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Federal Research and Development Funding: FY2007

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Federal Research and Development Funding: FY2007

Summary

The Bush Administration requested $137.2 billion in federal research and development (R&D) funding for FY2007. This sum represents a 2.6% increase over the estimated $133.7 billion that was approved in FY2006. As in the recent past, the FY2007 increase over the FY2006 estimated funding levels is due to significant funding increases in the Department of Defense (DOD) and the National Aeronautics and Space Administration's (NASA's) space vehicles development program.

The centerpiece of the President's proposed FY2007 R&D budget is the American Competitiveness Initiative (ACI). The President proposed this initiative in response to growing concerns about America's ability to compete in the technological global market place. Over the next 10 years, 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 permanent R&D tax incentive over the next 10 years. The most recent federal research tax credit expired on December 31, 2005. In his budget request, the President asked Congress to pass a permanent Research and Experimental Federal tax credit.

As part of the $50 billion for research, the President has called for doubling federal R&D funding over10 years. This increase would include the physical sciences and engineering research in three agencies: the National Science Foundation (NSF), the Department of Energy's (DOE's) Office of Science, and the National Institute of Standards and Technology (NIST). According to the Administration, in FY2007, the ACI overall funding increases for NSF, DOE, and NIST would be $910 million, or 9.3% above FY2006 estimated funding levels for th three agencies.

Despite the ACI proposal, total federal basic research funding for FY2007 would be flat at $28.2 billion (in real dollars). Five agencies account for 90% of all federal basic research expenditures. Total federal research funding (the sum of basic and applied research) is projected to decline 2.6%, to $54.4 billion. This decline is due to a 6.6% drop in applied research funding. Some contend that the $1.8 billion decline in funding for applied research helped to pay for the ACI.

Support for three federal, multiagency research initiatives would vary, with the National Nanotechnology Initiative proposed to decline 1.8% to $1.3 billion, primarily because DOD has not included FY2006 nanotechnology earmarks in its FY2007 nanotechnology request. Funding for the Networking and Information Technology R&D Initiative would increase 2.4% to $3.1 billion. (The ACI contains increasing support for computer sciences and other information technology research.) Finally, support for the Climate Change Science Program would increase in FY2007 by 0.2% to $1.7 billion, after steep cuts in FY2006 due to declining NASA funding for space-based observations of the environment.

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Recent Developments

The Bush Administration requested $137.2 billion in federal research and development (R&D) funding for FY2007. This sum represents a 2.6% increase over the estimated $133.7 billion that was approved in FY2006. As in the recent past, the FY2007 increase over the FY2006 estimated funding levels is due to significant funding increases in the Department of Defense (DOD) and the National Aeronautics and Space Administration's (NASA's) space vehicles development program.

According to the most recent NSF R&D data, in 2004, the United States spent $312.1 billion on R&D. Of that amount, $199 billion, or 63.8%, was spent by industry. The federal government was a distant second, accounting for $93.4 billion, or 29.9% of the national total. The remaining 6.3% is divided between universities (with $11.1 billion, or 3.6% of the national total) and nonprofits (with $8.6 billion, or 2.7% of the national total). The federal share of total national R&D expenditures declined below 50% for the first time in 1979. By 2000, the federal share of total R&D had reached a record low of 24.9% before it rose to 29.9% of total national R&D expenditures in 2004.[1]

The centerpiece of the President's proposed FY2007 R&D budget is the American Competitiveness Initiative (ACI). The President proposed this initiative in response to growing concerns about America's ability to compete in the technological global market place.[2] Over the next 10 years, 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 permanent research and development tax incentive over the next 10 years. The most recent federal research tax credit expired on December 31, 2005 (see P.L. 108-311). In his budget request, the President has asked Congress to pass a permanent Research and Experimental Federal tax credit.

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[1] See, National Science Board. *Science and Engineering Indicators 2006*, Volume 1, p. 4-5.

[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, D.C. 20001, 2005.

Institute of Standards and Technology (NIST). According to the Administration, in FY2007, the ACI overall funding increases for NSF, DOE, and NIST would be $910 million, or 9.3% above FY2006 estimated funding levels for the three agencies.

Despite the ACI proposal, total federal basic research funding for FY2007 would be flat at $28.2 billion (in real dollars). Five agencies account for 90% of all federal basic research expenditures. Total federal research funding (the sum of basic and applied research) is projected to decline 2.6%, to $54.4 billion. This decline is due to a 6.6% drop in applied research funding. Some contend the $1.8 billion decline in funding for applied research helped to pay for the ACI.

Funding for nondefense R&D expenditures would increase 1.9%, to $58.9 billion. This is more than the 0.5% decline requested for total nondefense discretionary programs. Spending for defense R&D (the sum of DOD's and DOE's defense programs) would increase 3.7%, to $78.2 billion. However, as in the past, the Administration is requesting deep cuts in DOD's science and technology programs.

The Administration has requested flat funding for the National Institutes of Health (NIH) in FY2007. Since Congress completed the doubling of NIH's budget between FY1999 and FY2003, funding for NIH has not increased in real dollars. Other agencies, such as the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the U. S. Geological Survey, and the Department of Agriculture, would all see their FY2007 R&D budgets decline below FY2006 estimated funding levels.

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In addition to the President's ACI proposal , a number of congressional bills that focus on various aspects of innovation and competitiveness issues have been introduced in the 109th Congress. Two such bills are the National Innovation Act (NIA), S. 2109, and the Protecting of America's Competitive Edge (PACE), which consists of three separate bills: S. 2197, S. 2198, and S, 2199. The NIA (S. 2109) would double NSF's research budget in five years (by 2011) and increase private sector interaction with NIST by authorizing $100 million over five years to support small business innovation. The NIA bill also proposes allocating 3% of DOD's total budget to science and technology research, of which 20% must be devoted to basic research. The PACE legislation would almost double funding for NSF over seven years (by 2013); double DOE's budget for basic research, development, demonstration, and commercial activities; and double DOD's and NASA's basic research budgets over seven years as well.

Both legislative proposals also contain a variety of financial incentives to encourage students to major in science, technology, engineering, or mathematics (STEM). Incentives could include the federal government paying up to $20,000 a year to qualified students who are studying to teach math or science at the K-12 levels. The legislation also provides a variety of incentives to encourage up to 10,000 STEM students, over the next 10 years, to pursue careers as university faculty and researchers. Both bills call for the passage of a permanent extension of the research tax credit.

Department of Agriculture (USDA)

The FY2007 request for research and education in the U.S. Department of Agriculture (USDA) is $2,275.8 million, a 15% decrease ($401.6 million) from the FY2006 estimate. (See **Table 1**). The USDA conducts in-house basic and applied research. The Agricultural Research Service (ARS) is the lead federal agency for nutrition research, operating five major laboratories in this area, including the world's largest multidisciplinary agricultural research center, located at Beltsville, Maryland. There are approximately 100 research facilities throughout the United States and abroad. The ARS laboratories focus on efficient food and fiber production, preservation of genetic resources, development of new products and uses for agricultural commodities, development of effective biocontrols for pest management, and support of USDA regulatory and technical assistance programs. Included in the total support for USDA in FY2007 is $1,027.8 million for ARS, an 18.8% decrease ($238.4 million) from the FY2006 level. The Administration proposes reductions of $146 million in all projects earmarked by Congress — $50 million in project terminations and approximately $49 million in formally unrequested projects. These amounts will be redirected to high-priority Administration initiatives that include livestock production, food safety, crop protection, human nutrition, and new products/value-added. Included in the FY2007 request for ARS is $8.4 million for buildings and facilities, a significant reduction from the FY2006 level of $131.2 million. The $8.4 million request by the Administration is to fund the design and site preparation of the Classical Chinese Garden of the U.S. National Arboretum. The Garden is a joint project between the governments of the United States and China.

The FY2007 request supports several research priority areas and strategic goals. The USDA has given priority to the mapping and sequencing projects funded by USDA, such as sequencing genomes of agriculturally important species. The sequencing projects will be coordinated with ongoing genomics initiatives supported by other federal agencies and facilitated by interagency working groups. Increases are provided for research involving animal and plant genomes. Also, the FY2007 request provides support for research on emerging and exotic diseases as part of the infrastructure to enhance homeland security. USDA states that this research is significant in protecting the nation from the deliberate or unintentional introduction of an agricultural health threat. The USDA has biocontainment complexes, where research and diagnostic work is done on organisms that pose serious threats to the crop, poultry, and livestock industries. Other research areas receiving support in the FY2007 request include bovine spongiform encephalopathy, air and water quality,

food safety, obesity/nutrition, biobased products/bioenergy research, and agricultural information.

The Cooperative State Research, Education, and Extension Service (CSREES) distributes funds to State Agricultural Experiment Stations, State Cooperative Extension Systems, land-grant universities, and other institutions and organizations that conduct agricultural research. Included in these partnerships is funding for research at 1,862 institutions, 1,890 historically black colleges and universities, and 1,994 tribal land-grant colleges. Funding is distributed to the states through competitive awards, statutory formula funding, and special grants. The FY2007 request for CSREES is $1,012 million, a decrease of $182.6 million from the FY2006 level. Funding for formula distribution in FY2007 to the state Agricultural Experiment Stations (and other eligible institutions) is $273.2 million, almost level with FY2006. The FY2007 request provides $37.9 million for the 1,890 formula programs, again almost level with FY2006. The FY2007 request will modify the Hatch formula program by expanding the multistate research programs from 25% to 55.6%. A portion of the funds will be redirected to nationally, competitively awarded grants. Such an approach should continue the matching requirement and leverage nonfederal resources.

The FY2007 request funds the National Research Initiative (NRI) Competitive Grants Program at $247.5 million, $66.3 million above the FY2006 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 contends that the NRI makes a significant contribution to developing the next generation of agricultural scientists. The FY2007 request includes approximately $7 million 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.

The Economic Research Service (ERS) is the principal intramural economic and social science research agency in USDA. The FY2007 request for ERS is $83 million, a $7.1 million increase over FY2006. The increase will continue the development of a consumer data and information system that will provide USDA with, among other things, current food prices, food purchases, sales volumes, and information on consumer characteristics and purchasing behavior. In addition, the increase will support a comprehensive data collection and research program to examine the changing economic health of farm and nonfarm households in rural areas. The multiyear, longitudinal data generated by this initiative will support the programs administered by the Rural Development mission area. The National Agricultural Statistics Service (NASS) conducts the Census of Agriculture and provides current data on agricultural production and economic indicators of the well-being of the farm sector. The FY2007 request for the NASS is $153 million, $12.3 million above the FY2006 level. Funding would help improve the quality of the principal economic indicators used by the Council of Economic Advisors and would support the analysis required to develop the upcoming 2007 Farm Bill. NASS will

continue to develop the USDA Enterprise Architecture and the USDA Enablers initiatives. **(CRS Contact: Christine Matthews.)**

Table 1. U.S. Department of Agriculture R&D

($ in millions)

	FY2005 Act.	FY2006 Est.	FY2007 Req.
Agric. Research Service (ARS)			
Product Quality/Value Added	$104.6	105.4	$93.8
Livestock Production	84.1	85.1	69.8
Crop Production	196.8	201.4	150.8
Food Safety	102.7	104.6	108.1
Livestock Protection	78.5	89.7	98.0
Crop Protection	193.0	197.2	181.6
Human Nutrition	83.7	84.8	84.4
Environmental Stewardship	219.4	223.3	172.3
National Agricultural Library	21.5	21.8	25.0
Repair & Maintenance	17.8	17.7	17.7
Subtotal	**1,102.0**[d]	**1,135.0**	**1,001.4**
Buildings & Facilities	186.3	131.2	8.4
Trust Funds	18.0	0.0	18.0
Total, ARS	**1,306.3**	**1,266.2**	**1,027.8**
Coop. St. Res. Ed. & Ext. (CSREES) Research and Education			
Hatch Act Formula	178.7	177.0	176.9
Cooperative Forestry Research	22.2	22.0	22.0
1890 Colleges and Tuskegee Univ.	12.3	37.2	37.9
Special Research Grants	135.5	141.6	18.1
NRI Competitive Grants	179.6	181.2	247.5
Animal Health & Disease Res.	5.1	5.0	0.0
Federal Administration	42.5	50.6	9.2
Higher Education[b]	50.7	55.0	69.7
Total, Coop. Res. & Educ.[c]	**655.5**	**686.8**	**581.3**
Extension Activities			
Smith-Lever Sections 3b&c	275.5	273.0	273.2
Smith-Lever Sections 3d	86.7	92.0	91.5
Renewable Resources Extension	4.1	4.0	4.1
Integrated Activities	54.7	55.2	19.1
1890 Research & Extension	16.8	16.6	16.6
Other Extension Prog. & Admin.	7.8	14.7	26.2
Total, Extension Activities[c]	**445.6**	**451.4**	**430.7**
Total, CSREES[c]	**1,184.0**	**1,194.6**	**1,012.0**
Economic Research Service	74.2	75.9	83.0
National Agricultural Statistics Service	128.4	140.7	153.0
Total, Research, Education & Economics	**$2,692.0**	**$2,677.4**	**$2,275.8**

a. Funding levels are contained in U.S. Department of Agriculture FY2007 Budget Summary and other documents internal to the agency.

b. Higher education includes payments to 1994 institutions and 1890 Capacity Building Grants program, the Native American Institutions Endowment Fund, and the Alaska Native and Native Hawaiian-Serving Institutions Education Grants.

c. Program totals may reflect 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.

d. Totals may not add due to rounding. Research activities carried out in support of Homeland Security are include in Food Safety, Livestock Protection, and Crop Protection portfolios.
e. Aggregate support for Homeland Security — FY2005, $30.2 million, FY2006, $35.6 million, and FY2007, $81.5 million.

Department of Energy (DOE)

The Department of Energy has requested $9.154 billion for R&D in FY2007, including activities in three major categories: Science, National Security, and Energy. (For details, see **Table 2**.) This request is 3.5% above the FY2006 level of $8.848 billion.

The requested funding for Science is $4.102 billion, a 14% increase from FY2006. This unusually large 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. About $200 million of the requested increase in FY2007 would support increased operating time for facilities managed by the Basic Energy Sciences program; the House and Senate appropriations reports for FY2006 both called for increased funding for this purpose. In the Fusion Energy Sciences program, the request includes $60 million for the International Thermonuclear Experimental Reactor (ITER), whose estimated U.S. total cost remains at $1.12 billion through FY2014.

The requested funding for R&D in National Security is $3.188 billion, a 7.4% decrease. Most of the reduction results from the completion of construction projects and the elimination of items funded at congressional direction in FY2006.

The requested funding for R&D in Energy is $1.864 billion, up 3.0% from FY2006. Within this total, R&D on nuclear, biomass, and solar energy would increase, while natural gas and oil technology programs would be terminated. Termination of the gas and oil technology programs was also proposed in FY2006, but was rejected by Congress. **(CRS Contact: Daniel Morgan.)**

Table 2. Department of Energy R&D

($ in millions)

	FY2005 Comparable	FY2006 Comparable	FY2007 Request
Science	**3635.6**	**3596.4**	**4101.7**
Basic Energy Sciences	1083.6	1134.6	1421.0
High Energy Physics	722.9	716.7	775.1
Biological and Environmental Research	566.6	579.8	510.3
Nuclear Physics	394.5	367.0	454.1
Fusion Energy Sciences	266.9	287.6	319.0
Advanced Scientific Computing Research	226.2	234.7	318.7
Other	374.9	276.0	303.5
National Security	**3406.9**	**3442.2**	**3188.0**
Weapons Activities[a]	2327.5	2311.7	2102.6
Naval Reactors	801.4	781.6	795.1
Nonproliferation and Verification R&D	219.8	318.8	268.9
Defense Environmental Cleanup TD&D	58.2	30.1	21.4
Energy	**1727.4**	**1809.0**	**1863.8**
Fossil Energy R&D	560.9	592.0	469.7
Energy Efficiency and Renewable Energy[b]	908.9	857.0	951.4
Nuclear Energy R&D	168.4	223.7	347.1
Electric Transmission and Distribution R&D	89.2	136.3	95.6
Total	**8769.9**	**8847.6**	**9153.5**

a. 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.

b. Excluding Weatherization and Intergovernmental Activities.

Department of Defense (DOD)

Nearly all of what the Department of Defense (DOD) spends on Research, Development, Test and Evaluation (RDT&E) is appropriated in Title IV of the defense appropriation bill (see **Table 3**). For FY2007, the Bush Administration is requesting $73.2 billion for DOD's baseline Title IV RDT&E. The baseline Title IV RDT&E request is $2.0 billion more than the total obligational authority available for Title IV in FY2006. RDT&E funds are also requested as part of the Defense Health Program ($131 million) and the Chemical Agents and Munitions Destruction Program ($231 million). The five-year budget plan projects spending $366.5 billion for RDT&E through FY2011. The Administration's FY2007 budget projection for RDT&E through FY2011 is nearly $22 billion more than its projection last year.

While the FY2007 RDT&E request represents an increase in RDT&E funding over last year, Science and Technology (S&T) funding would decrease. S&T consists of basic and applied research and advanced development (6.1, 6.2, and 6.3 activities in the RDT&E account). Although the FY2007 S&T budget request ($11.1 billion) is approximately $600 million more than the amount requested by the Administration for FY2006, the FY2007 S&T request is $2.2 billion less than the amount Congress appropriated for S&T in FY2006. The difference between the FY2007 S&T request and the amount appropriated by Congress for FY2006 roughly equals the amount the Administration claims was earmarked by Congress in the FY2006 S&T appropriation. The FY2006 request for basic research ($1.4 billion) is $70 million less than what Congress appropriated in FY2006 for basic research, but is over $100 million more than what the Administration requested for basic research in FY2006. 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. The FY2007 S&T request is 2.5% of the overall baseline DOD budget request of $439.3 billion. This amount is below the 3% target that the Bush Administration and Congress have set. The FY2007 budget request for Missile Defense RDT&E is $9.3 billion (an increase of $1.7 billion from the amount available for Missile Defense in FY2006). **(CRS Contact: John Moteff.)**

Table 3. Department of Defense RDT&E

	FY2005 Actual[d]	FY2006 Estimate[e]	FY2007 Request[f]
Accounts			
Army	10,576	11,026	10,856
Navy	17,077	18,734	16,912
Air Force	20,478	21,671	24,397
Defense Agencies	20,855	19,555	20,810
(DARPA)	(2,947)	(2,979)	(3,294)
(MDA[a])	(8,827)	(7,682)	(9,310)
Dir. Test & Eval	310	166	182
Total Obligational Authority	**69,296**	**71,152**	**73,157**
Budget Activity			
Basic Research	1,485	1,470	1,422
Applied Research	4,788	5,168	4,478
Advanced Dev.	6,768	6,603	5,183
Advanced Component Dev. and Prototypes	14,572	13,913	15,387
Systems Dev. and Demo	16,558	19,343	19,277
Mgmt. Support[b]	4,728	4,025	3,938

	FY2005 Actual[d]	FY2006 Estimate[e]	FY2007 Request[f]
Op. Systems Dev	20,398	20,630	23,471
Total Obligational Authority [c]	**69,297**	**71,152**	**73,156**
Other Defense Programs			
Defense Health Program	523	536	131
Chemical Agents and Munitions Destruction	205	67	231

Sources: Figures based on Department of Defense Budget, FY2007 RDT&E Programs (R-1), February 2006. Figures for the Defense Health Program are taken from the Department of Defense Budget, FY2007 Operations and Maintenance Programs (O-1) document and the Chemical Agents, and Munitions Destruction Program figures are taken from the Department of Defense Budget, FY2007 Procurement Programs (P-1) document. Both released in February 2006. Totals may not add due to rounding.

a. Includes only BMD RDT&E. Does not include procurement and military construction.
b. Includes funds for Developmental and Operational Test and Evaluation.
c. Numbers may not agree with Account Total Obligational Authority due to rounding.
d. The FY2005 figures in the R-1 reflect the FY2005 Supplemental (P.L.109-13) which included $587 million for RDT&E.
e. The FY2006 figures reflect the 1% across the board cut called for in the FY2006 DOD Appropriations bill (P.L. 109-148). It is not clear if the FY2006 figures in the R-1 reflect the $91.9 million in additional RDT&E funding included in Title IX (Division A) and Title IX (Division B) of the FY2006 DOD Appropriations. Division A appropriated contingency funds for the Global War on Terror that included $50.6 million for specified RDT&E programs. Division B provided emergency funds for hurricane relief that included $41.6 million for specified RDT&E activities. The FY2006 figures do not include the $782 million requested for RDT&E in the $72.4 billion FY2006 emergency supplemental request of February 16, 2006, nor the approximately $19.0 million for RDT&E included in another Katrina-related supplemental, also requested February 16, 2006.
f. It is not clear if the FY2007 R-1 figures include any RDT&E funds associated with another request by the Administration for contingency funds for the Global War on Terror to be included as part of the FY2007 DOD appropriations bill.

National Aeronautics and Space Administration (NASA)

NASA has requested $12.336 billion for R&D in FY2007. (For details, see **Table 4**.) This request is a 7.5% increase over FY2006, in a total NASA budget that would increase by just 1.0%. Within the increase for NASA R&D overall, however, a large increase for Constellation Systems (primarily the new Crew Exploration Vehicle and its launch vehicle) would be offset by decreases for Human Systems and Aeronautics and an increase for Science that is substantially less than previously projected.

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, then retiring it by 2010; completing the 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." Constellation Systems, the only R&D program to receive a large increase in the FY2007 request, is responsible for developing vehicles to return humans to the moon. The reduced rate of growth in requested funding for the Science Mission Directorate, a total reduction of $3.1 billion through FY2010 relative to projections in the FY2006 request, is mostly to offset higher than expected costs for returning the space shuttle to flight status.

The request for Science has been particularly controversial. It includes full funding for a Hubble Space Telescope servicing mission (in early FY2008, pending approval by the Administrator if the shuttle returns to flight successfully), but several robotic missions to Mars are cancelled or deferred. In addition no funding is requested for the SOFIA airborne infrared telescope or the Europa mission to one of Jupiter's moons. The request for Research and Analysis, which provides grant funding to individual researchers, is down 15% from FY2006 in most programs.

The request for Aeronautics Research is also of congressional interest. Although the requested budget for aeronautics research is about the same as was projected a year earlier, its content has changed significantly. The largest program, Vehicle Systems, has been renamed Fundamental Aeronautics and will now focus on "core competencies" in subsonic, supersonic, and hypersonic flight regimes, including work on rotorcraft. An amendment to the Senate FY2007 budget resolution (S.Amdt. 3033 to S.Con.Res. 83) increased the recommended funding for NASA aeronautics by $179 million. **(CRS Contact: Daniel Morgan.)**

Table 4. NASA R&D

($ in millions)

	FY2006 Estimated [a]	FY2007 Request
Science - Solar System Exploration	1,582.3	1,610.2
Science - The Universe	1,507.9	1,509.2
Science - Earth-Sun Systems	2,163.5	2,210.6
Constellation Systems	1,733.5	3,057.6
Exploration Systems Research and Technology	692.5	646.1
Human Systems Research and Technology	624.1	274.6
Aeronautics Research	884.1	724.4
Cross-Agency Support Programs	533.5	491.7
International Space Station	1,753.4	1,811.3
Subtotal R&D	**11,474.8**	**12,335.7**
Space Shuttle	4,777.5 [b]	4,056.7
Space and Flight Support	338.8	366.5
Inspector General	32.0	33.5
Total NASA	**16,623.0** [b]	**16,792.2**

a. Figures for FY2006 are from NASA's January 2006 operating plan and are not final. Figures for FY2005 are not shown because changes in budget structure and program shifts between accounts make comparisons between FY2005 and FY2007 difficult.
b. Includes $349.8 million in emergency supplemental funding for Hurricane Katrina response and recovery.

National Institutes of Health (NIH)

The President has requested a program level budget of $28.487 billion for NIH for FY2007, essentially equal to the FY2006 final budget and $66.8 million (0.2%) lower than the FY2005 level of $28.553 billion (see **Table 5**). The FY2006 amount was the first decrease in NIH's appropriation since 1970. The Senate has passed its budget resolution (S.Con.Res. 83), with some Senators indicating an interest in increasing the NIH appropriation for FY2007 above the level of the request. An increase of $1 billion for NIH was said to be assumed within the large budget category for health programs, and an amendment was adopted adjusting a different type of spending "in order to provide additional funding for health, education, training, and low-income programs."

The bulk of NIH's budget comes through the Labor-HHS-Education appropriation ($28.350 billion in the request). An additional small amount for environmental work related to Superfund comes from the Interior, Environment, and Related Agencies appropriation. Those two sources constitute NIH's discretionary budget authority. In addition, NIH receives $150 million preappropriated in separate funding for diabetes research and $8.2 million from a transfer within the Public Health Service (PHS). As in past years, the budget request proposes that $100 million of the NIH appropriation be transferred to the Global Fund to Fight HIV/AIDS, Tuberculosis, and Malaria. The "NIH program level" cited in the Administration's budget documents, however, does not reflect that transfer.

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. For FY2004 and FY2005, faced with competing priorities and a changed economic climate, Congress and the President gave increases of between 2% and 3%, levels that were below the estimated 3.5% and 3.3% biomedical inflation index for those two years. (The index has since been updated to show inflation of 3.6% for FY2004 and 5.5% for FY2005; the large increase is due to a new survey of medical school faculty salaries and benefits.) The research advocacy community had originally urged that the NIH budget grow by about 10% per year in the post-doubling years. They modified their recommendation to 6% for FY2006 and 5% for FY2007, maintaining that such increases would be needed to maintain the momentum of scientific discovery made possible by the increased resources of the doubling years. Since the projected biomedical inflation index is 4.1% for FY2006 and 3.8% for FY2007, the NIH budget has been losing ground in real terms each year since FY2003. In constant 2006 dollars, the FY2003 NIH budget was $30.8 billion, the FY2004 level was $30.6 billion, FY2005 was $29.7 billion, FY2006 is $28.5 billion, and the FY2007 request level is $27.4 billion.

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. The individual institutes and centers (ICs) — each with 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 OD. 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.)

Although the FY2007 budget requests the same overall level of funding for NIH as in FY2006, there are variable increases and decreases among the ICs and among the different funding mechanisms. As shown in **Table 5**, most of the IC budgets would decrease by 0.5%-0.8%, with several of the larger institutes losing between $10 million and $40 million. The two accounts that gain funds over FY2006 are the National Institute of Allergy and Infectious Diseases (NIAID), up $12 million (0.3%), and the Office of the Director (OD), up $140 million (26.6%). The NIAID increase is largely due to pandemic influenza funding. The OD increase includes a program formerly in NIAID for advanced development of biodefense countermeasures (up $110 million) and the OD contribution to the NIH Roadmap (up $29 million). Both programs are discussed below.

Specific priorities highlighted in the budget request include several trans-NIH initiatives involving multiple institutes with coordination by OD. *Biodefense* activities would receive a total of $1.9 billion, a net increase of $110 million (6.2%) over FY2006. Within OD would be a $160 million fund (up $110 million) for the advanced product development of vaccines and drugs that are priority targets for acquisition by Project BioShield. The activity would involve NIH more extensively than usual in working with academia and industry to bridge the research gap between investigational testing of a new drug and full product development. Also in OD is $96 million for research on countermeasures against nuclear/radiological threats and chemical threats, the same as in FY2006, and $25 million for construction and renovation of biosafety laboratories (down $5 million).

The *NIH Roadmap for Medical Research Program*, launched in September 2003, has identified critical scientific gaps that may be constraining rapid progress in biomedical research. Consequently, the agency has developed a list of 28 NIH-wide initiatives to address them. Roadmap initiatives are funded at $443 million for FY2007 ($332 million from the institutes and centers and $111 million from the Director's Discretionary Fund), up $113 million (34%) from FY2006. Three core themes focus on new paths to biological discoveries ($181 million), building multidisciplinary research teams ($81 million), and improving the clinical research enterprise ($181 million).

The *Genes, Environment, and Health* initiative would receive a total of $68 million (up $49 million) for its second year of funding. It will look for genetic and environmental interactions that might increase the risk of common chronic diseases and will work on new technologies for assessing the role of diet, physical activity, and environmental exposures in disease. The new *Pathway to Independence Award*

program ($15 million in the request) addresses NIH concerns about the support of new investigators, particularly younger scientists making the transition from training to independent research. The average age at which they receive their first independent grant has been increasing. In January 2006, NIH announced the new program to support promising postdoctoral scientists. The five-year awards will have a two-year mentored phase and a three-year independent phase. NIH expects to support 150-200 awards beginning in Fall 2006, and a similar number in each of the following five years, for a total commitment of almost $400 million. The new *Clinical and Translational Science Award* (CTSA) program, administered by the National Center for Research Resources (NCRR), has been developed to foster transdisciplinary clinical research and training, with the goal of speeding the translation of the findings of "discovery" research into clinical practice. Begun in FY2006, the program will transition elements of existing clinical research programs into CTSAs. Funding is estimated at $361 million for FY2007, including an additional $3 million requested in NCRR, sponsor of the current General Clinical Research Centers program.

In addition to showing the appropriation by institute, the other common way to describe the NIH budget is by "funding mechanism." On average, the ICs devote more than 80% of their budgets to supporting peer-reviewed extramural research by awarding research project grants (RPGs), research center grants, contracts, training grants, construction grants, and many other types of funding to researchers in universities and other institutions around the country. The remaining 15%-20% of the IC budgets supports their intramural research programs and research management costs. Budget data displayed by funding mechanism reveals the balance between extramural and intramural funding, as well as the relative emphasis on support of individual investigator-initiated research versus funding of larger projects, comprehensive research centers, agency-directed research contracts, research career training, facilities construction, and so forth.

The largest category, "*research project grants*" (RPGs), represents 53% of the total NIH request, or $15.1 billion. NIH estimates it would support a total of 37,671 RPGs in FY2007, which is 656 fewer grants than the estimate for FY2006. The main reason for the drop is that a large number of grants that were started toward the end of the doubling years are completing their funding cycles. (The average length of an RPG award is just under four years, but each year's funds are awarded separately from that year's appropriation.) Within the RPG total, about one quarter (9,337, for $3.3 billion) would be "competing" (new or competing renewal) grants, and the remaining three-quarters would be noncompeting (continuation) grants. The estimated number of competing RPGs would be an increase of 275 over the FY2006 number. The request proposes that the average cost of a competing RPG would not increase over the FY2006 level, and that noncompeting grants would receive no inflationary increases. NIH expects that the "success rate" of applicants receiving funding for competing RPGs will be about 19%, the same as FY2006, compared with 22% in FY2005. During the doubling years, the success rate averaged 30%-32%.

Support for research *centers* would grow by 2.3% to $2.8 billion; research *training* grants would remain at the FY2006 level ($760 million); research and development *contracts* would increase by $44 million (1.6%) to $2.7 billion because of the Genes, Health, and Environment initiative; the *intramural* research program

($2.8 billion) would decrease by $9 million (0.3%); research *management* and support would increase by $14 million (1.3%) to $1.1 billion; extramural research *facilities* construction would support only the $25 million for biosafety labs, with no funds (same as FY2006) for non-biodefense extramural construction; and funding for NIH's own *buildings and facilities* remains at $89 million.

The 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 FY2006 appropriation kept the tap at 2.4%, the same as in FY2005. NIH, with the largest budget among the PHS agencies, becomes the largest "donor" of program evaluation funds and is a relatively minor recipient.

After a hiatus of a dozen years, there has been some congressional movement toward action on reauthorization legislation for NIH. A number of hearings have been held in the past several years, and evolving drafts of proposed legislation are fostering discussions on such issues as the balance of authority and control between the central NIH Director's Office and the individual institutes and centers, the best methods of facilitating and funding cross-institute research initiatives, and possible changes in how authorization and appropriations levels for the institutes and centers are handled. **(CRS Contact: Pamela Smith.)**

Table 5. National Institutes of Health (NIH)

($ in millions)

Institutes and Centers (ICs)	FY2005 actual [a]	FY2006 approp. [b]	FY2007 request	% change FY07/06
Cancer (NCI)	$4,828.2	$4,793.4	$4,753.6	-0.8%
Heart/Lung/Blood (NHLBI)	2,941.2	2,921.8	2,901.0	-0.7%
Dental/Craniofacial Research (NIDCR)	391.8	389.3	386.1	-0.8%
Diabetes/Digestive/Kidney (NIDDK)	1,713.6	1,704.9	1,694.3	-0.6%
Neurological Disorders/Stroke (NINDS)	1,539.4	1,534.8	1,524.8	-0.7%
Allergy/Infectious Diseases (NIAID) [c]	4,402.8	4,383.3	4,395.5	0.3%
General Medical Sciences (NIGMS)	1,944.1	1,935.6	1,923.5	-0.6%
Child Health/Human Development (NICHD)	1,270.3	1,264.8	1,257.4	-0.6%
Eye (NEI)	669.1	666.8	661.4	-0.8%
Environmental Health Sciences (NIEHS)	644.5	641.1	637.3	-0.6%
Aging (NIA)	1,052.0	1,046.6	1,039.8	-0.6%
Arthritis/Musculoskeletal/Skin (NIAMS)	511.2	507.9	504.5	-0.7%
Deafness/Communication Disorders (NIDCD)	394.3	393.5	391.6	-0.5%
Nursing Research (NINR)	138.1	137.3	136.6	-0.6%
Alcohol Abuse/Alcoholism (NIAAA)	438.3	435.9	433.3	-0.6%
Drug Abuse (NIDA)	1,006.4	1,000.0	994.8	-0.5%
Mental Health (NIMH)	1,411.9	1,403.5	1,394.8	-0.6%
Human Genome Research (NHGRI)	488.6	486.0	482.9	-0.6%
Biomedical Imaging/Bioengineering (NIBIB)	298.2	296.8	294.9	-0.7%
Research Resources (NCRR)	1,115.1	1,099.1	1,098.2	-0.1%
Complementary/Alternative Med (NCCAM)	122.1	121.5	120.6	-0.8%
Minority Health/Health Disparities (NCMHD)	196.2	195.4	194.3	-0.6%
Fogarty International Center (FIC)	66.6	66.4	66.7	0.5%
Library of Medicine (NLM)	315.1	314.9	313.3	-0.5%
Office of Director (OD) [d]	405.1	527.6	667.8	26.6%
Buildings & Facilities (B&F)	110.3	81.1	81.1	0.0%
Subtotal, Labor/HHS Appropriation	*$28,414.5*	*$28,349.3*	*$28,350.0*	*0.0%*
Superfund (Interior approp to NIEHS) [e]	79.8	79.1	78.4	-0.9%
Total, NIH discretionary budget authority	**$28,494.4**	**$28,428.4**	**$28,428.4**	**0.0%**
Pre-appropriated Type 1 diabetes funds [f]	150.0	150.0	150.0	0.0%
NLM program evaluation [g]	8.2	8.2	8.2	0.0%
Total, NIH program level	**$28,652.6**	**$28,586.6**	**$28,586.6**	**0.0%**
Global Fund transfer (AIDS/TB/Malaria) [c]	-99.2	-99.0	-100.0	1.0%
Total, NIH program level after transfer	**$28,553.4**	**$28,487.6**	**$28,486.6**	**0.0%**

Source: FY2007 NIH budget justification.

a. FY2005 reflects across-the-board reduction (0.8%) totaling -$229.390m, Labor/HHS/Ed reduction of -$6.787m for salaries and expenses, and +$2.987m NCI breast cancer stamp funds.

b. FY2006 reflects across-the-board rescission (1%) of -$285.974m, and Interior reduction of -$0.382m.
c. NIAID totals include funds for transfer to the Global Fund to Fight HIV/AIDS, TB, and Malaria. FY2006 includes $18.0m supplemental funding from Public Health and Social Services Emergency Fund (PHSSEF) for pandemic flu (P.L. 109-148) and a comparable transfer of $49.5m from NIAID to OD for Advanced Development of countermeasures.
d. OD has Roadmap funds for distribution to ICs (FY2005, $59.520m; FY2006, $82.170m; FY2007, $110.700m). FY2005 is comparable for $47.021m from PHSSEF for nuclear/radiological countermeasures. FY2006 is comparable for $49.5m from NIAID for Advanced Development.
e. Separate account in the Interior/Related Agencies appropriation for NIEHS research activities mandated in Superfund legislation (formerly in VA/HUD appropriation).
f. Funds available to NIDDK for diabetes research (P.L. 106-554 and P.L. 107-360).
g. Additional funds available from the PHS program evaluation set-aside (sec. 241 of the Public Health Service Act), $8.2m for NLM each year.

National Science Foundation (NSF)

The FY2007 request for the National Science Foundation (NSF) is $6,020.2 million, a 7.9% increase ($439 million) over the FY2006 level of $5,581.2 million. (See **Table 6**). President Bush's ACI proposes to double the NSF budget over the next 10 years. The FY2007 request is to be the first installment toward that doubling effort. The FY2007 request for NSF provides support for several interdependent priority areas: broadening participation in the science and engineering enterprise, providing world-class facilities and infrastructure, advancing research at the frontier, and bolstering K-12 education. NSF will invest approximately $640 million in programs targeted at those groups underrepresented in the science and engineering workforce. Total support for providing world-class facilities will approach $1.7 billion. Across the agency, activities for advancing research at the frontiers of science would be $4.7 billion.

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 FY2007 request proposes $40.6 million for the Office of International Science and Engineering. Also, in FY2007, NSF will continue in its leadership role in planning U.S. participation in observance of the International Polar Year, which spans 2007 and 2008. A first-year investment of $62 million is provided to address major challenges in polar research. Other FY2007 highlights include funding for the National Nanotechnology Initiative ($373.2 million), investments in Climate Change Science Program ($205.3 million), continued support for homeland security ($384.2 million), and funding for Networking and Information Technology Research and Development ($903.7 million). Also, a new effort in the FY2007 request will be a $20 million program of fundamental research on new technologies for sensor systems that detect explosives.

Included in the FY2007 request is $4,666 million for Research and Related Activities (R&RA), a 7.7% increase ($334.5million) over the FY2006 level of $4,331.5 million. R&RA funds research projects, research facilities, and education and training activities. Partly in response to concerns in the scientific community about the imbalance between support for the life sciences and the physical sciences, the FY2007 request provides increased funding for the physical sciences — $248.5 million, a 6.6% increase ($15.4 million) over the FY2006 estimate. Research in the

physical sciences often leads 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. It also funds Partnerships for Innovation, disaster research teams, and the Science and Technology Policy Institute. The FY2007 request for IA is $131.4 million, a 4.2% decrease ($5.8 million) from the FY2006 estimate. 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 NSF. The NSF will continue to operate and maintain the three icebreakers. The OPP is funded at $438.1 million in the FY2007 request, 12.5% above the FY2006 level. Significant increases in OPP for FY2007 have been directed at the programs for arctic and antarctic sciences.

Research project support in the FY2007 request totals $2,413.7 million. This support is provided to individuals and small groups conducting disciplinary and cross-disciplinary research. Included in the total for research projects is support for centers, proposed at $259.8 million. The NSF supports a variety of individual centers and center programs. The FY2007 request provides $67.5 million for Science and Technology Centers, $55.7 million for Materials Centers, $62.8 million for Engineering Research Centers, $37.4 million for Nanoscale Science and Engineering Centers, and $6.5 million for Centers for Analysis and Synthesis.

The Major Research Equipment and Facilities Construction (MREFC) account is funded at $240.5 million in the FY2007 request, a 26% increase ($49.6 million) over the FY2006 level. 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 given to projects that have been approved by the National Science Board for new starts. The 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 states that the projects receiving support in the FY2007 request meet that qualification. Five ongoing projects and two new starts are funded in the FY2007 request. Projects receiving support are the Atacama Large Millimeter Array Construction ($47.9 million), EarthScope ($27.4 million), Ice Cube Neutrino Observatory ($28.7 million), National Ecological Observatory Network ($12 million), Scientific Ocean Drilling Vessel ($42.9 million), Alaskan Region Research Vessel ($56 million), and Ocean Observatories Initiative ($13.5 million).

The FY2007 request provides support for several NSF-wide investments: biocomplexity in the environment ($42.6 million), human and social dynamics ($41.5 million), and mathematical sciences ($78.5 million). Additional priority areas include those of strengthening core disciplinary research, continuing as lead federal agency in networking and information technology R&D, and sustaining organizational excellence in NSF management practices. The 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 $596.8 million in cyber infrastructure 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 grants applications has declined from approximately 30% in the late 1990s to an estimated 23% in FY2006.

The FY2007 request for the Education and Human Resources Directorate (EHR) is $816.2 million, a 2.5% increase ($19.5 million) over FY2006. 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 FY2006 request is as follows: precollege, $215 million; undergraduate, $196.8 million; and graduate, $160.6 million. Priorities at the precollege level include research and evaluation on education in science and engineering ($41.2 million), informal science education ($65.6 million), and a new program, Discovery Research K-12 ($104.1 million). Discovery Research will combine the strengths of three existing programs and encourage innovative thinking in K-12 science, technology, engineering, and mathematics education.

At the undergraduate level, approximately 72% of the funding is in support of new awards and activities. Priorities at the undergraduate level include the Robert Noyce Scholarship Program ($9.8 million), Course, Curriculum and Laboratory Improvement ($86.5 million), STEM Talent Expansion Program ($26.1 million), the National STEM Education Digital Library ($16 million), the Federal Cyber Service ($11 million), and Advanced Technological Education ($45.9 million). The Math and Science Partnership Program (MSP) has been transferred to the undergraduate level in FY2007.

MSP is supported at $46 million, a 27.2% decrease from the FY2006 estimate. Funding in the FY2007 request will provide support for ongoing awards, in addition to data collection, evaluation, knowledge management, and dissemination. No new partnership awards are proposed in this budget request. The MSP 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 ($24.6 million), Graduate Research Fellowships ($88 million), and the Graduate Teaching Fellows in K-12 Education ($46.8 million). Added support is given to several programs directed at increasing the number of underrepresented minorities in science, mathematics, and engineering. Among these targeted programs in the FY2007 request are the Historically Black Colleges and Universities Programs ($29.7 million), Tribal Colleges and Universities Program ($12.4 million), Louis Stokes Alliances for Minority Participation ($39.7 million), and Centers of Research Excellence in Science and Technology ($24.9 million). Funding for the Experimental Program to Stimulate Competitive Research (EPSCoR) is $100 million in the FY2007 request, a slight increase of $1.3 million over the FY2006 estimate. Approximately 55% of the FY2007 request for EPSCoR would be available for new awards and activities, with the balance supporting awards made in previous years. **(CRS Contact: Christine Matthews.)**

Table 6. National Science Foundation

($ in millions)

	FY2005 Act.	FY2006 Est.	FY2007 Req.
Res. & Related Act.			
Biological Sciences	$576.8	$576.7	$607.9
Computer & Inform. Sci. & Eng.	490.2	496.4	526.7
Engineering	557.1	580.9	628.6
Geosciences	697.2	702.8	744.9
Math & Physical Sci.	1,069.4	1,085.5	1,150.3
Social, Behav. & Econ. Sci.	196.8	199.9	213.8
Office of Cyberinfrastructure	123.4	127.1	182.4
Office of International Sci. & Eng.	43.4	34.5	40.6
U.S. Polar Programs	349.7	390.5	439.6
Integrative Activities	130.9	137.2	131.4
Subtotal Res. & Rel. Act	**$4,234.8**	**$4,331.5**	**$4,666.0**
Ed. & Hum. Resr.	843.5	796.7	816.2
Major Res. Equip. & Facil. Constr.	165.1	190.9	240.5
Salaries & Expenses	223.5	246.8	281.8
National Science Board	3.7	4.0	3.9
Office of Inspector General	10.2	11.4	11.9
Total NSF[a]	**$5,480.8**	**$5,581.2**	**$6,020.2**

a. The totals do not include carry overs or retirement accruals. Totals may not add due to rounding.
b. Additional funding resulting from H-1B Nonimmigrant Petitioner Receipts is $26 million in FY2005, an estimated $100 million in FY2006, and a projected $100 million in FY2007.

Department of Homeland Security (DHS) R&D

The Department of Homeland Security (DHS) has requested $1.552 billion for R&D in FY2007, which is an increase of 4.5% from FY2006. This total includes $1.002 billion for the Directorate of Science and Technology, $536 million for the Domestic Nuclear Detection Office (DNDO), and $14 million for Research, Development, Test, and Evaluation (RDT&E) in the U.S. Coast Guard. (For details, see **Table 7**.) The request for DNDO is a 70% increase. The request for the S&T Directorate is a 13% decrease.[3]

For individual portfolios within the S&T Directorate, comparing the FY2007 request with previous years is difficult because of several accounting factors. Certain expenses previously funded by each R&D portfolio are being funded in the Management and Administration account in FY2007. Funds for DNDO are being requested separately rather than as part of S&T. The former Transportation Security Administration R&D program, which was merged into S&T and funded in the R&D Consolidation line in FY2006, constitutes part of the Explosives Countermeasures

[3] DNDO was funded within the S&T Directorate in FY2006. The 70% increase for DNDO is relative to its FY2006 funding within S&T. The 13% decrease for S&T is relative to its FY2006 funding exclusive of DNDO.

and Support of Components portfolios in FY2007. Some activities, most notably the Counter MANPADS program to protect commercial aircraft against portable ground-to-air missiles, will continue at their current level of effort in FY2007 but require little additional budget authority because prior-year funds remain unspent. After accounting for these factors, it appears that the FY2007 request would reduce net funding for the Standards, Rapid Prototyping, SAFETY Act, and Critical Infrastructure Protection portfolio, and increase net funding for Cyber Security and the Office for Interoperability and Compatibility. Several of the requested net changes would offset changes that Congress made in FY2006 relative to the FY2006 request.

The department's FY2007 budget request marks the end of a period of consolidation for its R&D programs. 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. The FY2007 request proposes no further consolidations; conversely, it proposes dividing out DNDO funding into a separate account, which would comprise more than one third of the department's R&D budget. **(CRS Contact: Daniel Morgan.)**

Table 7. Department of Homeland Security R&D

($ in millions)

	FY2005 Enacted [a]	FY2006 Enacted [b]	FY2007 Request
Science and Technology Directorate	**1115.4**	**1467.1**	**1002.3**
Management and Administration	68.6	80.3	195.9
R&D, Acquisition, and Operations	1046.9	1386.8	806.4
Biological Countermeasures	362.6	376.2	337.2
NBACC Construction	35.0	0.0	0.0
Chemical Countermeasures	53.0	94.0	83.1
Explosives Countermeasures	19.7	43.6	86.6
Radiological/Nuclear Countermeasures [c]	122.6	18.9	-
Domestic Nuclear Detection Office [c]	-	314.8	-
Threat Awareness [d]	65.8	42.6	39.9
Standards	39.7	34.6	22.1
Support of DHS Components	54.6	79.2	88.6
University and Fellowship Programs	70.0	62.4	52.0
Emergent and Prototypical Technology [e]	86.8	42.6	19.5
Counter MANPADS	61.0	108.9	4.9
SAFETY Act	10.0	6.9	4.7
Office of Interoperability and Compatibility	21.0	26.2	29.7
Critical Infrastructure Protection	27.0	40.4	15.4
Cyber Security	18.0	16.5	22.7

	FY2005 Enacted [a]	FY2006 Enacted [b]	FY2007 Request
R&D Consolidation [f]	-	98.9	-
Rescission of Unobligated Funds from Prior Years	-	-20.0	-
Transportation Security Admin. and Customs R&D [f]	**179.4**	**-**	**-**
Domestic Nuclear Detection Office [c]	**-**	**-**	**535.8**
Management and Administration	-	-	30.5
Research, Development, and Operations	-	-	327.3
Systems Acquisition	-	-	178.0
U.S. Coast Guard RDT&E	**18.5**	**18.1**	**13.9**
Total DHS R&D	**1313.3**	**1485.2**	**1552.0**

a. The FY2005 enacted figures are from the FY2005 conference report (H.Rept. 108-774) and do not reflect subsequent reprogramming or transfers, if any. Note that the "FY2005 actual" figures given in the FY2007 Science and Technology Directorate budget justification are obligations; they are not used here because they are not directly comparable with the FY2006 and FY2007 figures, which are budget authority.

b. The FY2006 enacted figures have been reduced by the 1% general rescission (P.L. 109-148) and include a supplemental appropriation of $525,000 for Coast Guard RDT&E.

c. Funding for the Domestic Nuclear Detection Office (DNDO) was included in the budget for the Science and Technology Directorate in FY2006. It incorporated most of what had been in Radiological/Nuclear Countermeasures in FY2005. In FY2007, DNDO has a separate budget request.

d. Threat Awareness was formerly known as Threat and Vulnerability Testing and Assessment.

e. Emergent and Prototypical Technology combines two previous portfolios, Emerging Threats and Rapid Prototyping, whose funding in FY2005 and FY2006 has been summed for this table.

f. The Transportation Security Administration and Customs R&D programs were transferred into the Science and Technology Directorate in FY2006, and funding for them was requested in that year in the R&D Consolidation line. In FY2007, these activities will be funded by the Explosives Countermeasures and Support of DHS Components portfolios.

Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

President Bush requested a total of $532.6 million for FY2007 R&D programs and facilities at NOAA (see **Table 8**). Included in this total is $521.2 million for the Operations, Research, and Facilities (ORF) account and $11.4 million for the Procurement, Acquisitions, and Construction (PAC) account.[4] For FY2007, the R&D total is 14.5% of NOAA's total $3.68 billion budget request. Also, it is $13.5 million, or 2.5%, less than estimated $546.1 million appropriated for FY2006 and $41.9 million, or 7.3%, less than FY2005 actual funding.[5] The Office of Oceanic and

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[4] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Financial Administration, *Research and Development Budgets FY2005-FY2007*, February 21, 2006.

[5] The Office of Management and Budget's (OMB's) R&D Bureau estimates for NOAA R&D spending differ (i.e., $602 million for FY2005, $595 million for FY2006, and $554 million for FY2007). However, OMB's totals include capital costs for construction, (continued...)

Atmospheric Research (OAR) — NOAA's primary line office for research — conducts most of the agency's R&D programs and manages R&D facilities; however, not all OAR funding is for R&D. For example, the OAR request for FY2007 is $383.2 million; the R&D funding request for OAR is $304 million. OAR R&D levels would be $22.5 million, or 6.9%, less than the FY2006 estimate of $326.5 million. In addition, R&D funding of $73.1 million is requested for the National Ocean Service (NOS), $46.7 million for the National Marine Fisheries Service (NMFS), $31.7 for the National Weather Service (NWS), $25.2 million for the National Environmental Satellite Data and Information Service (NESDIS), and $52 million for the Office of Marine and Aviation Operations (OMAO) under Program Support. PAC Funding of $11.4 million is for systems acquisition and would include $9.4 million for OAR and $2.0 million for NWS to enhance weather and climate supercomputing capabilities.

Major Changes from FY2006 R&D Estimated Funding Levels. For National Ocean Science, R&D funding for the National Centers for Coastal and Ocean Science would decrease by $5 million. For OAR, Climate Observations and Services would increase by $22.5 million, or 91%; climate partnership programs would be zeroed out for a proposed saving of $150 million; the U.S. Weather Research Program partnerships would be zeroed out, except for $3 million for phased-array radar (PAR) research, for a proposed saving of $24.9 million; Ocean and Great Lakes Research partnership programs would be zeroed out for a proposed saving $16.1 million; and undersea and ocean exploration R&D funding would be restored to FY2005 funding levels. For NMFS, there is a $0.5 million increase requested for economic and social sciences research, a nine-fold increase for cooperative research for recreational fisheries, a $0.4 million increase for stock assessments and data collection, and a small decrease for fish information networks. For NWS, central forecast guidance R&D funding would double, for a total of $5.7 million, and there would be a slight increase for local warnings and forecasts. For NESDIS, the NOAA satellites program request includes $0.7 million for coral reef monitoring and an increase of $4.4 million (from the FY2005 hurricane supplemental) for product development, readiness, and applications. For OMAO, there is a combined increase of $7.8 million for marine services, R&D data acquisition, and research fleet maintenance and planning.

For information on the agency's full budget request for FY2007, see CRS Report RS22109, *National Oceanic and Atmospheric Administration (NOAA) Budget for FY2007: President's Request, Congressional Appropriations, and Related Issues*, by Wayne A. Morrissey. **(CRS Contact: Wayne A. Morrissey.)**

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[5] (...continued)
equipment, and maintenance for multiuse R&D facilities, which NOAA does not score as R&D obligations.

Table 8. NOAA R&D Estimates
($ in millions)

NOAA	FY2005	FY2006 Estimate	FY2007 Request
R&D Total	575	546	533
Office of Oceanic & Atmospheric Research (OAR) Line Office Total	410	372	349

Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of Financial Administration, NOAA Budget Office, *Research and Development Budgets FY2005-FY2007*, February 21, 2006.

a. P.L. 108-447 totals were subject to a congressional across-the-board rescission of 0.80%.
b. P.L. 109-272 totals were subject to an OMB 1% across the board rescission. For FY2005 funding details see, P.L 108-447, and for FY2006, see P.L. 109-272.

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 Administration's FY2007 budget includes $581.3 million for NIST, 22.7% below the current fiscal year. Support for internal R&D activities under the Scientific and Technology Research and Services (STRS) account would increase 18.3% to $467 million (including $8 million for the Baldrige National Quality Program). There is no funding for the Advanced Technology Program (ATP), and support for the Manufacturing Extension Partnership (MEP) would decline 55.7% to $46.3 million. Construction funding would total $68 million, a 60.8% decrease from FY2006. (See **Table 9**.)

As part of the ACI, the Administration will attempt 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 requests an increase of 18.3% for intramural R&D at NIST. 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.

For FY2006, the President's budget requested $532 million in NIST funding, a 23% decrease from FY2005 due primarily to an absence of support for ATP and a significant cut in financing for MEP. Included in the total figure was $426.3 million for the STRS account, which primarily finances the internal R&D activities of the laboratory. This amount was 12.5% above the previous fiscal year and included $5.7

million for the Quality Program. MEP was to be funded at $46.8 million, 56% below FY2005 support. The construction budget was $58.9 million.

H.R. 2862, as originally passed by the House, would have provided $548.7 million for NIST, 21% below FY2005 funding. The STRS account was to receive $397.7 million, 5% more than FY2005 but 6.7% below the President's request. Financing for MEP totaled $106 million, a decrease of 1.4% from the earlier fiscal year and more than twice the Administration's budget request. There was no funding for ATP. Construction activities would have received $45 million.

The version of H.R. 2862 initially passed by the Senate would have funded NIST at $844.5 million, almost 21% above the FY2005 budget. Included in this amount was $399.9 million for the STRS account (incorporating $7.2 million for the Quality Program), an increase of 5.6% over previous funding. MEP was to receive $106 million. Support for ATP, absent from both the President's budget request and the original House-passed bill, would total $140 million, 2.6% more than the financing provided in FY2005. The construction budget was to be funded at $198.6 million, more than double the earlier figure. This construction funding was more than three times that proposed by the Administration and more than four times that included in the original House version of the bill.

Subsequently, the final FY2006 appropriations legislation, P.L. 109-108, provides $752 million for NIST, an increase of 8.2% over FY2005 funding (after the mandated rescission). Support for the STRS account totals $394.8 million, including $7.3 million for the Quality Program. This amount is an increase of 4.2% over the previous fiscal year. MEP received $104.6 million, and ATP is financed at $79 million. The funding for MEP is a small decrease from FY2005, whereas support for ATP declines 42% from the earlier figure. The construction budget more than doubles to $173.6 million.

For FY2005, the Omnibus Appropriations Act, P.L. 108-447, provided NIST with $695.3 million (after a mandated 0.8% across-the-board rescission and a 0.54% rescission from Commerce, Justice, and State discretionary accounts). This amount was 14% above FY2004 funding. Internal research and development under the STRS account was $378.8 million (including funding for the Quality Program), almost 12% over the previous fiscal year. The Manufacturing Extension Partnership was funded at $107.5 million, an increase of 178% that brought support for the program up to pre-FY2004 levels. The Advanced Technology Program was financed at $136.5 million (20% below FY2004), and the construction budget received $72.5 million. The legislation also rescinded $3.9 million of unobligated balances from prior year funds in the ATP account.

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 is provided again in the FY2006 appropriations legislation, it was 41% below the earlier fiscal year.

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

Table 9. NIST
($ in millions)

NIST Program	FY2005[a]	FY2006[b]	FY2007 Request
NIST Total	695.3	752	581.3
STRS[c]	378.8	394.8	467
ATP	136.5	79	0
MEP	107.5	104.6	46.3
Construction	72.5	173.6	68

a. After mandated rescissions (but not including those to unobligated balances).
b. Includes mandated rescissions.
c. Includes funding for the Baldrige National Quality Program.

Department of Transportation (DOT)

The Bush Administration requested $557 million for the Department of Transportation's (DOT's) research and development budget in FY2007. This request represents a decrease of almost 21% below the estimated $704 million approved for R&D in FY2006. (See **Table 10**.) Funding for the Federal Highway Administration (FHWA) would remain flat at $227 million for FY2007. R&D funding for the Federal Aviation Administration (FAA) would decline from $311 million in FY2006 to $235 million in FY2007, a 24% decrease from FY2006 estimated funding levels. Some of this decline can be attributed to continued cuts in FFA's development activities. Finally, funding for DOT's other R&D programs are proposed to decline 42% below FY2006 funding levels to $95 million. Most of this decline can be attributed to the National Highway Traffic Safety Administration not requesting applied research funding in FY2007. **(CRS Contact: Mike Davey.)**

Table 10. Department of Transportation R&D
($ in millions)

Department of Transportation	FY2005 Estimate	FY2006 Estimate	FY2007 Request
Federal Highway Administration	154	227	227
Federal Aviation Administration	263	311	235
Others[a]	132	166	95
Total	549	704	557

a. "Others " includes Office of the Secretary, Federal Motor Carrier Safety Administration, Federal Railroad Administration, Pipeline and Hazardous Materials Safety Administration, and the Research and InnovativeTechnology Administration.

Department of the Interior (DOI)

The Administration requested $598 million for R&D in the Department of the Interior (DOI), a 5.7% decline from the $634 million the agency estimates it received in FY2006. (See **Table 11**.) The U.S. Geological Survey (USGS) is the primary supporter of R&D (almost 90 % of the total) within DOI. The USGS areas of research include mapping, geological resources, water quality, and biological resources. The proposed FY2007 budget for R&D within the USGS would decline from $558 million in FY2006 to $532 million in FY2007, a 4.7% decline. The USGS is one of the major sponsors of earth science research, along with NSF, DOE, and NASA.

As indicated in the table, funding for Geological Mineral Resources research is proposed to decline 8.5%, whereas Water Resources is scheduled to decline 8.7%. The geological hazards program conducts basic and applied research, collects long-term data, operates a variety of monitoring networks, and helps to warn the public of impending disasters, such as earthquakes. The geologic resources program assesses the availability and quality of the nation's energy and mineral resources. The geologic processes program researches, monitors, and assesses the landscape to understand geological processes to help distinguish natural change from those resulting from human activity. Water resources research focuses on activities aimed at improving the quality of the U.S. ground water. 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 USGS Biological Research would decline 3.3% below FY2006-estimated funding levels. This research program develops and distributes information needed in the conservation and management of the nation's biological resources. The program serves as the Department'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. **(CRS Contact: Mike Davey.)**

Table 11. Department of Interior R&D
($ in millions)

U. S. Geological Survey	FY2005 Request	FY2006 Estimate	FY2007 Request
National Mapping	37	40	46
Geological Resources	210	212	194
Water Resources	126	126	115
Biological Research	172	179	173
Enterprise Information	1	1	4
USGS total[a]	**546**	**558**	**532**
Other agencies[b]	75	76	66
Total all agencies	**621**	**634**	**598**

a. USGS R&D estimates are from the USGS budget office, and the USGS FY2007 Budget Justification documents.
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)

The Environmental Protection Agency's (EPA's) Science and Technology (S&T) account incorporates elements of the former research and development account (also called extramural research) and EPA's in-house research, development, and technology work. The FY2007 total S&T budget request is $816.1 million, which includes $27.8 million transferred from the Superfund account. For FY2006, the S&T total is $761.0 million, which includes $30.2 million transferred from the Superfund account. The FY2007 total S&T request represents an increase of $55.1 million over FY2006. The FY2005 - FY2006 data shown here reflect rescissions. (See **Table 12**.)

The FY2007 request includes $61 million transferred into the S&T account from EPA's Environmental Programs and Management (EPM) account. This transfer of funds, which is more than the total S&T increase of FY2007 over FY2006, is for rent, security, and utilities costs that were handled previously in EPA's EPM account. This shift will better reflect actual costs for personnel with S&T funds, according to EPA's FY2007 Congressional Justification document. Also noteworthy is the category of congressionally mandated research projects. The FY2007 budget

requests no funds for this category, although the FY2006 amount for this category of research amounted to $33.1 million, which was less than the FY2005 amount of $65.7 million. The Agency's FY2007 budget requests $12.5 million for its Climate Protection Program, approximately $6 million less than its FY2006 level and $8 million less than the FY2005 amount. In addition, the FY2007 budget request proposes to discontinue directed FY2006 Science to Achieve Results (STAR) Research Fellowships, which competitively awards stipends and other research support to graduate students in environmentally related fields. The FY2007 budget request also proposes to discontinue EPA's Environmental Technology Verification (ETV) centers, which verify the performance of innovative clean-up and other environmental technologies. The FY2007 budget request shows reductions of $3 million each for the STAR and ETV programs. EPA's FY2007 budget request includes an $8 million increase for developing new sampling methods for chemical, biological, and radiological agents; for testing outdoor decontamination methods; and for other related activities in the Agency's Homeland Security program.

Beyond the appropriateness of funding levels, a continuing question is the degree to which efforts to ensure sound science (such as the Information Quality Act [IQA] and the Office of Management and Budget's Peer Review guidelines) will affect EPA's S&T work, including the magnitude of Agency resources to satisfy IQA requirements and peer-review guidelines. **(CRS Contact: Michael Simpson.)**

Table 12. Environmental Protection Agency

($ in millions)

EPA	FY2005 Enacted	FY2006 Enacted	FY2007 Request
S&T total	779.9	761.0	816.1
Specifically for S&T	744.1	730.8	788.3
Transferred from Superfund	35.8	30.2	27.8