. Budget Activity Total Obligational Authority numbers may not agree due to rounding.
b. Includes funds for Developmental and Operational Test and Evaluation.

National Aeronautics and Space Administration (NASA)

NASA has requested $12.7 billion for R&D in FY2008. (For details, see **Table 4**.) This request is a 7.3% increase over FY2007, in a total NASA budget that would increase by 6.4%. The House provided $13.1 billion (H.R. 3093). The Senate committee recommended $12.9 billion (S.Rept. 110-124 accompanying S. 1745).

Budget priorities throughout NASA are being driven by the Vision for Space Exploration. Announced by President Bush in January 2004 and endorsed by Congress in the NASA Authorization Act of 2005 (P.L. 109-155), the Vision includes returning the space shuttle to flight status (which has been accomplished) then retiring it by 2010; completing the International Space Station, but discontinuing its use by the United States by 2017; returning humans to the moon by 2020; and then sending humans to Mars and "worlds beyond." The request for Constellation Systems, the program responsible for developing the Orion spacecraft and Ares I launch vehicle to return humans to the moon, is an increase of $518 million or 20.3% relative to FY2007. The request for the International Space Station is an increase of $466 million or 26.3%. Meanwhile, among programs not focused on space exploration, Science would increase by $145 million or 2.7%, and Aeronautics Research would decrease by $163 million or 22.7%.

The FY2008 request was released before final passage of the full-year continuing resolution that funded NASA for FY2007 (P.L. 110-5), and the continuing resolution made several major changes to the FY2007 request. As a result, some of the major shifts of funding in the FY2008 request, viewed relative to FY2007, reflect the continuing resolution's changes to the FY2007 baseline more than any change in NASA's own plans. Most notably, FY2007 funding for Constellation Systems is $682 million less than was requested, so that the FY2008 request for Constellation Systems (a 20.3% increase) is actually less than the FY2007 request was. NASA's top priority is maintaining the development schedule for Orion and Ares I, and an initial operating capability (i.e., a first crewed flight) is now planned in early 2015. Conversely, FY2007 funding for Aeronautics Research is $187 million more than was requested, so that the FY2008 request (a 22.7% decrease) is actually more than the FY2007 request was, and planned future funding for aeronautics has increased by about $50 million per year through FY2011. On the other hand, the continuing

resolution provided only $10 million more than requested for the International Space Station; the requested FY2008 increase for that program mostly reflects the previously planned construction schedule.

Further complicating comparisons between FY2008 and previous years is a change in how NASA accounts for overhead expenses. The new system, implemented in September 2006 and known as "full cost simplification," increases the stated cost of some programs and decreases the stated cost of others, without affecting actual program content. The increases and decreases exactly balance, so that NASA's total budget is unchanged, but for any particular program, amounts expressed in the new accounting system are not directly comparable with amounts expressed in the previous system.

The House provided the requested amount for Constellation Systems and the International Space Station and $146 million more than the request for Aeronautics. The Senate committee recommended $50 million more than the request for Constellation Systems and the requested amount for the International Space Station and Aeronautics.

Table 4. NASA R&D

($ in millions)

	FY2007 Op. Plan	FY2008 Request	FY2008 House	FY2008 Sen. Cmte.
Science	$5,371.4	$5,516.1	$5,696.1	$5,655.1
Astrophysics	*1,610.8*	*1,565.8*	*1630.8*	*1,564.9*
Earth Science	*1,409.0*	*1,497.3*	*1,572.3*	*1,635.3*
Heliophysics	*1,011.9*	*1,057.2*	*1,072.2*	*1,088.5*
Planetary Science	*1,339.6*	*1,395.8*	*1,420.8*	*1,366.3*
Exploration Systems	3,457.1	3,923.8	3,923.8	3,972.5
Constellation Systems	*2,550.5*	*3,068.0*	*3,068.0*	*3,117.6*
Advanced Capabilities	*906.7*	*855.8*	*855.8*	*854.9*
Aeronautics Research	716.7	554.0	700.0	554.0
Cross-Agency Support Programs	540.5	489.2	576.3	521.4
International Space Station	1,773.0	2,238.6	2,238.6	2,238.6
Subtotal R&D	**11,858.7**	**12,721.7**	**13,134.8**	**12,941.6**
Space Shuttle	3,977.4	4,007.5	3,987.5	4,007.8
Space and Flight Support	395.9	545.7	465.7	545.6
Inspector General	32.2	34.6	34.6	34.6
General Reduction	—	—	—	-70.0
Total NASA	**16,264.3**	**17,309.4**	**17,622.5**	**17,459.6**

Source: FY2007 amounts are from NASA briefing charts based on the March 2007 operating plan. FY2008 amounts are from the NASA budget justification [http://www.nasa.gov/about/budget/], H.R.

3093 as passed by the House, H.Rept. 110-240, S. 1745 as reported by the Senate Appropriations Committee, and S.Rept. 110-124. The italicized rows are shown in the categories NASA uses for FY2008, which are different from those it uses for FY2007. In those rows, some FY2007 amounts have been calculated by CRS to make them comparable with the FY2008 request; the FY2007 amounts for Earth Science and Heliophysics are estimates. The House amount for Education is included in Cross-Agency Support Programs for comparability with the other columns. All amounts reflect "full cost simplification."

The effect of the Vision on science funding is of particular congressional interest. For example, the House report said that the requested budget would "sacrifice future missions of discovery to pay for present efforts," while the Senate report expressed concern that NASA science "is being left behind rather than being nurtured and sustained." Support for Earth Science has been a particular concern in both Congress and the scientific community. Although the FY2008 request includes increased funding for Earth Science and projects further increases in FY2009 and FY2010 relative to previous plans, most of the increases would go to cover cost growth and schedule delays in existing missions. In Astrophysics, the FY2008 request defers the Space Interferometer mission (SIM) beyond FY2012. The House provided $180 million more than the request for Science, including $60 million for new Earth Science missions and $50 million for SIM. The Senate committee recommended $139 million more than the request for Science, with the bulk of the increase devoted to Earth Science. **(CRS Contact: Daniel Morgan.)**

National Institutes of Health (NIH)

The President has requested a budget of $28.558 billion at the program level for NIH for FY2008, 1.7% ($480 million) below the final level of $29.038 billion for FY2007. House and Senate actions on FY2008 appropriations bills have thus far produced recommendations for increases above the FY2007 level of 2.0% ($569 million) and 2.7% ($770 million), respectively, to program funding levels of $29.607 billion and $29.837 billion (see **Table 5**). The FY2007 level was derived from P.L. 110-5, the Revised Continuing Appropriations Resolution (CR), although actual FY2007 appropriations levels were not specified by the CR. The amounts became available as agencies reported their FY2007 operating plans, and the final amount for NIH was also affected by the FY2007 supplemental appropriations legislation. The FY2007 appropriation was $570 million (2.0%) more than the FY2006 program level of $28.468 billion.

The bulk of NIH's budget comes through the Labor-HHS-Education appropriations legislation. The House Appropriations Committee reported H.R. 3043 on July 13, 2007 (H.Rept. 110-231), and the House passed the bill, with three changes to NIH funding, on July 19. The Senate Appropriations Committee had reported its own Labor-HHS-Education bill on June 27, 2007 (S. 1710, S.Rept. 110-107). An additional small amount of funding for environmental work related to Superfund comes from the Interior, Environment, and Related Agencies appropriation (H.R. 2643 has passed the House and S. 1696 has been reported in the Senate). Those two sources constitute NIH's discretionary budget authority. In addition, NIH receives $150 million pre-appropriated in separate funding for diabetes research, and $8.2 million from a transfer within the Public Health Service (PHS).

For the past several years, about $100 million of the annual NIH appropriation has been transferred to the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria. The FY2008 budget request proposes to increase the amount to $300 million, representing the entire U.S. contribution to the Global Fund. The House and Senate Labor-HHS-Education bills agree with that approach.

FY2003 was the final year of the five-year effort to double the NIH budget from its FY1998 base of $13.7 billion to the FY2003 level of $27.1 billion. The annual increases for FY1999 through FY2003 were in the 14%-15% range each year. The research advocacy community had originally urged that the NIH budget grow by about 10% per year in the post-doubling years. For FY2004 and FY2005, however, Congress gave NIH increases of between 2% and 3%, levels which were below the biomedical inflation index for those two years. The advocates modified their recommendation to 6% for FY2006 and to 5% for FY2007, maintaining that such increases would be needed to keep up the momentum of scientific discovery made possible by the increased resources of the doubling years. Instead, the NIH appropriation for FY2006 declined 0.3%, marking the first decrease in the agency's budget since 1970. The FY2007 final level was a 2.0% increase over FY2006, compared to a projected biomedical inflation index of 3.7%. For FY2008, the advocacy community is urging a 6.7% increase in the appropriation as a step towards reversing the decline in NIH's purchasing power that has occurred since FY2003.

The agency's organization consists of the Office of the NIH Director and 27 institutes and centers. The Office of the Director (OD) sets overall policy for NIH and coordinates the programs and activities of all NIH components, particularly in areas of research that involve multiple institutes. The individual institutes and centers (ICs), each having a focus on particular diseases, areas of human health and development, or aspects of research support, plan and manage their own research programs in coordination with the Office of the Director. As shown in **Table 5**, Congress provides a separate appropriation to 24 of the 27 ICs, to OD, and to a buildings and facilities account. (The other three centers, not included in the table, are funded through the NIH Management Fund, financed by taps on other NIH appropriations.)

The FY2008 President's request was developed prior to congressional completion of the FY2007 appropriation. In the request, most of the institutes and centers are approximately level-funded from their FY2007 amounts, while several that were given increases by Congress in the FY2007 CR are dropped back to levels closer to their FY2006 funding. For example, the National Center for Research Resources (NCRR) was given $34 million extra in FY2007 for one-year Shared Instrumentation Grants; the FY2008 request decreases the NCRR budget by $21 million. The biggest institute, the National Cancer Institute, would be cut by over $15 million (0.3%). The second largest, the National Institute of Allergy and Infectious Diseases (NIAID), would be increased by $225 million (5.1%) over FY2007, but only $24 million of that amount is for NIAID programs. The other $201 million of the increase is for transfer to the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria, mentioned earlier.

The House and Senate Labor-HHS-Education appropriations bills, in contrast, would increase funding for most of the institutes and centers over their FY2007

levels by between 1.4% and 1.7% for the House and between 2.2% and 2.5% for the Senate committee. Somewhat larger increases would go to several ICs in both bills, including NCRR and NIAID.

The two biggest changes in the request are a 68% increase in the Buildings and Facilities account, and a 51% drop in funding for the Office of the Director. Many of the laboratories, animal facilities, and office buildings on the NIH campus are aging, and are in need of upgrading to stay compliant with health and safety guidelines and to provide the proper infrastructure for the Intramural Research program. The budget requests $136 million for Buildings and Facilities (B&F), an increase of $55 million. The House and Senate bills both include $121 million for B&F, an increase of $40 million (49%).

The other large change in the request, the $580 million drop in the OD account, is handled differently in the appropriations bills. It reflects a change in the way Congress funds the NIH Roadmap for Medical Research, which is a set of trans-NIH research activities designed to support high-risk/high-impact research in emerging areas of science or public health priorities. The initiatives are funded through a Common Fund that previously was supported partially in the OD appropriation and partially by contributions from each IC at a fixed percentage. The original FY2007 Roadmap total of $443 million required $332 million from the institutes and centers (a 1.2% tap on their budgets) and $111 million from the Director's Discretionary Fund. The final FY2007 CR, however, appropriated $483 million and placed the entire sum in OD, boosting that appropriation and allowing the ICs to use all of their funding for their own programs without the Roadmap tap for trans-NIH research. For FY2008, the request divides a planned total of $486 million for the Roadmap/Common Fund between the IC budgets ($364 million, a 1.3% tap) and OD ($122 million). The House and Senate bills support the Common Fund entirely in OD, with the House bill providing a 2.5% increase to $495 million, and the Senate committee recommending a 10% increase to $531 million.

Also in the OD account for the first time in FY2007 was $69 million for the National Children's Study. This long-term (25+ year) environmental health study was proposed for cancellation in the FY2007 request. The multi-agency study, mandated by the Children's Health Act of 2000 (P.L. 106-310), plans to examine the effects of environmental influences on the health and development of more than 100,000 children across the United States, following them from before birth until age 21. The overall projected cost for the whole study is about $2.7 billion. For FY2007, both appropriations committees directed NIH to continue with the study, and the CR provided the $69 million. The FY2008 request again contains no funding for the study, but both bills specify $110.9 million in OD for its continued support.

The NIH's two major concerns in the face of tight budgets are maintaining support of investigator-initiated research through research project grants (RPGs), and continuing to nourish the pipeline of new investigators. The FY2008 request concentrates resources on supporting research grants, planning to fund 10,188 competing RPGs, one of the highest numbers ever. However, the expected "success rate" of applications receiving funding would remain at about 20%, and scientists with non-competing (continuation) grants would not receive inflationary increases for their costs. Both committee reports indicate that their funding would support a

larger number of grants than the request and would fund some increases in the average costs of grants. Several efforts are focused on supporting new investigators, to encourage young scientists to undertake careers in research despite the discouraging financial climate, and to help them speed their transition from training to independent research. The request and the bills include increases for new types of awards such as the Pathway to Independence, the Directors' Bridge awards, and New Innovator awards in the Common Fund. The Director's Pioneer Awards to encourage high risk research are also supported, as are clinical research training and the new Clinical and Translational Science Awards. The biodefense research portfolio is slated to increase slightly by cycling one-time extramural construction costs into other research areas. The Senate bill includes legislative language on human embryonic stem cell research, expanding access to stem cell lines and tightening ethical guidelines for their use.

NIH and other Public Health Service agencies within HHS are subject to a budget "tap" called the PHS Program Evaluation Transfer (Section 241 of the PHS Act), which has the effect of redistributing appropriated funds among PHS agencies. The FY2008 bills keep the tap at 2.4%, the same as in FY2007. NIH, with the largest budget among the PHS agencies, becomes the largest "donor" of program evaluation funds, and is a relatively minor recipient.

At the end of the 109th Congress, the House and Senate agreed on the first NIH reauthorization statute enacted since 1993, the NIH Reform Act of 2006 (P.L. 109-482). The law made managerial and organizational changes in NIH, focusing on enhancing the authority and tools for the NIH Director to do strategic planning, especially to facilitate and fund cross-institute research initiatives. It required detailed tracking of the research portfolio and periodic review of NIH's organizational structure. The measure authorized, for the first time, overall funding levels for NIH, although not for the individual ICs, and established a "common fund" for trans-NIH research. For further information on NIH, see CRS Report RL33695, *The National Institutes of Health: Organization, Funding, and Congressional Issues,* by Pamela W. Smith. **(CRS Contact: Pamela Smith.)**

Table 5. National Institutes of Health

($ in millions)

Institutes and Centers (ICs)	FY2007 enacted[a]	FY2008 request	FY2008 House	FY2008 S.Comm.
Cancer (NCI)	$4,797.6	$4,782.1	$4,880.4	$4,910.2
Heart/Lung/Blood (NHLBI)	2,922.9	2,925.4	2,965.8	2,992.2
Dental/Craniofacial Research (NIDCR)	389.7	389.7	395.8	398.6
Diabetes/Digestive/Kidney (NIDDK)	1,705.9	1,708.0	1,731.9	1,747.8
Neurological Disorders/Stroke (NINDS)	1,535.5	1,537.0	1,569.1	1,573.3
Allergy/Infectious Diseases (NIAID)[bc]	4,367.7	4,592.5	4,631.8	4,668.5
General Medical Sciences (NIGMS)	1,935.8	1,941.5	1,966.0	1,978.6
Child Health/Human Development (NICHD)	1,254.7	1,264.9	1,273.9	1,282.2
Eye (NEI)	667.1	667.8	677.0	682.0
Environmental Health Sciences (NIEHS)	642.0	637.4	652.3	656.2
Aging (NIA)	1,047.3	1,047.1	1,062.8	1,073.0
Arthritis/Musculoskeletal/Skin (NIAMS)	508.2	508.1	516.0	519.8
Deafness/Communication Disorders (NIDCD)	393.7	393.7	400.3	402.7
Nursing Research (NINR)	137.4	137.8	139.5	140.5
Alcohol Abuse/Alcoholism (NIAAA)	436.3	436.5	442.9	445.7
Drug Abuse (NIDA)	1,000.6	1,000.4	1,015.6	1,022.6
Mental Health (NIMH)	1,404.5	1,405.4	1,425.5	1,436.0
Human Genome Research (NHGRI)	486.5	484.4	494.0	497.0
Biomedical Imaging/Bioengineering (NIBIB)	296.9	300.5	303.3	304.3
Research Resources (NCRR)	1,133.2	1,112.5	1,171.1	1,178.0
Complementary/Alternative Med (NCCAM)	121.6	121.7	123.4	124.2
Minority Health/Health Disparities (NCMHD)	199.4	194.5	202.7	203.9
Fogarty International Center (FIC)	66.4	66.6	67.6	68.0
Library of Medicine (NLM)	320.9	312.6	325.5	327.8
Office of Director (OD)[cd]	1,046.9	517.1	1,114.4	1,145.8
Common Fund (non-add)	*(483.0)*	*(121.5)*	*(495.2)*	*(531.3)*
Buildings & Facilities (B&F)	81.1	136.0	121.1	121.1
Subtotal, Labor/HHS Appropriation	**$28,899.9**	**$28,621.2**	**$29,669.7**	**$29,899.9**
Superfund (Interior approp to NIEHS)[e]	79.1	78.4	79.1	78.4
Total, NIH discretionary budget authority	**$28,979.0**	**$28,699.7**	**$29,748.8**	**$29,978.3**
Pre-appropriated Type 1 diabetes funds[f]	150.0	150.0	150.0	150.0
NLM program evaluation[g]	8.2	8.2	8.2	8.2
Total, NIH program level	**$29,137.2**	**$28,857.9**	**$29,907.0**	**$30,136.5**
Global Fund transfer (AIDS/TB/Malaria)[b]	-99.0	-300.0	-299.8	-300.0
Total, NIH program level after transfer	**$29,038.2**	**$28,557.9**	**$29,607.2**	**$29,836.5**

Sources: For Labor/HHS appropriation, table from House Appropriations Committee reflecting passage of H.R. 3043, and S.Rept. 110-107 on S. 1710. For Interior/Environment appropriation, H.Rept. 110-187 on H.R. 2643 and S.Rept. 110-91 on S. 1696. Totals may not add due to rounding.

a. FY2007 does not reflect comparative transfers to HHS ($0.542m) or among NIH ICs that are shown in the FY2008 budget justification. FY2007 reflects transfer of $99.0m from NIH to the Office of the Secretary, as mandated by the supplemental appropriations act, P.L. 110-28 (see note c).
b. NIAID totals include funds for transfer to the Global Fund to Fight HIV/AIDS, TB, and Malaria.
c. For FY2007, the war/emergency supplemental appropriations act (P.L. 110-28, May 25, 2007) transferred funding for Advanced Development of Medical Countermeasures to the Public Health and Social Services Emergency Fund ($49.5m each from NIAID and OD).
d. OD has Roadmap funds for distribution to ICs. In FY2007 and the FY2008 bills, all Roadmap/ Common Fund money is in OD; in the FY2008 request, IC budgets include funds that would be tapped for Roadmap contributions.
e. Separate account in the Interior/Environment/Related Agencies appropriation for NIEHS research activities related to Superfund.
f. Funds available to NIDDK for diabetes research under PHS Act § 330B (P.L. 106-554 and P.L. 107-360).
g. Additional funds from program evaluation set-aside (§ 241 of PHS Act).

National Science Foundation (NSF)

The FY2008 request for the National Science Foundation (NSF) is $6.429 billion, an 8.6% increase ($511.8 million) over the FY2007 estimate of $5.917 billion. (See **Table 6**). President Bush's ACI has proposed to double the NSF budget over the next 10 years. The FY2008 request will be another installment toward that doubling effort. The FY2008 request for NSF is designed to support several interdependent priority areas: discovery research for innovation, preparing the workforce of the 21st century, transformational facilities and infrastructure, international polar year leadership, and stewardship. These particular areas of investments, similar to the goals contained in the President's proposed ACI, are designed to promote research that will drive innovation and support the design and development of world-class facilities, instrumentation, and infrastructure at the frontiers of discovery. The priorities will support also a portfolio of programs directed at strengthening and expanding the participation of underrepresented groups and diverse institutions in the scientific and engineering enterprise.

The NSF asserts that international research partnerships are critical to the nation in maintaining a competitive edge, addressing global issues, and capitalizing on global economic opportunities. To address these particular needs, the Administration requested $45.0 million for the Office of International Science and Engineering. Also, in FY2008, NSF continues in its leadership role in planning U.S. participation in observance of the International Polar Year, which spans 2007 and 2008. The FY2008 request for addressing the challenges in polar research is $464.9 million. A major focus of planned polar research will be in climate change and environmental observations. Other proposed FY2008 highlights include funding for the National Nanotechnology Initiative ($389.9 million), investments in Climate Change Science Program ($208.3 million), continued support for homeland security ($375.4 million), and funding for Networking and Information Technology Research and Development ($993.7 million).

Included in the FY2008 request is $5.131 billion for Research and Related Activities (R&RA), a 7.6% increase ($363.0 million) above the FY2007 level of $4.768 billion. 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 FY2008 request provides increased funding for the physical sciences. Research is multidisciplinary and transformational in nature, and very often, discoveries in the physical sciences often lead to advances in other disciplines. R&RA includes Integrative Activities (IA) and is a source of funding for the acquisition and development of research instrumentation at U.S. colleges and universities. IA also funds Partnerships for Innovation, disaster research teams, and the Science and Technology Policy Institute. The FY2008 request transfers support for the Experimental Program to Stimulate Competitive Research (EPSCoR) from the Education and Human Resources Directorate (EHR) to IA. It was determined that placement in IA would allow the research focus and cross-directorate activities of EPSCoR to be more fully integrated in the agency and give it more leverage for improving and planning its research agendas. The FY2008 request provides $263 million for IA. Included in that amount is $107 million for EPSCoR. The EPSCoR request will support a portfolio of four investment strategies. Approximately 62.6% of the funding for EPSCoR will be for a combination of new and continuing awards.

The Office of Polar Programs (OPP) is funded in the R&RA. In FY2006, responsibility for funding the costs of icebreakers that support scientific research in polar regions was transferred from the U.S. Coast Guard to the NSF. While the NSF does not own the ships, it is responsible for the operation, maintenance, and staffing of the vessels. The OPP is funded at $464.9 million in the FY2008 request. Increases in OPP for FY2008 are directed at research programs for arctic and antarctic sciences — glacial and sea ice, terrestrial and marine ecosystems, the ocean, and the atmosphere, and biology of life in the cold and dark. The NSF also serves in a leadership capacity for several international research partnerships in polar regions.

The NSF supports a variety of individual centers and center programs. The FY2008 request provides $66.2 million for Science and Technology Centers, $59.2 million for Materials Research Science and Engineering Centers, $52.9 million for Engineering Research Centers, $42.4 million for Nanoscale Science and Engineering Centers, $27.0 million for Science of Learning Centers, and $11.5 million for Centers for Analysis and Synthesis.

Additional priority areas in the FY2008 request include those of strengthening core disciplinary research, and sustaining organizational excellence in NSF management practices. NSF maintains that researchers need not only access to cutting-edge tools to pursue the increasing complexity of research, but funding to develop and design the tools critical to 21st century research and education. An investment of $200.0 million in cyberinfrastructure will allow for funding of modeling, simulation, visualization, and data storage and other communications breakthroughs. NSF anticipates that this level of funding will make cyberinfrastructure more powerful, stable, and accessible to researchers and educators through widely shared research facilities. Increasing grant size and duration has been a long-term priority for NSF. The funding rate for research grant applications was 21% in FY2006 and 20% in FY2007. NSF plans to return to the 21% funding rate in FY2008. In addition, the average duration will lengthen and the average award size will increase.

The FY2008 request for the EHR Directorate is $750.6 million, $55.9 million (8%) below the FY2007 level. The EHR portfolio is focused on, among other things, increasing the technological literacy of all citizens, preparing the next generation of science, engineering, and mathematics professionals, and closing the achievement gap in all scientific fields. Support at the various educational levels in the FY2008 request is as follows: research on learning in formal and informal settings (includes precollege), $222.5 million; undergraduate, $210.2 million; and graduate, $169.5 million. Priorities at the precollege level include research and evaluation on education in science and engineering ($42.0 million), informal science education ($66.0 million), and Discovery Research K-12 ($107.0 million). Discovery Research is structured to combine the strengths of three existing programs and encourage innovative thinking in K-12 science, technology, engineering, and mathematics education.

Programs at the undergraduate level are designed to "create leverage for institutional change." Priorities at the undergraduate level include the Robert Noyce Scholarship Program ($10.0 million), Course, Curriculum and Laboratory Improvement ($37.5 million), STEM Talent Expansion Program ($29.7 million), Advanced Technological Education ($51.6 million), and Scholarship for Service ($12.1 million). The Math and Science Partnership Program (MSP), a crosscutting program, is proposed at $46 million in the FY2008 request. The MSP in NSF coordinates activities with the Department of Education and its state-funded MSP sites. The MSP in NSF has made approximately 80 awards, with an overall funding rate of about 9%. At the graduate level, priorities are those of Integrative Graduate Education and Research Traineeship ($25.0 million), Graduate Research Fellowships ($97.5 million), and the Graduate Teaching Fellows in K-12 Education ($47.0 million). Added support is given to several programs directed at increasing the number of underrepresented groups in science, mathematics, and engineering. Among these targeted programs in the FY2008 request are the Historically Black Colleges and Universities Undergraduate Program ($30.0 million), Tribal Colleges and Universities Program ($12.9 million), Louis Stokes Alliances for Minority Participation ($40.0 million), and Centers of Research Excellence in Science and Technology ($29.5 million).

The Major Research Equipment and Facilities Construction (MREFC) account is funded at $244.7 million in the FY2008 request, a 28.1% increase ($53.8 million) over the FY2007 estimate. The MREFC supports the acquisition and construction of major research facilities and equipment that extend the boundaries of science, engineering, and technology. Of all federal agencies, NSF is the primary supporter of "forefront instrumentation and facilities for the academic research and education communities." First priority for funding is directed to ongoing projects. Second priority is directed at projects that have been approved by the National Science Board for new starts. NSF requires that in order for a project to receive support, it must have "the potential to shift the paradigm in scientific understanding and/or infrastructure technology." NSF stated that the projects scheduled for support in the FY2008 request met that qualification. Six ongoing projects and one new start are proposed for funding in the FY2008 request: Atacama Large Millimeter Array Construction ($102.1 million), Ice Cube Neutrino Observatory ($22.4 million), National Ecological Observatory Network ($8.0 million), South Pole Station Modernization project ($6.6 million), Alaskan Region Research Vessel ($42.0 million), Ocean

Observatories Initiative ($31.0 million), and Advanced Laser Interferometer Gravitational Wave Observatory ($32.8 million).

On May 2, 2007, the House Committee on Science and Technology passed H.R. 1867 (H.Rept. 110-114), the National Science Foundation Authorization Act of 2007. The bill authorizes a total of $21.0 billion for the NSF for FY2008, FY2009, and FY2010, including $16.4 billion for R&RA, $2.8 billion for EHR, and $787.0 million for MREFC. Priorities to be addressed in the three-year authorization bill include those of supporting successful K-12 science, mathematics, and engineering education programs, promoting university-industry partnerships, balancing funding between interdisciplinary and disciplinary research, and improving funding rates for new investigators.

On June 29, 2007, the Senate reported S. 1745, Departments of Commerce and Justice, Science and Related Agencies Appropriations Bill, FY2008 (S.Rept. 110-124). The bill would provide a total of $6.553 billion for the NSF in FY2008, $124.4 million above the request and $636.2 million above the estimated FY2007 level. Included in the total is $5.156 billion for R&RA, $24.4 million above the FY2008 request and $490.1 million above FY2007. The Senate would fund the EHR at $850.6 million in FY2008, $100.0 million above the request and $53.9 million above the FY2007 level. The MREFC would receive $244.7 million in FY2008, level with the budget request and $53.9 million above FY2007. On July 12, the House reported its version of the appropriations bill, H.R. 3093 (H. Rept.110-240). The House would provide $6.509 billion for the NSF in FY2008, $80 million above the request, and $44 million below the Senate version. The House would fund the R&RA at approximately $5.140 billion, $8 million above the request and $16.1 million below the Senate bill. For the MREFC and the EHR, the House would provide $244.7 million and $822.6 million, respectively. **(CRS Contact: Christine Matthews.)**

Table 6. National Science Foundation

($ in millions)

	FY2006	FY2007 P.L. 110-5	FY2008 Req.	House FY2008	Senate FY2008
Research & Related Activities					
Biological Sciences	$580.9		$633.0		
Computer & Inform. Sci. & Eng.	496.4		574.0		
Engineering	585.5		683.3		
Geosciences	704.0		792.0		
Math and Physical Sciences	1,086.6		1,253.0		
Social, Behav., and Econ. Sciences	201.2		222.0		
Office of Cyberinfrastructure	127.1		200.0		
Office of International Sci. and Eng.	42.6		45.0		
U.S. Polar Programs	390.5		464.9		
Integrative Activities[a]	233.3		263.0		
U.S. Arctic Research Commission	1.2		1.5		

	FY2006	FY2007 P.L. 110-5	FY2008 Req.	House FY2008	Senate FY2008
Subtotal Res. & Rel. Act	**4,351.0**	**4,768.0[c]**	**5,131.7**	**5,139.7[c]**	**5,156.1[c]**
Ed. & Hum. Resr.	796.7	694.7	750.6	822.6	850.6
Major Res. Equip. & Facil. Constr.	233.8	190.9	244.7	244.7	244.7
Agency Operations and Award Management	247.1	248.3	285.6	285.6	285.6
National Science Board	3.9	4.0	4.0	4.0	4.0
Office of Inspector General	11.5	11.4	12.4	12.4	12.4
Total NSF[b]	**5,645.8**	**5,917.2**	**6,429.0**	**6,509.0**	**6,553.4**

a. Beginning in the FY2008 request, EPSCoR was transferred from the EHR Directorate to Integrative Activities.
b. The totals do not include carry overs or retirement accruals. Totals may not add due to rounding.
c. Specific funding allocations for each directorate or for individual programs and activities have not been determined.

Department of Agriculture (USDA)

The FY2008 request for research and education in the U.S. Department of Agriculture (USDA) is $2.301 billion, a 9% decrease ($226.9 million) from the FY2007 level. (The funding estimates presented for FY2007 are based on the estimated full year amounts available under the Continuing Appropriations Resolution, 2007, P.L.110-5, as amended.) (See **Table 7**.) The Agricultural Research Service (ARS) is USDA's in-house basic and applied research agency, and operates approximately 100 laboratories nationwide, including the world's largest multidisciplinary agricultural research center, located in Beltsville, Maryland. The ARS laboratories focus on efficient food and fiber production, 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. Included in the total support for USDA in FY2008 is $1.038 billion for ARS, an 8.1% decrease ($91.4 million) from FY2007. The Administration has proposed reductions of $141.0 million in funding add-ons designated by Congress for research at specific locations. These amounts are to be redirected to high-priority Administration initiatives that include livestock production, food safety, crop protection, and human nutrition. Included in the request for ARS is $16.0 million for buildings and facilities. The requested funding is for the planning and design of the Biocontainment Laboratory and Consolidated Poultry Research Facility in Athens, Georgia.

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, education, and outreach. Included in these partnerships is funding for research at 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 FY2008 request for CSREES is $993.6 million, a decrease of $128.1 million from the FY2007 estimate. Funding for formula distribution in FY2008 to the state Agricultural Experiment Stations is $273.2 million, $12.4 million below the FY2007 estimate. Support for the 1890 formula programs is $38.3 million, slightly below the FY2007 level of $40.7 million. The FY2008 request proposes, as in previous years, to modify the Hatch formula program. It would expand the multistate research programs from 25% to approximately 60% and distribute a portion of the funds through competitively awarded grants. In previous years, Congress did not accept the Administration's proposed changes to the Hatch formula.

The FY2008 request funds the National Research Initiative (NRI) Competitive Grants Program at $256.5 million, $66.3 million above the FY2007 level. The increase will support initiatives in agricultural genomics, emerging issues in food and agricultural security, the ecology and economics of biological invasions, plant biotechnology, and water security. In addition to supporting fundamental and applied science in agriculture, USDA maintains that the NRI makes a significant contribution to developing the next generation of agricultural scientists. The FY2008 request also includes funding for grants to educational institutions and community-based organizations to benefit socially disadvantaged farmers and ranchers. These grants are intended to encourage greater participation of black farmers, tribal groups, and Hispanic and other minority groups in the USDA portfolio of commodity, loan, education, and grant offerings. In addition, NRI funding will support projects directed at developing alternate methods of biological and chemical conversion of biomass, and research determining the impact of a renewable fuels industry on the economic and social dynamics of rural communities.

The FY2008 request for USDA provides $82.5 million for the Economic Research Service (ERS), $7.3 million above the FY2007 estimate; and $167.7 million for the National Agricultural Statistics Service (NASS), approximately $20.4 million above the FY2007 estimate. The proposed increase for ERS will expand the market analysis and outlook program and strengthen the coverage of increasingly complex global markets for various agricultural products. The increase for NASS will be in support of the 2007 Census of Agriculture. Funding will be available also to obtain contract services for extensive data collection and processing activities scheduled to occur in 2008.

On July 24, 2007, the House Committee on Appropriations reported H.R. 3161, Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Bill, FY2008 (H.Rept. 110-258). H.R. 3161 would provide $2.578 billion for research and education in USDA, $276.8 million above the Administration's request. The bill would fund CSREES at $1.135 billion, approximately $141.7 million above the request. Other funding levels for programs in the bill are $79.3 million for ERS, and $166.1 million for NASS, both below the Administration's request. Also, on July 24, the Senate reported its version of the bill (S. 1859, S.Rept. 110-134). The Senate version of the bill would provide $2.611 billion for research and education activities. Included in that amount is $1.194 billion for ARS, $156.8 million above the request, and $1.159 billion for CSREES, $165.5 million above the request. S. 1859 would provide $76.5 million for ERS and $167.7 million for NASS. **(CRS Contact: Christine Matthews.)**

Table 7. U.S. Department of Agriculture R&D

($ in millions)

	FY2006	FY2007 P.L. 110-5[a]	FY2008 Request[b]	House FY2008	Senate FY2008
Agric. Research Service (ARS)					
Product Quality/Value Added	$105.3		$104.6		
Livestock Production	85.0		70.7		
Crop Production	201.1		168.9		
Food Safety	104.4		103.2		
Livestock Protection	82.5		108.3		
Crop Protection	196.8		173.7		
Human Nutrition	84.6		84.1		
Environmental Stewardship	222.9		171.0		
National Agricultural Library	23.8		20.4		
Repair and Maintenance	17.6		16.6		
Subtotal	**1,150.0[c]**	**1,128.9**	**1,021.5**	**1,076.3**	**1,154.2**
Buildings and Facilities	159.1	0.0	16.0	64.0	40.1
Total, ARS	**1,309.1**	**1,128.9**	**1,037.5**	**1,140.3**	**1,194.3**
Coop. St. Res. Ed. & Ext. (CSREES) Research and Education					
Hatch Act Formula	177.0	322.6	164.4	195.8	214.9
Cooperative Forestry Research	22.0	30.0	20.5	23.3	30.0
Evans-Allen Formula (Payments to 1890 Institutions)	37.2	40.7	38.3	42.0	40.7
Special Research Grants	126.9	14.7	18.1	110.2	67.7
NRI Competitive Grants	181.2	190.2	256.5	190.2	244.0
Animal Health and Disease Res.	5.0	5.0	0.0	5.0	5.0
Federal Administration	50.0	10.3	10.0	44.4	20.8
Higher Education[d]	55.0	37.6	40.5	36.5	38.4
Other Programs	31.9	50.7	44.3	24.0	39.3
Total, Coop. Res. & Educ.[e]	**670.7**	**671.4**	**562.5**	**671.4**	**700.8**
Extension Activities					
Smith-Lever Sections 3b&c	273.0	285.6	273.2	281.4	285.8
Smith-Lever Sections 3d	62.0	94.5	91.5	100.9	95.5
Renewable Resources Extension	4.0	4.1	4.1	4.1	4.0
1890 Colleges, Tuskegee, & West Virginia State University Colleges	32.9	35.2	34.1	37.0	35.2
Other Extension Prog. & Admin.	99.1	30.9	28.3	40.5	37.8
Total, Extension Activities[e]	**527.4**	**450.3**	**431.1**	**463.9**	**458.3**
Total, CSREES[e]	**1,198.1**	**1,121.7**	**993.6**	**1,135.3**	**1,159.1**
Economic Research Service	75.9	75.2	82.5	79.3	76.5
National Agricultural Statistics Service	140.7	147.3	167.7	166.1	167.7
Integrated Activities	55.8	55.2	20.1	57.2	12.9

	FY2006	FY2007 P.L. 110-5[a]	FY2008 Request[b]	House FY2008	Senate FY2008
Total, Research, Education, and Economics	**2,740.8**	**2,528.3**	**2,301.4**	**2,578.2**	**2,610.5**

a. Funding levels for specific programs are not yet available.
b. Funding levels are contained in U.S. Department of Agriculture FY2008 Budget Summary and other documents internal to the agency.
d. Includes Hurricane Katrina Emergency Appropriations of $29.2 million.
d. Higher education includes payments to 1994 institutions and 1890 Capacity Building Grants program, the Native American Institutions Endowment Fund, the Alaska Native and Native Hawaiian-Serving Institutions Education Grants, and others.
e. Program totals may or may not include set-asides (non-add) or contingencies. The CSREES total includes support for Integrated Activities, Community Food Projects, and the Organic Agriculture Research and Education Initiative.

Department of Homeland Security (DHS) R&D

The Department of Homeland Security (DHS) has requested $1.379 billion for R&D in FY2008, a decrease of 6.3% from FY2007.[5] This total includes $799 million for the Directorate of Science and Technology (S&T), $562 million for the Domestic Nuclear Detection Office (DNDO), and $18 million for Research, Development, Test, and Evaluation (RDT&E) in the U.S. Coast Guard. (For details, see **Table 8**.) The request for DNDO is a 17% increase. The request for the S&T Directorate is an 18% decrease, about half of which results from the transfer of some operational programs out of S&T into other DHS organizations.[6] The House provided a total of $1.351 billion: $777 million for S&T, $556 million for DNDO, and $18 million for Coast Guard RDT&E (H.R. 2638, H.Rept. 110-181). The Senate provided a total of $1.414 billion: $838 million for S&T, $550 million for DNDO, and $26 million for Coast Guard RDT&E (S. 1644, S.Rept. 110-84).

Starting in late 2006, the S&T Directorate realigned its programs and reorganized its management structure. The directorate's program structure is now as shown in **Table 8**. The directorate's university centers of excellence are expected to be aligned to match the new organization, with new centers being established for some topics. The requested reduction of $41 million in the Explosives program is due to the completion of efforts (known as Counter-MANPADS) to develop a prototype system for protecting commercial aircraft against ground-to-air missiles. The requested $51 million reduction in the Infrastructure and Geophysical program largely reflects the elimination of funding for community and regional initiatives previously established or funded at congressional direction. The operational programs being transferred out of S&T are the BioWatch monitoring system, the Biological

[5] The FY2007 appropriations bill rescinded $125 million in prior-year funds from the S&T Directorate. If the FY2007 enacted total for DHS R&D is reduced by the amount of this prior-year rescission, the FY2008 request is a 2.4% increase.

[6] If the FY2007 enacted funding for S&T is reduced by the amount of the prior-year rescission, the FY2008 request for S&T is only a 5.8% decrease. See previous footnote. If the FY2007 enacted amount is adjusted for both the rescission and the transfer of programs out of the S&T Directorate, the FY2008 request for S&T is a 5.4% increase.

Warning and Incident Characterization (BWIC) system, and the Rapidly Deployable Chemical Detection System (RDCDS) from the Chemical and Biological program and SAFECOM from the Command, Control, and Interoperability program.

The House, citing unfilled staff positions in the S&T Directorate, provided $12 million less than the request for Management and Administration. It rejected the $14 million request for procurement of third-generation BioWatch units in the Biological and Chemical program. It provided $10 million more than the request for University Programs and instructed the S&T Directorate to report by February 1, 2008, on how it selects university centers of excellence, determines the research topics for centers, and evaluates the quality of their work. Several other smaller changes added up to a net decrease of $10 million in Research, Development, Acquisition, and Operations.

The Senate provided an increase of $41 million in Research, Development, Acquisition, and Operations. Within this total, reductions relative to the request included $13 million from the Biological and Chemical program and $14 million from Innovation. Increases included $18 million for Explosives to counter car bombs and other improvised explosive devices, $40 million for Infrastructure and Geophysical earmarked for the Southeast Region Research Initiative and the Regional Technology Integration initiative, and $15 million for Laboratory Facilities earmarked for Pacific Northwest National Laboratory. The Senate provided a reduction of $2 million in Management and Administration.

In DNDO, the proposed $47 million increase in Research, Development, and Operations would focus primarily on the Transformational R&D program, whose goal is to identify, develop, and demonstrate technologies that fill major gaps in the nuclear detection architecture. The proposed $30 million increase in Systems Acquisition would be used to begin implementation of the Securing the Cities initiative in the New York City area. Congressional attention has focused recently on criticism of a cost-benefit analysis that DNDO conducted to support its assessment of next-generation Advanced Spectroscopic Portal technology for radiation portal monitors.[7]

The House provided the requested amount for Systems Acquisition. The House committee recommended a $40 million reduction, including a $20 million reduction in the Securing the Cities initiative, but this was reversed by a floor amendment. The House reduced Management and Administration and Research, Development, and Operations by $3 million each. The House report directed DNDO not to procure Advanced Spectroscopic Portal (ASP) systems until it certifies that they are more effective than traditional radiation portal monitors.

The Senate provided a reduction of $2 million in Management and Administration for DNDO, an increase of $16 million in Research, Development, and Operations, and a reduction of $26 million in Systems Acquisition. The largest

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[7] See, for example, Government Accountability Office, *Combating Nuclear Smuggling: DHS's Decision to Procure and Deploy the Next Generation of Radiation Detection Equipment Is Not Supported by Its Cost-Benefit Analysis*, GAO-07-581T, testimony before the House Committee on Homeland Security, March 14, 2007.

change relative to the request was a shift of $29 million from Systems Acquisition to Research, Development, and Operations. Of this amount, $20 million would be spent on screening general aviation aircraft for illicit nuclear materials. The Senate committee recommended a $10 million reduction in the Securing the Cities initiative, half from Systems Acquisition and half from Research, Development, and Operations, but a floor amendment reserved the requested amount for this initiative without increasing either account. The Senate provided no funding for full-scale procurement of ASP monitors until DHS provides the report and certification called for by the FY2007 conference report (H.Rept. 109-699).

The FY2007 budget request marked the end of a period of consolidation for DHS R&D programs and the beginning of its reversal; the FY2008 request would further reverse the consolidation trend. In the FY2004 appropriations conference report (H.Rept. 108-280), Congress directed the department to consolidate its R&D activities into the S&T Directorate. This process began with several small programs in FY2005, but a proposed move of the Coast Guard RDT&E program was rejected by the Senate. In FY2006, the much larger R&D program of the Transportation Security Administration was moved into S&T, but again the Senate rejected moving the Coast Guard program. In FY2007 no further consolidations were proposed. Conversely, R&D on radiological and nuclear countermeasures, previously funded by S&T, was expanded and transferred to the newly created DNDO, an independent organization with its own appropriations accounts. With DNDO funding increasing and S&T funding decreasing in the FY2008 request, the relative roles of the two organizations remain an issue of congressional interest. The S&T Directorate's requested share of DHS R&D funding would drop to 58%, which may raise questions about the S&T Under Secretary's statutory responsibility for "establishing and administering the primary research and development activities of the Department" and "coordinating and integrating all research, development, demonstration, testing, and evaluation activities of the Department."[8] **(CRS Contact: Daniel Morgan.)**

Table 8. Department of Homeland Security R&D

($ in millions)

	FY2007 Enacted	FY2008 Request	FY2008 House	FY2008 Senate
Science and Technology Directorate	**$848.1**	**$799.1**	**$777.1**	**$838.0**
Management and Administration[a]	135.0	142.6	130.8	140.6
R&D, Acquisition, and Operations	713.1	656.5	646.3	697.4
Borders and Maritime Security	33.4	25.9	25.9	25.5
Chemical and Biological[a]	313.6	228.9	215.1	216.0
Command, Control, and Interoperability[b]	62.6	63.6	61.1	61.8
Explosives	105.2	63.7	63.7	81.7
Human Factors	6.8	12.6	12.6	6.7
Infrastructure and Geophysical	74.8	24.0	24.0	64.0
Innovation	38.0	59.9	51.9	46.0

[8] Homeland Security Act of 2002 (P.L. 107-296), Sec. 302, items 10 and 11.

	FY2007 Enacted	FY2008 Request	FY2008 House	FY2008 Senate
Laboratory Facilities	105.6	88.8	88.8	103.8
Test and Evaluation, Standards	25.4	25.5	28.5	24.2
Transition	24.0	24.7	26.0	23.9
University Programs	48.6	38.7	48.6	38.7
Homeland Security Institute[c]	—	—	—	5.0
Rescission of Unobligated Prior-Year Funds	-125.0	—	—	—
Domestic Nuclear Detection Office	**481.0**	**561.9**	**556.1**	**550.0**
Management and Administration	30.5	34.0	31.2	32.0
Research, Development, and Operations	272.5	319.9	316.9	336.0
Systems Acquisition	178.0	208.0	208.0	182.0
U.S. Coast Guard RDT&E	**17.0**	**17.6**	**17.6**	**25.6**
Total DHS R&D	**1,346.1**	**1,378.6**	**1,350.8**	**1,413.6**
Total (Excluding Prior-Year Rescission)	**1,471.1**	**1,378.6**	**1,350.8**	**1,413.6**

Notes: Programs in the S&T Directorate have been realigned since the enactment of the FY2007 appropriation. For comparability, the FY2007 column is shown here in the new structure. (Enacted amounts for FY2007 are presented both ways, with a crosswalk between the two, in the FY2008 congressional budget justification.)

a. BioWatch and related programs will be transferred from the S&T Directorate to the Office of Health Affairs in FY2008. The enacted FY2007 funding for these programs in S&T consisted of $1.0 million in the Management and Administration account plus $84.1 million in the Chemical and Biological program of the R&D, Acquisition, and Operations account.
b. SAFECOM will be transferred from the S&T Directorate to the National Protection and Programs Directorate in FY2008. Its enacted FY2007 funding in S&T was $5.0 million in the Command, Control, and Interoperability program of the R&D, Acquisition, and Operations account.
c. The Homeland Security Institute (HSI) currently receives funding from each of the S&T Directorate divisions. The Senate committee report recommended breaking out this funding as a separate item and stated that HSI's total funding was $10 million in FY2007 and is the same in the FY2008 request.

Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

The following information is taken from the Department of Commerce, *NOAA FY2008 Budget Summary*, released February 8, 2007. NOAA R&D funding is 16% of NOAA's total budget request of $3.82 billion. The R&D budget is comprised of 86% research and 14% development funding. Seventy percent of R&D is intramural, while 30% is extramural. NOAA Research "OAR" manages 60% of all R&D conducted at NOAA.

The Administration has requested flat funding for NOAA's R&D programs in FY2008. However the Administration proposes to increase Oceanic and Atmospheric Research by $19 million in FY2008, a 6.7% increase over FY2007 estimated funding level. Nevertheless the Administration proposes to cut a number of other NOAA

programs, including a 46% reduction in the agencies' National Ocean Service Program.

The FY2008 appropriations bill reported from the Senate Committee on Appropriations, S. 1745 (S.Rept. 110-124), would provide $628 million for NOAA R&D, an 18% increase over FY2007 estimated funding level. The senate bill criticizes NOAA for requesting steep cuts in key ocean programs in the past, and in FY2008 for requesting modest increases in ocean programs only at the expense of steep cuts in other areas. The Senate report points to the Joint Ocean Commissions' January 2007 findings about poor progress toward a U.S. ocean policy as a driving force behind its increase for ocean research and related NOAA R&D programs. The Senate committee calls attention to nearly $32 million in new funding for competitively awarded research grants programs in NOAA's Office of Oceanic and Atmospheric Research (OAR). The Senate committee's recommendations for OAR R&D would increase almost 32% percent above FY2007 levels to $371 million. For climate change research under OAR, the recommendation is $217 million, $24 million more than the request. Competitive research grants for climate change research would total $140 million, up from FY 2007 levels of $126 million.

For FY2008, the House Appropriations Committee recommended $585 million for NOAA R&D, which is $43 million, or 7.4%, less than the Senate recommendation, $57 million, or 10.8% more than the request and $5 million, or 9.9% more than the FY2007 level. OAR funding for climate change would increase by $44 million more than the request to $236 million. Competitive research grants for climate change total $172 million, $126 million more than the FY2007 level. Total NOAA R&D would increase by 23% to $346 million. In addition $6 million is set aside for the National Academy of Sciences to establish a Climate Change Study Committee to make recommendations for policy responses to climate change. No specific references to a funding initiative to implement U.S. ocean policy/research recommendations is mentioned. **(CRS Contact: Wayne Morrissey.)**

Table 9. NOAA R&D

($ in millions)

Type of R&D	FY2007[a] (Est.)	FY2008 Request	S. 1745	H.R. 3093
National Ocean Service	65	36	51	37
National Marine Fisheries	42	42	45	41
Oceanic and Atmospheric Research	281	300	371	346
National Weather Service	24	23	**23**	**23**
National Env. Satellite and Data Information	24	27	27	27
All other NOAA R&D[b]	95	100	111	110
Total Conduct of R&D[c]	**532**	**528**	**628**	**585**

Source: Office of Management and Budget, R&D Bureau Report, February 1, 2007.

a. P.L. 110-5 (Reported as H.J.Res. 20)

b. Includes marine research data acquisition services.
c. Data from the American Association for the Advancement of Science

National Institute of Standards and Technology (NIST)

The National Institute of Standards and Technology (NIST) is a laboratory of the Department of Commerce. It is mandated to increase the competitiveness of U.S. companies through appropriate support for industrial development of precompetitive generic technologies and the diffusion of government-developed technological advances to users in all segments of the American economy. NIST research also provides the measurement, calibration, and quality assurance techniques that underpin U.S. commerce, technological progress, improved product reliability, manufacturing processes, and public safety.

The President's FY2008 budget requests $640.7 million for NIST, 5.3% below the current fiscal year. Internal research and development under the Scientific and Technology Research and Services (STRS) account would increase 15.2% to $500.5 million (including funding for the Baldrige National Quality Program). There would be no funding for the Advanced Technology Program (ATP) and support for the Manufacturing Extension Partnership would be reduced 55.8% to $46.3 million. Construction expenses increase 60% to $93.9 million. (See **Table 10**.)

The FY2008 appropriations bill reported from the Senate Committee on Appropriations, S. 1745, would provide $863 million for NIST, an increase of 27.5% over FY2007. Funding for the STRS account would total $502.1 million, 15.6% above the current fiscal year. The Advanced Technology Program would be financed at $100 million, an increase of 26.4%, recognizing that there is a possible revision of the program in discussion at the conference over the competitiveness legislation. Support for the Manufacturing Extension Program would increase 5.1% to $110 million. There is also a $10 million rescission to the Industrial Technology Development account which is comprised of the ATP and MEP activities. The committee report to accompany the appropriations bill recommends a new pilot program for manufacturing technology development under MEP. The construction budget would total $150.9 million, over two and one half times more than FY2007 funding.

H.R. 3093, as passed by the House from the House, provides $831.2 million for NIST, 22.8% above the current fiscal year. Included in this total is $500.5 million for the STRS account (with the Baldrige National Quality Program), an increase of 15.2% over FY2007. Support for ATP would increase 17.7% to $93.1 million, while funding for MEP would increase 3.9% to $108.8 million. The Committee Report to accompany the bill notes support for legislation (P.L. 110-69) that reestablishes ATP as the Technology Innovation Program while making some changes to the activity. The construction budget would more than double from the current fiscal year to $128.9 million.[9]

[9] The sum of these figures may not total $831.2 million because of rounding.

The Administration's FY2007 budget included $581.3 million for NIST, almost 22.7% below the previous fiscal year. Support for the STRS account would have increased 18.3% to $467 million. There was no funding for the Advanced Technology Program (ATP), and support for the Manufacturing Extension Partnership (MEP) would have declined 55.7% to $46.3 million. Construction funding would have totaled $68 million, a 60.8% decrease from FY2006.

No final FY2007 appropriations legislation for NIST was enacted during the 109th Congress. A series of continuing resolutions funded the program at FY2006 levels through February 15, 2007. However, P.L. 110-5, passed in the 110th Congress, provides $676.9 million in FY2007 support for NIST. Funding for the STRS account increased 10% to $434.4 million while the construction budget decreased 66% to $58.7 million. Financing for ATP at $79.1 million and support for MEP at $104.7 million reflect similar funding in FY2006.

As part of the American Competitiveness Initiative, the Administration stated its intention to double over 10 years funding for "innovation-enabling research" done at NIST through its "core" programs (defined as internal research in the STRS account and the construction budget). To this end, the President's FY2007 budget requested an increase of 18.3% for intramural R&D at NIST; FY2007 appropriations for these programs increased 9.6%. For FY2008, the Administration has again recommended an increase in support for the STRS account, up 15.1% from the current fiscal year, as does H.R. 3093, while S. 1745 includes a 15.6% increase. It remains to be seen how support for this effort will evolve and how this might affect financing of extramural efforts such as ATP and MEP.

Continued support for the Advanced Technology Program has been a major funding issue. ATP provides "seed financing," matched by private sector investment, to businesses or consortia (including universities and government laboratories) for development of generic technologies that have broad applications across industries. Opponents of the program cite it as a prime example of "corporate welfare," whereby the federal government invests in applied research activities that, they argue, should be conducted by the private sector. Others defend ATP, arguing that it helps businesses (and small manufacturers) develop technologies that, while crucial to industrial competitiveness, would not or could not be developed by the private sector alone. While Congress has maintained support for the Advanced Technology Program, the initial appropriation bills passed by the House since FY2002 provided no funding for ATP. Although support was provided again in the FY2006 appropriations legislation, it was 41% below the earlier fiscal year. In the 109th Congress, both the House-passed FY2007 appropriations bill and the version reported from the Senate Committee on Appropriations contained no funding for the program. It remains to be seen how the 110th Congress will address this issue since P.L. 110-69 reestablishes ATP as the Technology Innovation Program and creates several additional manufacturing initiatives under MEP.

For additional information, see CRS Report 95-30, *The National Institute of Standards and Technology: An Appropriations Overview*; CRS Report 95-36, *The Advanced Technology Program*; and CRS Report 97-104, *The Manufacturing Extension Partnership Program: An Overview*, all by Wendy H. Schacht. **(CRS Contact: Wendy H. Schacht.)**

Table 10. NIST
($ in millions)

NIST Program	FY2006[a]	FY2007	FY2008 Request	S. 1745 (reported)	H.R. 3093 (passed)
STRS[b]	$394.8	$434.4	$500.5	$502.1	500.5
ATP	79	79.1	0	100	93.1
MEP	104.6	104.7	46.3	110	108.8
Construction	173.6	58.7	93.9	150.9	128.9
NIST Total	$752	676.9	640.7	863	831.2

Note: Figures may not add up because of rounding.
a. Includes mandated rescissions.
b. Includes funding for the Baldrige National Quality Program.

Department of Transportation (DOT)

The Bush Administration has requested $812 million for the Department of Transportation's (DOT's) research and development budget in FY2008. (See **Table 11**.)

Funding for Federal Highway Administration (FHWA) R&D is requested at $430 million in FY2008. Highway research includes the Federal Highway Administration's transportation research and technology contract programs. These research programs include the investigation of ways to improve safety, reduce congestion, improve mobility, reduce lifecycle construction and maintenance costs, improve the durability and longevity of highway pavements and structures, enhance the cost-effectiveness of highway infrastructure investments and minimize negative impacts on the natural and human environment.

The funding request for the Federal Aviation Administration (FAA) is $140 million, including $63 million focused on the advancement of the Next Generation Air Transportation System led by the Joint Planning Development Office. Funding for the FAA is proposed to decline from $310 million in FY2006 to $140 million in FY2008.

Finally, the Administration is proposing $12 million for the Research and Innovation Technology Administration to coordinate and advance the pursuit of transportation research that cuts across all modes of transportation, such as hydrogen fuels, global positioning, and remote sensing. DOT also supports nanotechnology research, the U. S. Climate Change Technology Program, and the President's Hydrogen Fuel Initiative.

The House bill (H.R. 3074) would provide a total of $835 million for the Department of Transportation, while the Senate bill (S. 1789) would provide $847 million, $12 million above the House bill. Both the House and Senate bills would fund the Federal Highway Administration at $410 million in FY2008, a $49 million increase over the FY2007 estimated funding level. The House bill would fund the

FAA $265 million, $38 million below the FY2007 estimated level. The Senate approved $272 million for the FAA, $31 million below the FY2007 estimated funding level.

The Intelligent Transportation Systems (ITS) portfolio of innovative technologies to improve traffic flow would also increase to $84 million in FY2008, an estimated 31% increase over FY2007. The FHWA budget also includes state highway R&D distributed to states and local governments to support their local R&D efforts. Both the House and Senate have approved $172 million for this activity. On July 24, 2008, the House passed H.R. 3074. On September 12, 2007, the Senate approved its version of H. R 3074. **(CRS Contact: Mike Davey.)**

Table 11. Department of Transportation R&D

($ in millions)

Department of Transportation	FY2007 Estimate	FY2008	H.R. 3074	H.R. 3074 Senate
Federal Highway Administration	$361	$430	$410	$410
Federal Aviation Administration	303	140	265	272
Others[a]	130	242	160	165
Total	794	812	835	847

Note: "Others" includes Office of the Secretary, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Pipeline and Hazardous Materials Safety Administration, and the Research and Innovative Technology Administration.

Department of the Interior (DOI)

The Administration has requested $621 million for R&D in the Department of the Interior (DOI), an estimated decline of 3% in FY2008. (See **Table 12**.)

The U.S. Geological Survey (USGS) is the primary supporter of R&D (almost 90 % of the total) within DOI. The three major USGS areas of research include Geological Resources, Water Resources and Quality, and Biological Resources. Funding for the USGS is proposed to decline 4% in FY2008.

Funding for the Geological Resources is proposed to decline 7.3%, to an estimated $198 million for FY2008. The Geological Resources Program assesses the availability and quality of the nation's energy and mineral resources. The Geological Resources Program researches, monitors, and assesses the landscape to understand geological processes to help distinguish natural change from those resulting from human activity. Within the earth sciences, the USGS plays a major role in important geological hazards research, including research on earthquakes and volcanoes. Enterprise Information conducts information science research to enhance the National Map and National Spatial Data infrastructure.

Funding for Water Resources Research focuses on activities aimed at improving the quality of U.S. groundwater. Water Resources Investigations R&D is proposed to decline 6.2%, but as in the past, Congress may reject these cuts. This program supports the collection of basic hydrologic data, studies of specific water-resources problems, and hydrologic research through USGS partnerships with state governments and other entities.

Funding for USGS Biological Research is basically unchanged at $181million in FY2008. This research program develops and distributes information needed in the conservation and management of the nation's biological resources. The program serves as DOI's research arm, utilizing the capabilities of 17 research centers and 40 Cooperative Research Units that support research on fish, wildlife, and natural habitats. Major research initiatives are carried out by USGS scientists who collect scientific information through research, inventory, and monitoring investigations. These activities develop new methods and techniques to identify, observe, and manage fish and wildlife, including invasive species and their habitats. Nearly 90% of USGS research is performed within Interior labs to address the science needs of DOI and other agencies, such as the Fish and Wildlife Service and the Bureau of Land Management.

On June 7, 2007, the House Appropriations Committee approved funding for its version of the Interior-Environmental appropriations bill (H.R. 2643) which provides $602 million for R&D, a 6.6% increase over the FY2007 estimated funding level. (See **Table 12.**) The Geologic Hazards Resource and Processes Division would see its R&D funding increase 5%, rather than a decrease of 7% as requested in the President's budget. Funding for the Water Resources Division is proposed to increase $2 million, to $128 million. The House Appropriations Committee would also increase funding for Biological Research by an additional $6 million. The House bill also includes $10 million for the USGS, specifically for research efforts related to various aspects of global climate change. It is anticipated that $10 million will be distributed evenly among USGS's four research divisions. On June 27, 2007, the House of Representatives passed H.R. 2643.

On June 21, 2007, the Senate Interior-Environment Appropriations Subcommittee approved S. 1696, that includes a 3% increase for the USGS (S.Rept. 110-91) to $581 million for FY2008. The Senate bill contains smaller increases for Geological Resources and Biological Research, and does not include funding for the House initiative related to the various aspects of global climate change. **(CRS Contact: Mike Davey.)**

Table 12. Department of the Interior R&D
($ in millions)

DOI	FY2007 Estimate	FY2008	H.R. 2643	S. 1696
National Mapping	$44	$42	$47	$46
Geological Resources	214	198	225	219
Water Resources	126	119	128	128
Biological Research	180	181	187	182
Climate Change Research	0	0	10	0
Enterprise Information	5	7	6	6
USGS total[a]	**570**	**547**	**602**	**581**
Other agencies[b]	70	74	76	76
Total	**639**	**621**	**678**	**657**

a. USGS R&D estimates are from the American Association for the Advancement of Science, USGS budget office, and USGS FY2008 Budget Justification documents. Total may not add due to rounding.

b. "Other agencies" includes the Bureau of Reclamation, the Bureau of Land Management, the Minerals Management Service, and the National Park Service.

Environmental Protection Agency (EPA)

H.R. 2643 (H.Rept. 110-187) as passed in the House June 27, 2007, included $809.4 million, and S. 1696 (S.Rept. 110-91) as reported by the Senate Appropriations Committee on June 26, 2007, included $798.6 million for FY2008 for the Environmental Protection Agency's (EPA) Science and Technology account, which reflects most of the Agency's R&D funding. Both amounts are an increase above the President's FY2008 request, and the FY2007 level. (See **Table 13**). The House also approved $50.0 million within a new EPA appropriations account primarily to be distributed across multiple federal agencies for federal climate change adaptation and mitigation research. The Senate committee did not include this provision.

EPA, the regulatory agency responsible for carrying out a number of environmental laws, funds a broad portfolio of R&D activities to provide the necessary scientific tools and knowledge to support decisions relating to preventing, regulating, and abating environmental pollution. As is the case for several federal agencies, funding for EPA's individual R&D activities generally is not identified separately from applied science and technology line items in the agency's budget request or appropriations, but rather are typically included within general program funds. Although the Office of Management and Budget (OMB) reports[10] historical

[10] The Office of Management and Budget (OMB) reports R&D budget authority amounts (continued...)

and projected budget authority amounts for R&D at EPA (and other federal agencies), how these amounts explicitly relate to the requested and appropriated funding amounts within EPA accounts for specific program activities is not clear.

R&D at EPA headquarters and laboratories around the country, as well as external R&D, is primarily managed by EPA's Office of Research and Development (ORD). EPA's annual appropriations are requested, considered, and enacted according to eight line-item appropriations accounts, which were established by Congress during the FY1996 appropriations process. EPA's R&D activities managed by ORD, including the agency's research laboratories and research grants, as well as the agency's applied science and technology activities conducted through the its program offices, are funded within the agency's Science and Technology (S&T) appropriations account. Many of the programs implemented by EPA have a research component, but the research is not necessarily the primary focus of the program. The S&T account incorporates elements of the former EPA Research and Development account, as well as a portion of the former Salaries and Expenses and Research and Program Operations accounts, which had been in place until FY1996. The S&T account is funded by a base appropriation and a transfer of appropriated funds from the Superfund account. These transferred funds are dedicated to research on more effective methods to clean up contaminated sites.

On June 27, 2007, the House passed H.R. 2643 (H.Rept. 110-187), the FY2008 appropriations bill for the Interior, Environment, and Related Agencies, that includes EPA. H.R. 2643 would provide $8.09 billion for EPA for FY2008.[11] Including the transfer from Superfund, the House bill would provide $809.4 million for the S&T account, an increase of 4% above the President's FY2008 request of $780.6 million, and 7% above the FY2007 appropriation of $763.6 million. In its bill, S. 1696, reported on June 26, 2007, the Senate Appropriations Committee recommended $7.77 billion for EPA. The Senate reported bill would provide $798.6 million (including transfers) for the S&T account, 2% above the President's FY2008 request and less than 5% above the FY2007 level.

Although the House approved an increase in funding for most of the line item programs within the S&T account, the largest increase is reflected in the total $33.3 million proposed for global change research in FY2008. The amount would be roughly twice the amount requested for FY2008 and included in the FY2007 appropriation. The Senate Committee proposed $18.6 million for this research

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[10] (...continued)
in its Analytical Perspectives accompanying the annual President's budget, but amounts for specific programs are not included. The budget authority amounts reported by OMB are typically significantly less than amounts appropriated/requested for the S&T account, but the differences are not explicitly defined. For example, OMB reported actual budget authority of $622 million for FY2006, and estimated amounts of $567 million for FY2007 and $562 million for FY2008. See OMB, *Fiscal Year 2008 Budget of the United States: Analytical Perspectives — Cross Cutting Programs*, [http://www.whitehouse.gov/omb/budget/fy2008/].

[11] For more information regarding EPA's FY2008 appropriations see CRS Report RL34011, *Interior, Environment, and Related Agencies: FY2008 Appropriations*, coordinated by Carol Hardy Vincent.

activity. The largest increase recommended by the Senate Committee was $14.0 million for extramural research grants which was not included in the FY2008 request or in the FY2007 appropriations. The extramural grants would be in the form of competitive grants for "high-priority" air ($10.0 million) and water ($4.0 million) quality research in addition to that included in the FY2008 request.

Although most of the appropriations within the S&T account funds "actual" research activities, certain facility operations and administration expenses, such as rent, utilities, and security, are also funded within this account. The House and the Senate Appropriations Committee recommended the same amount as the President requested for facility operations and administration within the S&T account,[12] but each added more funds to the account to provide a net increase for actual research. The President's requested increase for the S&T account as a whole was mainly attributed to a continued shift from the Environmental Programs and Management account, which had been funding these activities. When comparing funding for research alone, the President's budget would provide roughly $20 million less in FY2008 than in FY2007, while the House proposal would be an overall net increase of $33.8 million above the FY2008 request and $14.0 million above the FY2007 appropriations. The Senate Committee recommended amount would be roughly $2.0 million less than the FY2007 level, but $18.0 million above the FY2008 request.

In addition to S&T appropriations, for FY2008 the House approved the creation of a new EPA appropriations account, the "Commission on Climate Change Adaption and Mitigation." The House bill included $50.0 million for this account for FY2008. Of the total, $5 million would be for the establishment and operations of a temporary (two-year) multi-agency commission to analyze science questions related to climate change adaptation and mitigation and to recommend research priorities. The President of the National Academy of Sciences would serve as the Chairman of the new, temporary Commission. The remaining $45.0 million within this account would be distributed to support federal agency climate change adaptation and mitigation research efforts based on the commission's recommendations. The Senate committee did not include a new account or provide similar funding for purposes of a climate change commission.

Some Members of Congress and an array of stakeholders have raised concerns about the adequacy of funding for scientific research at EPA. A number of the scientific organizations, including EPA's Science Advisory Board (SAB)[13] and the American Association for the Advancement of Science (AAAS), analyzed the FY2008 request, identified potential shortfalls and provided their recommendations for funding increases above those proposed for certain research activities. In

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[12] An amendment agreed to during the House floor debate would reduce, then increase, the S&T account by $3.9 million. In the floor debate the sponsoring Member of the amendment stated the amount would reduce funding for the operations and administration in the S&T account by $3.9 million, and increase funding for homeland water security initiative within this account to bring the total amount up to the requested level of $21.9 million (p. H7126 in the June 26, 2007 Congressional Record).

[13] Comments on EPA's Strategic Research Directions and Research Budget for FY2008, An Advisory Report of the U.S. Environmental Protection Agency Science Advisory Board (EPA-SAB-07-004) [http://www.epa.gov/science1/pdf/sab-07-004.pdf].

particular, the EPA SAB expressed its concerns about the "decreased trends in the funding of ecosystems research, decreased funding of the Science to Achieve Results (STAR) extramural and fellowship programs, and the elimination of the economics and decision sciences research program within ORD." According to the AAAS estimates, the FY2008 requested EPA R&D funding would be the lowest in more than two decades, in real, inflated adjusted dollars. Consistent with budgetary procedures, the House Committee on Science and Technology submitted its views and estimates of the FY2008 budget to the House Budget Committee.[14] In its April 2007 views and estimates, the Committee noted the EPA SAB's opinions regarding the inadequacies of EPA's R&D resources, and agreed that a more robust investment is needed to maintain a healthy environment and economy.

In testimony on the FY2008 request before Congress, EPA acknowledged reductions in certain research areas but contended that the FY2008 proposed budget addresses the highest priority environmental research needs, given available resources and interest in reducing the federal deficit.[15] For example, although overall funding requested for human health research would have decreased compared to FY2007, human health risk assessment research, within that broader category, would have increased from $38.3 million in FY2007 to $42.8 million in FY2008. Other priority areas receiving increased funding noted by EPA included clean air research and research regarding fate, transport and other issues associated with nanomaterials. The FY2008 request also proposed combining line item funding for certain research activities to allow for flexibility and a "more holistic approach" for addressing science challenges. For example, the FY2008 request proposed combining funding for air toxics research and funding for National Ambient Air Quality Standards (NAAQS) research into an integrated air research program.

Debate regarding funding for scientific research administered by EPA (and other federal agencies) often has focused on the question of whether the agency's actions are based on "sound science," and how scientific research is applied in developing federal policy. Although EPA contends the recent fiscal budget requests are adequate to support the agency's priorities, the question of sound science continues to be of concern as evidenced by recent EPA actions. For example, the debate regarding too much or not enough science and how EPA used the science in its decision making, has been an issue surrounding EPA's recent review of air quality standards or NAAQS.[16] The adequacy of resources necessary to ensure the sufficiency of scientific support for EPA's implementation of the many environmental requirements remains an issue of concern. **(CRS Contact: Robert Esworthy)**.

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[14] See the House Committee on Science and Technology website at [http://science.house.gov/randd/views_estimates.htm].

[15] See March 14, 2007, testimony of George Gray, EPA Assistant Administrator for Research and Development and Science Advisor, before the House Subcommittee on Energy and Environment, Committee on Sciences and Technology [http://science.house.gov/publications/Testimony.aspx?TID=5177].

[16] See CRS Report RL33807, *Air Quality Standards and Sound Science: What Role for CASAC?* by James E. McCarthy.

Table 13. Environmental Protection Agency S&T Account

($ in millions)

Environmental Protection Agency	FY2006 Enacted[a]	FY2007 Enacted	FY2008 Request	H.R. 2643 House-Passed	S. 1696 S. Comm. Reported
Science and Technology Appropriations Account					
— Base Appropriations	*$730.8*	*$733.4*	*$754.5*	*$783.3*	*$772.5*
— Transfer in from Superfund Account	*30.2*	*30.2*	*26.1*	*26.1*	*26.1*
Science and Technology Total	**761.0**	**763.6**	**780.6**	**809.4**	**798.6**
— (Operations and Administration)	*(8.5)*	*(33.0)*	*(73.9)*	*(73.9)*	*(73.9)*
Net Science and Technology	**752.5**	**730.6**	**706.7**	**735.5**	**724.7**

Source: Prepared by the Congressional Research Service (CRS) using information provided by the House and Senate Appropriations Committees. Numbers may not add due to rounding.

a. Committee amounts for FY2006 in the above table reflect a 0.476% across-the-board rescission, and a 1% government-wide rescission, applicable to that year.