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Federal Research and Development Funding: FY2004

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SUMMARY

The Bush Administration requested $122.7 billion in federal research and development (R&D) funding for FY2004. This is $5.3 billion above the estimated $117.4 billion that was appropriated for federal R&D in FY2003. This proposed 4.2% increase for R&D is based on new Office of Management and Budget (OMB) FY2003 estimates for civilian R&D, approved by the 108th Congress, on February 13, 2003 (as part of the FY2003 Omnibus appropriation bill P.L. 108-7) that were not available when the President unveiled his FY2004 federal budget on February 3, 2003. Consequently, FY2004 R&D funding comparisons with FY2003 R&D estimates contained in this issue brief (except for DOD R&D numbers which were approved in the 107th Congress) are different than those discussed in the President's FY2004 budget documents.

The President's proposed $4.8 billion increase for DOD R&D ($61.827 billion), along with a $332 million increase for R&D in the Department of Homeland Security, account for almost the entire increase for federal R&D in FY2004. In fact, based on estimated FY2003 spending levels, civilian R&D would decline from $56 billion to $55.8 billion in FY2004. Defense R&D (the sum of DOD's R&D programs and DOE's defense related programs) would increase 8.2%, to $66.9 billion. DOD's basic and applied research programs are proposed to decline 7% and 14% respectively, below FY2003 funding levels. DOD's development activities account for the entire increase in its budget. The Administration has requested $27.070 billion for basic research, a 3.7% increase over FY2003, while applied research funding would be flat at $26.784 billion.

To date, the House has passed all of its appropriations bills while the Senate has passed 7 of its bills. Based on current House actions, CRS estimates that the House has approved an estimated $126 billion for R&D in FY2004, about $4 billion more than the President requested. While the President requested $61.8 billion for DOD's RDT&E program, Congress approved an estimated $65.2 billion for DOD R&D, a 14.3 % increase over the FY2003 estimated level.

Congress has approved large R&D increases for the Department of Homeland Security (DHS) in FY2004, approving a budget in excess of $1 billion. The House has matched the President's request for NIH recommending $27.7 billion, a 2.7% increase, while the Senate approved $28.1 billion for NIH, an increase of 3.7%. The House has approved a total budget for NSF of $5.6 billion, and the Senate VA/HUD Subcommittee $5.5 billion, an increase of about 6.2 % over FY2003.

Current House and Senate actions would increase Interior's and DOE's R&D programs, but would reduce R&D funding (below FY2003) within the Department of Transportation and the EPA. Finally, while the House approved significant cuts in NOAA's and NIST's R&D programs, the Senate Commerce/ Justice/State Appropriations Subcommittee recommended significant increases for those programs.

MOST RECENT DEVELOPMENTS

President Bush has proposed to increase R&D spending 4.2% in FY2004, requesting a record level of $122.7 billion. DOD would receive the largest proposed increase, climbing to a proposed record high of $61.8 billion. Based on the 11 appropriations bills passed by the House, CRS estimates that Federal R&D spending for FY2004 could reach a record $125.5 billion. Both the House and Senate have approved large increases for DOD's and DHS's R&D programs. Congress has passed a Continuing Resolution (P.L. 108-84, expires Oct. 31st), that would maintain funding at FY2003 levels for those agencies that have not had their FY2004 appropriations bills enacted by Congress.

BACKGROUND AND ANALYSIS

Department of Agriculture (USDA)

The FY2004 budget request for research and education in the U.S. Department of Agriculture (USDA) is $2,266 million, a decrease of $113.6 million from the FY2003 level of $2,379.6 million (see **Table 1**). The FY2004 request provides increased funding for several continuing research priority areas: new uses for agricultural products, global climate change, agricultural genomes, biosecurity, agricultural information services, and homeland security supplemental. Other priority areas include protecting agriculture and U.S. trade from terrorism, and emerging and exotic diseases of both plants and animals. Research programs on emerging and exotic diseases are part of the infrastructure to enhance homeland security. The USDA has five biocontainment complexes where research and diagnostic work is done on organisms that pose serious threats to the crop, poultry, and livestock industries. Also, USDA is concerned with training and educating the next generation of agricultural scientists and supporting core university-based research. The request provides increased funding to address these areas.

The USDA conducts in-house basic and applied research. The Agricultural Research Service (ARS) is the lead federal agency for nutrition research, operating five major laboratories in this area, including the world's large multi-disciplinary agricultural research center located at Beltsville, Maryland. There are approximately 100 research facilities throughout the U.S. and abroad. ARS laboratories focus on efficient food and fiber production, preservation of genetic resources, development of new products and uses for agricultural commodities, development of effective biocontrols for pest management, and support of USDA regulatory and technical assistance programs. The FY2004 request provides $1,034 million for ARS, $121.1 million below the FY2003 level. Reductions are proposed in all projects earmarked by Congress in FY2003 in order to finance high priority program increases. The FY2004 request proposes a $3.5 million increase for animal genomics and $8.3 million for emerging diseases and biosecurity. There is also an increase proposed for information technology cyber security and animal waste related problems. The ARS reports that the majority of its facilities, constructed prior to 1960, have become functionally obsolete. Many of the facilities are not in total compliance with current health and safety standards. The FY2004 request for ARS includes $24 million for buildings and facilities.

The Cooperative State Research, Education, and Extension Service (CSREES) distributes funds to universities and organizations that conduct agricultural research. Included is funding for research at the 1862 institutions, 1890 historically black colleges and universities, and 1994 tribal land-grant colleges. Funding is distributed to the states through competitive awards, formula funding, and other means. The FY2004 request for CSREES is $1,019 million, almost level funding with FY2003. Funding for earmarked programs and certain lower priority work is terminated in order to support competitively awarded grants and other high priority programs. Funding for formula distribution in FY2004 to the state agricultural experiment stations (and other eligible institutions) would be $276 million, a slight increase over FY2003. The request proposes increases for the 1890 formula programs in response to the higher authorization levels enacted in the 2002 Farm Bill. Increases are proposed for CSREES graduate fellowships. The FY2004 request funds the National Research Initiative (NRI) Competitive Grants Program at $200 million, $34 million above the FY2003 level.

The Economic Research Service (ERS) is the principal intramural economic and social science research agency in USDA. The request for ERS in FY2004 is $77 million, an increase of $8.3 million over the previous fiscal year. Included in the increase is funding for two priority areas: the security analysis system for USDA ($1 million), and the genomics initiative ($1.1 million). The security analysis system will improve USDA's ability to mitigate security threats to the Nation's food supply. The genomics initiative will provide for the collection on foreign market requirements for genetically-engineered products. The National Agricultural Statistics Service (NASS) conducts the Census of Agriculture and provides current data on agricultural production and indicators of the well-being of the farm sector. The Administration requests $136 million for NASS in FY2004, a decrease of $2.4 million from FY2003.

On July 14, 2003, the House passed H.R. 2673 (H.Rept. 108-193), the Department of Agriculture and Related Agencies Act of FY2004. The House measure provides $2,284.1 million for research and education in FY2004, $18.1 million above the request and $95.5 million below the FY2003 estimate. The Senate Appropriations Committee reported S. 1427 (S.Rept. 108-107), on July 17. The Committee's bill provides a total of $2,358 million in FY2004, $73.9 million above the House, $92 million above the request, and $21.6 million below the FY2003 estimate.

Table 1. U.S. Department of Agriculture

(millions $)

	FY2003 Est.	FY2004 Req.	FY2004 House	FY2004 Senate
Agric. Research Service (ARS)				
Soil & Water Conservation		102.0		
Plant Sciences		355.0		
Animal Sciences		191.0		
Commodity Conversion & Delivery		180.0		
Human Nutrition		77.0		
Integration of Agricultural Systems		41.0		
Information and Library Sciences		23.0		
Repair and Maintenance		18.0		
Contingencies & Trust Funds		23.0		
Subtotal	**1,036.7**	**1,010.0**	**1,014.0**	**1,045.5**
Buildings & Facilities	118.7	24.0	35.9	46.0
Total, ARS a	**1,155.4**	**1,034.0**	**1,049.9**	**1,091.5**
Coop. St. Res. Ed. & Ext. (CSREES) Research and Education				
Hatch Act Formula	179.0	180.0	180.1	179.0
Cooperative Forestry Research	21.7	22.0	21.9	21.7
1890 Colleges and Tuskegee Univ.	35.4	68.0	36.0	35.4
Special Research Grants	147.3	0.0	101.2	101.6
NRI Competitive Grants	166.0	200.0	149.2	180.0
Animal Health & Disease Res.	5.1	5.0	5.1	5.1
Federal Administration	48.2	15.0	36.8	26.7
Higher Education **b**	36.9	30.0	38.4	39.9
Total, Coop. Res. & Educ.[c]	**587.3**	**514.0**	**594.8**	**617.6**
Extension Activities				
Smith-Lever Sections 3b&c	279.4	276.0	275.9	279.4
Smith-Lever Sections 3d	90.1	89.0	90.0	90.1
Renewable Resources Extension	4.5	4.0	4.1	4.5
1890 Research & Extension	46.8	14.0	13.5	14.9
Other Extension Prog. & Admin.	8.6	36.0	54.7	61.2
Total, Extension Activities c	**429.8**	**422.0**	**438.2**	**450.1**
Total, CSREES c	**1,017.1**	**1,019.0d**	**1,033.0**	**1,067.7**
Economic Research Service	68.7	77.0	71.4	69.9
National Agric. Statistics Service	138.4	136.0	129.8	128.9
TOTAL, Research, Education & Economics	**$2,379.6**	**$2,266.0**	**$2,284.1**	**$2,358.0**

a. The total for ARS excludes trust funds and support for Counter-Drug Research and Development and for Anti-Drug Research and Related Matters.
b. Higher education includes payments to 1994 institutions and 1890 Capacity Building Grants program.
c. Program totals may reflect set-asides (non-add) or contingencies.
d. Includes $63 million for Integrated Activities and $11 million for the Native American Endowment Fund and Interest.

Department of Energy (DOE)

For FY2004, DOE requested $8.6 billion for R&D, including activities in each of the department's four business lines: National Security, Science, Energy Supply, and Environmental Quality. This request is 1.0% below the FY2003 level (see **Table 2**). The House and Senate bills (H.R. 2754 and S. 1424 Energy and Water, H.R. 2691 and S. 1391 Interior) would increase funding to $9.1 billion and $8.7 billion respectively.

The requested funding for R&D in National Security is $3.6 billion, which is 2.2% above the FY2003 level after adjusting for programs transferred to the Department of Homeland Security on March 1, 2003. The House and Senate would provide $3.8 billion and $3.6 billion respectively. The bulk of the requested increase is in the Naval Reactors program, which is beginning development of a new nuclear reactor design for future navy ships. The House and Senate changes from the request are largely within the Weapons Activities account. The request and the House and Senate bills all include full funding for continued construction of the National Ignition Facility, scheduled for completion in 2008.

The requested funding for Science is $3.3 billion, an increase of 1.3% over FY2003 after adjusting for programs transferred to the Department of Homeland Security. The House and Senate would provide $3.5 billion and $3.4 billion respectively. Within these overall increases, there would be no major funding shifts between programs. The request and the House and Senate bills would all include full funding for continued construction of the Spallation Neutron Source, scheduled for completion in 2006.

The requested funding for R&D in Energy Supply is $1.6 billion, down 8.7% from FY2003. The largest reduction is a 16.3% cut in the Fossil Energy R&D program, which has begun to apply specific investment criteria for applied R&D as part of the President's Management Agenda. The requested budget would also reduce funding for Energy Conservation R&D by 12.0%. The requested 5.9% increase for Renewable Energy is largely the result of the Hydrogen Fuel Initiative; most other Renewable Energy subprograms would be reduced. The House and Senate each increased funding for Energy Supply R&D to $1.7 billion, shrinking the proposed reductions in Fossil Energy R&D and reducing rather than increasing funds for Renewable Energy.

The requested funding for R&D in Environmental Quality is $64 million, down 46% from FY2003. This change, which follows a 41% reduction in FY2003, reflects the continued reorientation of the program following an internal review of the entire Office of Environmental Management (whose total FY2004 budget request is $7.2 billion). The House provided the requested amount; the Senate provided $85 million.

Table 2. Department of Energy

($ millions)

	FY2003 Appropriated[a]	FY2004 Request	FY2004 House	FY2004 Senate
National Security	**3548.2**	**3626.7**	**3803.2**	**3569.0**
Weapons Activities [b]	2643.5	2654.4	2830.9	2565.7
Naval Reactors	702.2	768.4	768.4	768.4
Nonproliferation & Verification R&D	202.5	203.9	203.9	234.9
Science	**3268.9**	**3310.9**	**3480.2**	**3360.4**
Basic Energy Sciences	1022.2	1008.6	1016.6	1008.6
High Energy Physics	722.0	738.0	748.0	738.0
Biological & Environmental Research	507.2	499.5	562.0	534.0
Nuclear Physics	382.0	389.4	399.4	389.4
Fusion Energy Sciences	248.3	257.3	268.1	257.3
Advanced Scientific Computing	168.6	173.5	213.5	183.5
Other [c]	218.6	244.6	272.6	249.6
Energy Supply	**1796.2**	**1639.3**	**1743.7**	**1691.3**
Energy Conservation R&D	623.5	548.8	609.5	587.6
Fossil Energy R&D	620.8	519.3	609.3	593.5
Renewable Energy	419.6	444.2	407.2 [d]	358.5
Nuclear Energy R&D	132.3	127.0	117.7	151.7
Environmental Quality	**117.4**	**63.9**	**63.9**	**85.1**
Technology Development & Deployment [e]	117.4	63.9	63.9	85.1
Total	**8730.7**	**8640.8**	**9091.0**	**8705.8**

a. Figures for FY2003 are adjusted to reflect program transfers, including the transfer of former DOE R&D programs that became part of the Department of Homeland Security on March 1, 2003. FY2003 figures have also been reduced to reflect the 0.65% across-the-board rescission. They do not include transfers made by DOE subsequent to congressional action or additional funds provided in the Emergency Wartime Supplemental Appropriations Act of 2003 (P.L. 108-11).

b. Includes Stockpile R&D, Science Campaigns, Engineering Campaigns except Enhanced Surety and Enhanced Surveillance, Inertial Confinement Fusion (called High Energy Density Physics in the FY2003 budget request), Advanced Simulation and Computing, and a prorated share of Readiness in Technical Base and Facilities.

c. For FY2003, funding for Science is subject to a general reduction of $20 million. Since DOE's allocation of this reduction to particular programs was not specified by Congress, the full $20 million has been taken out of the "Other" category for the purposes of this table. The same is true for a $1 million general reduction in the FY2004 House report.

d. For comparability, this figure includes $77.0 million in the new Electricity Transmission and Distribution account.

e. Within Defense Site Acceleration Completion in the FY2004 request. Formerly known as Science and Technology within Defense Environmental Restoration and Waste Management.

Department of Defense (DOD)

Nearly all of what the Department of Defense spends on Research, Development, Test and Evaluation (RDT&E) is appropriated in Title IV of the defense appropriation bill (see

Table 3). For FY2004, the Bush Administration is requesting $61.8 billion for Title IV RDT&E. This is approximately $5 billion above the amount made available in Title IV dollars for FY2003. The request would also represent the largest ever single-year RDT&E budget (beginning in 1962), when measured in FY2004 dollars. The 6-year budget plan estimates $394 billion for RDT&E. RDT&E funds are also requested as part of the Defense Health Program ($66 million) and the Chemical Agents and Munitions Destruction Program ($252 million).

While the FY2004 RDT&E request would boost RDT&E funding overall, the proposed increases are focused on development activities. Basic research and applied research are proposed at levels below FY2003 funding, declining 7% and 14% respectively. Over half of DOD's basic research budget is spent at universities and represents the major contributor of funds in some areas of science and technology. Much of the support of research at DOD laboratories comes from applied research accounts. The S&T funding request, which consists of basic and applied research and advanced development (6.1, 6.2 and 6.3 activities in the RDT&E account) is 2.5% of the overall Department of Defense topline of $379.9 billion. In testimony before the Senate Armed Services Committee (June 5, 2001) the Under Secretary of Defense for Acquisition, Technology, and Logistics, Pete Aldridge, suggested that DOD should set S&T funding at 3% of DOD's topline.

The House, in its version of DOD's appropriation bill (H.R. 2658), appropriated $64.6 billion for Title IV RDT&E, including $11.9 billion for S&T. The Senate, in its version (S. 1382), appropriated $63.6 billion for Title IV RDT&E, including $11.4 billion for S&T. Both chambers increased RDT&E funding for the Defense Health Program to $410 million. The House slightly reduced funding for missile defense, below the Administration's request. The Senate approved slightly more funding than what was requested for missile defense.

The appropriations conference report (H.Rept. 108-283) recommended (and Congress approved) an appropriation of $65.2 billion for Title IV RDT&E (including $12.2 billion for S&T). The S&T appropriations equals 3.3% of DOD's total appropriation. While the bill increases applied research and advanced technology development, it left basic research at roughly FY2003 levels. The bill also provided $486 million for RDT&E in the Defense Health Program (including $150 million for peer-reviewed breast cancer research and $85 million peer-reviewed prostrate cancer research) and $252 million in RDT&E for the Chemical Agents and Munitions Destruction Program.

In other issues, DOD requested, and Congress appropriated, $7.7. billion for missile defense RDT&E. The appropriation bill also terminated the Terrorism Information Awareness Program (and all but a few of its component elements) and eliminated the Information Awareness Office within DARPA. It does allow for expenditure of funds for developing processing, analysis, and collaboration technologies within the classified National Foreign Intelligence Program and allows the deployment and use of such technology for lawful military operations outside the United States and for intelligence activities conducted wholly outside the United States or wholly against non-U.S. citizens.

Table 3. Department of Defense

($ millions)

	FY2003 Estimate	FY2004 Request	House Apprn.	Senate Apprn.	Conf.
Accounts					
Army	7,535	9,123	10,186	9,513	10,364
Navy	13,631	14,107	14,666	14,886	15,146
Air Force	18,560	20,336	20,704	20,086	20,201
Defense Agencies	17,061	17,974	18,774	18,774	18,901
(DARPA)	(2,690)	(2,954)	(3,039)	(3,101)	(3,090)
(MDA[a])	(6,719)	(7,729)	(7,478)	(7,804)	(7,712)
Dir. Test & Eval	238	287	294	305	306
Total Ob. Auth.	**$57,025**	**$61,827**	**$64,613**	**$63,564**	**$65, 218**
Budget Activity					
Basic Research	1,417	1,309	1,431	1,358	1,418
Applied Res.	4,289	3,670	4,383	4,048	4,489
Advanced Dev.	5,067	5,253	6,092	5,927	6,308
Advanced Component Dev. and Prototypes	10,754	13,197	13,176	13,070	13,443
Systems Dev. and Demo	13,737	15,913	15,950	16,330	16,131
Mgmt. Support[b]	3,106	3,028	3,315	3,127	3,356
Op. Systems Dev.[c]	18,656	19,458	20,267	19,668	20,073
Total Ob. Auth.[d]	**$57,026**	**$61,828**	**$64,614**	**$63,564**	**$65, 218**
Other Defense Programs					
Defense Health Program	456	66	410	410	486
Chemical Agents and Munitions Destruction	294	252	255	252	252

Source: FY2002 to FY2004 figures based on Department of Defense Budget, Fiscal Year 2004 RDT&E Programs (R-1), February 2002. FY2002 to FY2004 figures for Defense Health Program and Chemical Agents and Munitions Destruction Program come from OMB's FY2004 Budget Appendix. Totals may not add due to rounding. House and Senate appropriations for FY2004 were taken from H.Rept. 108-187 and S.Rept. 108-87, respectively.

a. Includes only BMD RDT&E. Does not include procurement and military construction.

b. Includes funds for Developmental and Operational Test and Evaluation.

c. Includes classified programs.

d. Numbers may not agree with Account Total Obligational Authority due to rounding.

National Aeronautics and Space Administration (NASA)

The National Aeronautics and Space Administration (NASA) is requesting $11.041 billion for R&D for FY2004, out of a total NASA budget request of $15.469 billion (see **Table 4**). That R&D figure is almost exactly the same as NASA received for R&D in FY2003—$11.029 billion. Comparing NASA's FY2003 appropriations and its FY2004 request on a program by program basis is virtually impossible this year, even though comparisons can be made at the aggregate level, such as for total R&D. Budget comparisons at a greater level of refinement are not meaningful because NASA transitioned to full cost accounting and restructured its budget categories in the FY2004 budget request (see CRS Report RL31821 for further explanation). NASA's R&D budget is essentially the entire NASA budget minus the space shuttle program and procurement of other launch services. The shuttle program is excluded because it has been considered an operational program.

However, in the wake of the space shuttle *Columbia* tragedy, some are questioning whether the shuttle is operational or still an R&D program. In this report, the shuttle will continue to be excluded unless it is recategorized as R&D as a result of that debate.

NASA's FY2004 request for the International Space Station is $2.285 billion, comprising $1,707 million in the Space Flight Capabilities account, and $578 million in the Biological and Physical Sciences account. The space station has been controversial for many years because of schedule slippage and cost overruns, but this year the impact on the program of the *Columbia* tragedy is the focus of attention. See CRS Report RS21408 and CRS Issue Brief IB93017.

For Space Science, NASA is requesting $4.007 billion in FY2004. Last year NASA wanted to terminate a proposed mission to Europa, one of the moons of Jupiter, because, at $1 billion, it was too expensive. This year, NASA is proposing a more expensive mission to Europa and two other Jovian moons, Callisto and Ganymede. Called the Jupiter Icy Moons Orbiter (JIMO), it would utilize nuclear power and propulsion that NASA is developing under its Nuclear Systems Initiative (NSI). JIMO and NSI are grouped together in NASA's FY2004 budget under the name Project Prometheus. The request for Project Prometheus is $279 million. The 5-year (FY2004-2008) projected cost is $3 billion, and the total cost estimate is $8-9 billion, though NASA cautions that those are very preliminary. Last year NASA also had wanted to terminate a mission to Pluto and the Kuiper Belt, but Congress directed NASA to continue the program, and NASA includes it in the FY2004 budget request as the first in its "New Frontiers" series of planetary probes.

The request for the Earth Science program is $1.552 billion. NASA is completing the launches of the first set of spacecraft in its Earth Observing System (EOS) to study global climate change. Plans to initiate construction of a second series have been terminated in favor of using instruments on a new generation of weather satellites, NPOESS, being built by the National Oceanic and Atmospheric Administration and DOD. NASA is building a spacecraft, the NPOESS Preparatory Project (NPP), as a "bridge" between EOS and NPOESS. The request for the Office of Biological and Physical Research is $973 million, including $578 million for research on the space station. The extent to which the grounding of the shuttle fleet will impact OBPR's budget is unknown at this time.

Funding for NASA's Office of Aerospace Technologies (OAT) is split in the FY2004 budget request. Aeronautics is in the "Science, Aeronautics, and Exploration" account, and the rest of OAT's activities are in "Crosscutting Technologies" in the "Space Flight Capabilities" account. The request for aeronautics is $959 million; $1.673 billion is requested for the rest of OAT's activities. "Crosscutting Technologies" includes the Space Launch Initiative (SLI), which was significantly restructured in November 2002. It now comprises the Orbital Space Plane (OSP) and Next Generation Launch Technology (NGLT) programs. In the restructured program, NASA plans to rely on the space shuttle longer than originally planned, and to build OSP as a complement (not a replacement). OSP would take crews to and from the space station. It is a spacecraft, not a launch vehicle. NASA would continue technology development for new space launch vehicles through NGLT, but delay a decision on what to build until 2009. OSP is discussed in CRS Issue Brief IB93017; NGLT in CRS Issue Brief IB93062. How the plans for OSP and NGLT may change in the wake of the *Columbia* accident remains unclear, though NASA is studying whether it can accelerate the OSP program by two years.

Table 4. National Aeronautics and Space Administration

($ millions)

Category	FY2003 Request (Nov. 2002, (not in full cost accounting)	FY2003 *Request* in Full Cost Accounting	FY2004 Request in Full Cost Accounting	House-passed approps. (H.R 2861)	Senate Approps. Comm-mittee (S. 1584)
Science, Aeronautics & Exploration	**7,015**	**7,101**	**7,661**	****7,708**	****7,731**
Space Science	3,414	3,468	4,007		
Earth Science	1,628	1,610	1,552		
Biological & Physical Research	842	913	973		
Aeronautics	986	949	959		
Education	144	160	170		
Space Flight Capabilities (R&D only)	**3,321**	**3,619**	**3,380**	**3,403**	**3,180**
Space Flight Space Station*	(1,492)	(1,851)	(1,707)	(1,707)	(1,507)
Crosscutting Technologies	1,829	1,768	1,673	1,696	1,673
Space Launch Initiative	(879)	(1,150)	(1,065)	(1,065)	(1,065)
Other	(950)	(617)	(607)	(631)	(607)
Total NASA R&D	10,336	10,720	11,041	11,111	10,911
Total NASA	***15,000***	***15,000***	***15,469***	***15,540***	***15,339***

Sources: NASA FY2004 budget estimate, committee reports on FY2004 VA-HUD-IA appropriations bill (H.Rept. 108-235, S.Rept. 108-143). Column totals may not add due to rounding. **The NASA-provided figures in the third (shaded) column adjust the FY2003 numbers as though they had been prepared in full cost accounting. They are for comparison purposes only and do not reflect actual funding increases or decreases.**

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

**It is not possible in all cases to determine from the committee reports what changes were made to which SAE subaccounts, so only the total funding for the SAE account is shown here.

The House passed the FY2004 VA-HUD-IA appropriations act (H.R. 2861) on July 25, with a net increase of $71 million for NASA, comprising $96 million in cuts and $167 million in additions. The House made no changes to the space station, space shuttle, OSP, or NGLT programs pending release of the report on the *Columbia* accident (released on August 26, see CRS Report RS21606). The major R&D changes were an addition of $24 million for technology transfer, and cuts of $55 million from New Frontiers, $20 million from the James Webb Space Telescope, $8.15 million from the Space Interferometry Mission, and $13 million from Earth Science Applications. The Senate Appropriations Committee reported its version of the bill (S. 1584, S.Rept. 108-143), cutting the total request by $130 million, comprising a $200 million cut from the space station, and $70 million in net additions elsewhere in the budget request. See CRS Report RL31821 for details.

National Institutes of Health (NIH)

The FY2003 appropriation essentially completed a 5-year doubling of the NIH budget, an effort which had meant increases of 14%-15% per year since FY1999. For FY2004, the President requested a much smaller increase, one considerably lower than the "soft landing" approach of 8%-10% increases for the post-doubling years which has been urged by research advocates. The Administration budget includes a total of $27.893 billion for NIH, an increase of $727 million or 2.7% over the FY2003 program level of $27.166 billion (see **Table 5**). Of that amount, $150 million has already been appropriated (in separate funding for diabetes research), so the amounts requested for congressional consideration are $27.664 billion under the request for the Labor-Health and Human Services-Education (L-HHS) appropriation, and $79 million under the request for the VA-HUD appropriation. The total request for new appropriations of $27.743 billion is an increase of $677 million or 2.5% over the FY2003 budget authority of $27.066 billion. The FY2003 appropriation, provided by the Consolidated Appropriations Resolution (P.L. 108-7, H.J.Res. 2), was a $3.6 billion or 15.4% increase over FY2002.

The House passed its FY2004 Labor-HHS bill (H.R. 2660, H.Rept. 108-188) on July 10, 2003, matching the President's funding request of $27.66 billion for NIH. The Senate passed H.R. 2660 on September 10, after substituting its own reported version (S. 1356, S.Rept. 108-81) and further amending it. The Senate gave NIH $27.98 billion, a $1 billion or 3.7% increase over FY2003; a proposed amendment to add another $1.5 billion was rejected. The VA-HUD appropriation has also passed both the House (H.R. 2861, H.Rept. 108-235) and the Senate (S. 1584, S.Rept. 108-143), providing NIH an additional $80 million and $78.8 million respectively. Neither appropriation has been conferenced.

The FY2004 Administration budget documents portray the increase for NIH's research programs as larger than the overall 2.7% increase, because about $1.4 billion of the FY2003 appropriation was for facilities costs (much of it related to bioterrorism) and other one-time expenses. By devoting those funds to research in FY2004, the request would increase spending on research programs by about $2 billion or nearly 8%, while spending on NIH's intramural buildings and facilities would drop 87% and the extramural facilities construction program would be zeroed out entirely. The Senate restored the extramural facilities program to the FY2003 level ($119 million) and added $9.5 million to the request for intramural facilities. The request would support a record number of research project grants (37,467), including 10,509 in the new and competing renewal category.

Research areas of particular emphasis include biodefense, HIV/AIDS, diabetes and obesity, and broad initiatives in genetics, regenerative medicine, structural biology, bioinformatics, nanotechnology, and molecular imaging. A new effort, termed the "NIH Roadmap," has been made to identify critical roadblocks and knowledge gaps that may be constraining rapid progress in biomedical research. The NIH Director would allocate additional funds to institutes and centers for programs addressing such roadblocks. On July 29, 2003, the National Research Council and the Institute of Medicine released a congressionally-mandated study on the organizational structure of NIH. It recommended that there be more multi-institute strategic initiatives, with a stronger role for the NIH director, more support of "risky" research, and that some existing institutes be merged and a process developed for considering further increases or decreases in the number of NIH units. (For

more information, see the "Biomedicine Issues" section of CRS Report RL31846, *Science and Technology Policy: Issues for the 108th Congress, 1st Session*.)

Table 5. National Institutes of Health (NIH)

($ millions)

Institutes and Centers (ICs)	FY2003 enacted [a]	FY2004 request	FY2004 House	FY2004 Senate
Cancer (NCI)	$4,592.3	$4,770.5	$4,770.5	$4,770.5
Heart/Lung/Blood (NHLBI)	2,793.7	2,868.0	2,868.0	2,897.6
Dental/Craniofacial Research (NIDCR)	371.6	382.4	382.4	386.4
Diabetes/Digestive/Kidney (NIDDK)	1,722.7	1,820.0	1,820.0	1,833.0
Neurological Disorders/Stroke (NINDS)	1,456.5	1,468.9	1,468.9	1,510.9
Allergy/Infectious Diseases (NIAID) [b]	3,706.1	4,335.3	4,335.3	4,335.3
General Medical Sciences (NIGMS)	1,847.0	1,923.1	1,923.1	1,917.0
Child Health/Human Develmt (NICHD)	1,205.9	1,245.4	1,245.4	1,251.2
Eye (NEI)	633.1	648.3	648.3	657.2
Environmental Health Sciences (NIEHS)	614.2	630.8	630.8	637.1
Aging (NIA)	993.6	994.4	994.4	1,031.4
Arthritis/Musculoskeletal/Skin (NIAMS)	486.1	502.8	502.8	505.0
Deafness/Communication Dis. (NIDCD)	370.4	380.4	380.4	384.6
Nursing Research (NINR)	130.6	134.6	134.6	135.6
Alcohol Abuse/Alcoholism (NIAAA)	416.1	430.1	430.1	431.5
Drug Abuse (NIDA)	961.7	995.6	995.6	997.6
Mental Health (NIMH)	1,341.0	1,382.1	1,382.1	1,391.1
Human Genome Research (NIHGR)	465.0	478.1	478.1	482.4
Biomedical Imaging/Bioenginrg (NIBIB)	278.3	282.1	282.1	289.3
Research Resources (NCRR)	1,138.8	1,053.9	1,053.9	1,186.5
Complementary/Alt. Medicine (NCCAM)	113.4	116.2	116.2	117.9
Minority Health/Disparities (NCMHD)	185.7	192.7	192.7	192.8
Fogarty International Center (FIC)	63.5	64.3	64.3	65.9
Library of Medicine (NLM)	300.1	316.0	316.0	311.8
Office of Director (OD) [c]	266.2	318.0	318.0	323.5
Buildings & Facilities (B&F)	628.7	80.0	80.0	89.5
Subtotal, (L-HHS Approp + diabetes)	$27,082.6	$27,814.0	$27,814.0	$28,132.6
Superfund (VA-HUD Approp to NIEHS) [d]	83.5	78.8	80.0	78.8
Total, NIH Program Level [e]	**$27,166.1**	**$27,892.8**	**$27,894.0**	**$28,211.4**
Pre-appropriated Type 1 diabetes funds [f]	-100.0	-150.0	-150.0	-150.0
Total, NIH Budget Authority	**$27,066.1**	**$27,742.8**	**$27,744.0**	**$28,061.4**

Sources: L-HHS: H.Rept. 108-188 on H.R. 2660 and S.Rept. 108-81 on S. 1356;
VA-HUD: H.Rept. 108-235 on H.R. 2861 and S.Rept. 108-143 on S. 1584.

Note: Columns may not add due to rounding.

a. FY2003 reflects the across-the-board rescission of 0.65% mandated in the consolidated appropriation (P.L. 108-7), and a transfer of $583,000 from NIAID to Department of Homeland Security.

b. NIAID totals include funds for transfer to the Global Fund to Fight HIV/AIDS, Malaria, and Tuberculosis ($100 million in FY2003, FY2004 request, and FY2004 House, and $150 million in FY2004 Senate).

c. FY2004 request for OD includes $35 million in Roadmap funds for later distribution to ICs.

d. Separate account in the VA-HUD appropriation for NIEHS activities mandated in Superfund legislation.

e. Does not reflect $8.2 million for NLM in FY2003 and in the FY2004 Senate amount to be provided from the evaluation set-aside (authorized by sec. 241 of the Public Health Service Act).

f. Funds available for diabetes research in accordance with the Balanced Budget Act of 1997 (FY1998-FY2002) and P.L. 106-554 and P.L. 107-360 (included in NIDDK above).

National Science Foundation (NSF)

The FY2004 request for the National Science Foundation (NSF) is $5,481.2 million, a 3.2% ($171.2 million) increase over the FY2003 level of $5,310 million (see **Table 6**). This requested increase would not sustain the goal of doubling NSF's budget over five years as called for in P.L.107-368, signed by the President on December 19, 2002. The proposed 3.2% budget increase is much lower than the 14% increase NSF received in FY2003, which was aimed at initiating the 5 year doubling objective. The FY2004 request provides support for several interdependent priority areas: biocomplexity in the environment ($99.8 million), information technology research ($302.6 million), workforce for the 21st century ($8.5 million), nanoscale science and engineering ($249 million), mathematical sciences ($89.1 million), and human and social dynamics ($24.3 million). The request provides the third installment of $200 million for the President's Math and Science Partnerships program (MSP). The MSP is a five-year investment to improve the performance of U.S. students in science and mathematics at the precollege level. Additional FY2004 highlights include funding for graduate fellowships and traineeships ($215 million), leading-edge research in cyber infrastructure ($20 million), continued support of plant genome research ($75 million), investments in Climate Change Research Initiative ($25 million), added support for the administration and management portfolio ($291.4 million), and funding for three to five new multi-disciplinary, multi-institutional Science of Learning Centers ($20 million).

Included in the FY2004 request is $4,106.4 million for Research and Related Activities (R&RA), a 1.2% increase ($50 million) over the FY2003 level of $4,056.5 million. R&RA funds research projects, research facilities, and education and training activities. In the FY2004 request, the NSF has placed an emphasis on funding rates for new investigators and on increasing grant size and duration. Partly in response to concerns in the scientific community about the imbalance between support for the life sciences and the physical sciences, the FY2004 request provides increased funding for the physical sciences.
Research project support in the FY2004 request totals $2,696 million. Support is provided individuals and small groups conducting disciplinary and cross-disciplinary research. Included in the total for research projects is support for centers, proposed at$411 million. NSF supports a variety of individual centers and center programs. The request provides $45 million for Science and Technology Centers, $57 million for Materials Centers, $60 million for Engineering Research Centers, $13 million for Physics Frontiers Centers, $32 million for the Plant Genome Virtual Centers, and $74 million for Information Technology Centers.

The Major Research Equipment and Facilities Construction (MREFC) account is funded at $202.3 million in FY2004, a 36.2% increase ($53.8 million) over the FY2003 level. The MREFC supports the acquisition and construction of major research facilities and equipment that extend the boundaries of science, engineering, and technology.

The FY2004 request for the Education and Human Resources Directorate (EHR) is $938 million, a 3.9% increase ($34.8 million) over FY2003. Support at the various educational levels in the FY2004 request is as follows: precollege, $346.9 million; undergraduate, $180.7 million; and graduate, $164.9 million. Support at the precollege level includes $200 million for the MSP directed at funding for states and local school districts to join with colleges and universities to strengthen K-12 science and mathematics education. An increase in FY2004 for graduate level programs will allow NSF to raise the stipend of graduate fellows to $30,000 and to increase the number of offers to new fellowships.

Graduate Teaching Fellowships in K-12 Education will be increased to $42.5 million. Funding for the Experimental Program to Stimulate Competitive Research (EPSCoR) is $75 million in FY2004.

Table 6. National Science Foundation

($ millions)**a**

	FY2003 Appr.	FY2004 Req.	FY2004 House	FY2004 Senate
Res. & Related Act. Biological Sciences	$570.7	$562.2	$586.8	$577.2
Computer & Inform. Sci. & Eng.	581.9	584.3	609.9	609.4
Engineering	540.5	536.6	560.1	550.0
Geosciences	692.2	687.9	718.1	692.2
Math & Physical Sci.	1,041.0	1,061.3	1,107.8	1,085.9
Social, Behav. & Econ. Sci.	194.3	211.7	221.0	206.7
U.S. Polar Programs.	319.1	329.9	355.0	341.7
Integrative Activities	116.8	132.5	147.8	157.5
Subtotal Res. & Rel. Act	**4,056.5**	**4,106.4**	**4,306.4**	**4,220.6**
Ed. & Hum. Resr.	903.2	938.0	904.7	975.9
Major Res. Equip. & Facil. Constr.	148.5	202.3	192.3	149.7
Salaries & Expenses	189.1	225.7	221.9	225.7
Office of Inspector General	9.2	8.8	10.0	10.0
National Science Board	3.5	0.0	3.8	3.9
Total NSF	**$5,310.0**	**$5,481.2**	**$5,639.1**	**$5,585.8**

a. The totals do not include carry overs or retirement accruals.
b. Includes $57.3 million in FY2002 and an estimated $65.7 million in FY2003 from H-1B Nonimmigrant Petitioner Receipts. There are no projections for FY2004 due to expiration of H-1B legislation in FY2003.

On July 25, 2003, the House passed H.R. 2861, H.Rept. 108-235, VA, HUD, and Independent Agencies Appropriations FY2004. The bill provides a total of $5,639.1 million for NSF in FY2004, $157.9 million (2.8%) above the FY2004 request and $329.1 million (6.2%) more than the FY2003 estimate. Within the House measure is $4,306.1 million in support of R&RA, $904.7 million for EHR, and $192.3 million for MREFC. On September 4, the Senate Appropriations Committee marked up its version , S. 1584, S.Rept. 108-143. The Senate provides a total of $5,585.8 million for the NSF in FY2004, $104.6 million (1.9%) above the request and $53.3 million (1%) below the House measure. The Senate version provides $4,220.6 million for R&RA, $975.9 million for EHR, and $149.7 million for MREFC.

Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

For FY2004 President Bush requested a total of $765 million in R&D funding for NOAA conduct of R&D, facilities, and major equipment. (See Table 7) This amount is 6% below the estimated $816 million in appropriations for NOAA R&D for FY2003. This figure reflects a 0.65 percent across the board cut required by P.L. 108-7. The Senate

Appropriations Committee reported S. 1585 on Sept. 5, 2003 (S.Rept. 108-144), and recommended total spending of $3.78 billion for NOAA. For the most part, NOAA Research, for which the Committee recommended $394.5 million, would fare well, particularly climate research, for which $162.7 million was recommended. The Committee recommended $21 million for the National Undersea Research Program (NURP). (The House did not include funding for NURP in H.R. 2799.) The Senate Committee did not fund NOAA solar research programs, which it stated in its bill report, was also conducted at NASA. Some $314 million was recommended for NOAA Fisheries S&T programs. For NOAA Environmental Data and Information Centers, $61.7 million was recommended. The Senate Appropriations Committee also recommended $53 million for NOAA's third new Fisheries Research Vessel (FRV#3), and $7.6 million in upgrades for NOAA research aircraft

On July 21, 2003, the House passed H.R. 2799, appropriating $3.05 billion for NOAA for FY2004. The House funded NOAA Research $306.4 million, $60.1 million less than the FY2004 request, and $88 million less than the bill report for S. 1585. Most NOS coastal and ocean science research programs were level funded at $17.3 million, and coastal and ocean assessments programs were funded $81.5 million. About $314 million was appropriated for NOAA Fisheries S&T programs. The House directed the Secretary of Commerce to review NOAA Research labs and joint [research] institutes operations for possible consolidation. (A similar directive is found in the bill report on S. 1585.) More information on NOAA funding for FY2004, may be found in the CRS electronic briefing book on *Commerce, State, Justice, the Judiciary and Related Agency Appropriations* at [http://www.congress.gov/brbk/html/apcjs4.html].

National Institute of Standards and Technology

The Bush Administration's FY2004 budget request includes $496.8 million for the National Institute of Standards and Technology (NIST), 30% less than the $712.1 million appropriated for FY2003. The significant decline proposed for NIST's budget is due to the Administration's goal of ending federal support for the Advanced Technology Program (ATP) and the Manufacturing Extension Partnership (MEP) after the FY2004 budget cycle. The $27 million requested for ATP is to cover on-going commitments; no new projects would be funded. The $12.6 million for MEP is to finance the operation of centers that have not experienced 6 years of federal support. The Scientific and Technical Research and Services (STRS) account (which involves intramural research and development) would receive $387.6 million, an increase of 8% over the previous fiscal year. The construction budget would be $69.6 million. H.R. 2799, as passed by the House on July 23, 2003, provides $460.1 million in FY2004 funding for NIST. This figure is 35% below the FY2003 appropriation due primarily to a major reduction in support for MEP and no funding for ATP. Included in the total is $357.9 million for the core programs in the STRS account (a small increase over FY2003, but 7% below the President's FY2004 request) and $39.6 million for the Manufacturing Extension Partnership (a 63% reduction from FY2003, although 68% above the Administration's FY2004 budget request). The construction budget would total $62.6 million. S. 1585, as reported from the Senate Committee on Appropriations, would fund NIST at $835.2 million for FY2003, 18% above the current fiscal year and almost 81% more than the amount in the House-passed bill. The significant increases contained in the Senate legislation are due primarily to the restoration of funding for the Manufacturing Extension Program and an increase in support for the Advanced Technology Program. S. 1585 provides $383.4 million for the STRS account (7% above

FY2003 and the House bill), $106.6 million for MEP (a slight increase from the current fiscal year and 169% more than H.R. 2799), and $259.6 million for ATP. In addition, the Committee Report to accompany the Senate bill recommends that of the amount designated for ATP, $50 million be used from homeland security projects. Construction would be funded at $84.6 million.

Department of Transportation (DOT)

According to the Bush Administration's Budget, the Department of Transportation (DOT) requested $693 million for research and development in FY2004. This is $142 million below the estimated $830 million that was available in FY2003. However, $133 million of the "decrease" can be attributed to the transfer of the Transportation Security Administration ($ 110 million) and the Coast Guard ($23 million) to the Department of Homeland Security. The House (H.R. 2989) recommended $597 million for DOT R&D, a 15% reduction from FY2003 estimated levels. The proposed cuts would primarily affect the R&D programs of the Federal Highway Administration (FHWA $363 million requested), and the Federal Aviation Administration (FAA $298 million requested). The Senate Transportation Appropriations Subcommittee's bill (S. 1589) recommends a 10% reduction for DOT's R&D programs.

Department of Interior (DOI)

According to the President's budget, the Administration requested $633 million for R&D in the Department of Interior. This is a slight increase from the $627 million received in FY2003. The U.S. Geological Survey (USGS) is the primary supporter of R&D (about two-thirds of the total) within DOI. Areas of research include mapping, and research in geological, water, and biological resources. The FY2004 budget for R&D within the USGS would decline 4%, from $569 million in FY2003 to $545 million in FY2004. The full House (H.R. 2691) and the Senate (S. 1391), rejected the Administration proposal to cut USGS R&D funding approving 6% ($ 577 million) and 5% ($573 million) increases respectively over FY2003 estimated levels.

Environmental Protection Agency (EPA)

The House approved on July 25, 2003 an appropriation for FY2004 of $767.1 million (H.R. 2861) for Science and Technology at EPA (including R&D activities under Superfund), $51.5 million above last year's level of $715.6 million, and $35.6 million above the Administration's FY2004 request of $731.5 million. This sum does not include the transfer of $44.7 million from the Hazardous Substance Superfund to the S&T account. The House also instructed EPA to work with the Department of Health and Human Services to request that the National Academy of Sciences conduct a study that would develop a research agenda for interpreting human biomonitoring data. Among other things, the study should include the development of different approaches to improve the collection of biomonitoring data that are more usable for human health risk evaluation.

Department of Homeland Security

For FY2004, the Department of Homeland Security (DHS) requested approximately $1 billion for R&D. The bulk of this sum, $803.4 million, would fund the Directorate of Science and Technology (S&T). The remainder would be divided among several other units of the Department, such as $75.2 million for R&D in the Transportation Security Administration (TSA). The House (H.R. 2555) provided an increase of $97.0 million for the S&T Directorate and an increase of $50.5 million for R&D in TSA. The Senate (H.R. 2555) provided an increase of $62.6 million for the S&T Directorate and an increase of $55.0 million for R&D in TSA. The conference report (H.Rept. 108-280) increased the request by $114.8 million for the S&T Directorate and by $80.0 million for R&D in TSA. The net increase in R&D funding for the Department as a whole is difficult to identify in all three cases because several Department components outside the S&T Directorate conduct R&D activities below the level of a distinct appropriations account. Addressing this issue, the House directed the Department to report on R&D activities outside the S&T Directorate, including the cost of each activity and why it is not being funded in the S&T Directorate. The conference report went further, expressing concern about the potential for duplication, waste, and lack of management oversight, and directing DHS to consolidate all its R&D funding in the S&T Directorate in the FY2005 budget. In certain cases, this consolidation has already begun as part of the FY2004 appropriations process, as Congress provided funds to the S&T Directorate that were originally requested for R&D programs elsewhere in the Department. Congressional changes to the funding requested by the Administration for the S&T Directorate appear to reflect certain differences in priorities. The share of the Directorate's budget devoted to bioterrorism was reduced from 45% in the request to 33% in the conference report. The Directorate (not TSA's R&D program) received an unrequested $60 million for R&D on anti-missile devices for commercial aircraft. For more information on R&D in DHS, see CRS Report RL31914.

Table 7. R&D Budgets of Preceding Agencies

($ millions)

	FY2002 Actual	FY2003 Estimate	FY2004 Request
National Oceanic and Atmospheric Administration	$868	$816	$765
National Institute of Standards & Technology	678	712	497
Department of Interior	623	627	633
Department of Transportation	892	705	693
Department of Homeland Security a	266	759	1,001
Environmental Protection Agency	825 **b**	716	732

a. FY2002 figures for the Department of Homeland Security are for programs in other agencies that were transferred into the Department by the Homeland Security Act of 2002 (P.L. 107-296). FY2003 figures are Administration estimates based on the FY2003 requested budgets of the same transferred programs. Most of the program transfers did not actually take place until March 1, 2003, or later, several months into FY2003. Because of this, the FY2002 and FY2003 figures should be considered approximate and may be estimated differently by different sources

b. Includes $90.3 million in supplemental funding for Homeland Security.