Order Code IB10083

CRS Issue Brief for Congress
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Research and Development Funding: Fiscal Year 2002

Updated November 14, 2001

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SUMMARY

In the President's Budget released in April, President Bush requested $95.253 billion for federal R&D in FY2002, a 5.8% increase over the estimated $90.010 billion appropriated for FY2001. The budget included $48.579 billion for Defense R&D (DOD's plus DOE's weapons R&D activities), an increase of 8.1%. Federal civilian R&D, for FY2002, would increase to $46.674 billion, 3.6% above FY2001 estimated $45.064 billion level. The President's FY2002 budget also proposes to permanently extend the Research and Experimentation (R&E) tax credit.

Funding for basic research in the President's budget would increase 6.2% to $23.352 billion, while applied research is proposed to increase 4% to $21.553 billion. Together, basic and applied research (referred to as the "research" portion of the R&D budget) would account for 47% of total federal R&D spending, up from 34% of total R&D in FY1990.

Two agencies, DOD and NIH, account for the entire growth in the R&D budget. All of the other civilian agencies (except transportation, which receives R&D funds from a mandatory trust fund) would see their FY2002 research budgets' decline from estimated FY2001 levels. Absent NIH's proposed 13.5% increase ($2.7 billion), funding for the remaining civilian R&D programs would decline around 3%.

On June 27, the President released an amended budget request for the Department of Defense, adding another $5.6 billion for research and development for that department, changing the percentages noted above.

The Administration highlighted three multi-agency research initiatives in its FY2002 budget submission. Funding for the 12 agency (up from 6 agencies in FY2001) Nanotechnology program is scheduled to increase 15% to $485 million. Support for the Networking and Information Technology program would increase $40 million or 2%, reaching $1.969 billion. Funding for the U.S. Global Change Research (USGCR) program would decline 4% below FY2001, to $1.630 billion. A proposed $90 million reduction in NASA's portion of USGCR (mostly in earth sciences) accounts for the entire decrease.

The President's FY2002 R&D budget has raised an issue about the composition of the research portion of the federal R&D budget. The Administration's proposed $23 billion budget for NIH would increase its share of total civilian R&D to 49%, up from 35% in 1990. Members of Congress and representatives from the scientific community have voiced concerns about what they believe is a growing funding "imbalance" between health related research and other fields such as physical sciences, environmental sciences, and engineering.

To date, both the House and Senate have voted to increase the agencies' research and development funding above the President's request. Even so, in some cases, funding would still be below last year's appropriations.

MOST RECENT DEVELOPMENTS

Appropriation bills for Interior and Energy and Water have been signed into law (P.L. 107-63 and P.L. 107-66, respectively). In addition, both the House and Senate have agreed to the conference report on VA/HUD appropriations (H.Rept. 107-272). The bill awaits the President's signature. The House approved the Agriculture appropriations conference report (H.Rept. 107-275). The Commerce/Justice/State appropriations bill was reported (H.Rept. 107-278) out of conference. The Senate approved its version of the Labor/HHS appropriations bill (S. 1536). The House Appropriations Committee approved its defense appropriations bill, but has not yet reported it out.

BACKGROUND AND ANALYSIS

Department of Agriculture (USDA)

The FY2002 budget request for research and education in the U.S. Department of Agriculture (USDA) is $2,144.1 million, a $174.4 million decrease (7.5%) from the FY2001 estimate of $2,318.5 million (see **Table 1**). The FY2002 budget request proposes increased funding for several research priority areas: new uses for agricultural products ($15 million), emerging and exotic diseases and pests ($12 million), and biotechnology ($7.5 million). The FY2002 request assumes that $120 million will be available for the Initiative for Future Agriculture and Food Systems. These funds will address critical issues related to agricultural productivity, food safety, biobased products, and natural resource management. Also, $30 million is proposed for rural development and research, education, and extension projects supported by the Fund for Rural America. USDA will terminate all new Congressionally-earmarked projects for a savings of $34 million, which will be redirected toward other priority 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. Other 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 FY2002 request provides $938.6 million for ARS, level funding with FY2001. 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 FY2002 request proposes an additional $30 million for high priority modernization and construction at seven ARS laboratories.

The Cooperative State Research, Education, and Extension Service (CSREES) distributes funds to universities and organizations that conduct agricultural research. Funding is distributed to the states through competitive awards, formula funding, and other means. The FY2002 request for CSREES is $994 million, a decrease of $144 million (12.7%) from the FY2001 estimate. Funding for formula distribution in FY2002 to the state agricultural

experiment stations (and other eligible institutions) through the Smith-Lever Act would be $275.9 million, about level with FY2001. Funding for the 1890 institutions through the Evans-Allen formula also is maintained at its current level of $32.7 million. Several special grants and construction projects, which target local concerns, are proposed for reductions. The request proposes $106 million, level funding, for the National Research Initiative (NRI) Competitive Grants Program.

The budget proposed for the National Agricultural Statistics Service (NASS) is at $113.8 million in the FY2002 request, $13.1 million above the FY2001 estimate. Programs that are proposed for increased funding include computer security architecture and the Census of the Agriculture. The Economic Research Service (ERS) is the principal intramural social science research agency in USDA. The ERS request for FY2002 is $67.2 million, near the FY2001 level.

On November 9, 2001, the Committee on Conference filed the conference report for H.R. 2330, Agricultural, Rural Development, Food and Drug Administration and Related Agencies, 2002 (H. Rept. 107-275). Conferees provided a total of $2,261.1 million for research and education activities in USDA in FY2002, $117 million above the Administration's request, and $57.4 million below the FY2001 estimate. Included in that total is $1,098.5 million for the ARS, of which $119 million is for the support of buildings and facilities. CSREES is funded at $981.6 million, the Economic Research Service at $67.2 million, and the NASS at $113.8 million.

Table 1. U.S. Department of Agriculture

($ millions)

	FY2000 Act.	FY2001 Est.	FY2002 Req.[d]	FY2002 Conf.
Agric. Research Service (ARS)				
Soil & Water Conservation	88.0	92.1	90.0	
Plant Science	296.0	336.4	324.8	
Animal Science	135.0	142.8	147.1	
Commodity Conversion & Delivery	175.0	185.5	202.3	
Human Nutrition	72.0	75.3	75.7	
Integration of Agricultural Systems	32.0	37.1	37.6	
Information and Library Sciences	18.0	19.5	19.8	
Repair and Maintenance	19.0	18.2	18.2	
Contingencies & Trust Funds	20.0	23.0	23.0	
Subtotal	**855.0**	**938.6**	**938.6**	**979.5**
Buildings & Facilities	53.0	74.2	30.5	119.0
Total, ARS	**908.0**	**1,012.8**	**969.1**	**1,098.5**
Coop. St. Res. Ed. & Ext. (CSREES) Research and Education				
Hatch Act Formula	180.5	180.5	180.1	180.1
Cooperative Forestry Research	21.9	21.9	21.9	21.9
1890 Colleges and Tuskegee Univ.	30.7	32.7	32.7	34.6
Special Research Grants	63.2	85.7	2.8	97.0
NRI Competitive Grants	119.3	106.0	106.0	120.5
Animal Health & Disease Res.	5.1	5.1	5.1	5.1
Federal Administration	14.8	18.1	4.5	21.7

	FY2000 Act.	FY2001 Est.	FY2002 Req.[d]	FY2002 Conf.
Higher Education[b]	28.0	34.0	35.0	39.3
Total, Coop. Res. & Educ.[c]	**490.0**	**506.2**	**407.3**	**542.1**
Extension Activities				
Smith-Lever Sections 3b&c	276.5	276.5	275.9	275.9
Smith-Lever Sections 3d	88.5	100.6	100.5	91.5
Renewable Resources Extension	3.2	3.2	3.2	4.1
1890 Research & Extension	58.0	28.2	28.2	44.7
Federal Admin. & Special Grants	26.0	18.1	5.7	17.6
Total, Extension Activities[c]	**424.9**	**432.0**	**413.4**	**439.5**
Total, CSREES[c]	**1,074.0**	**1,138.0**	**994.0**	**981.6**
Economic Research Service	64.0	67.0	67.2	67.2
National Agric. Statistics Serv.	99.0	100.7	113.8	113.8
TOTAL, Research, Education & Economics	**$2,145.0**	**$2,318.5**	**$2,144.1**	**$2,261.1**

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. The FY2002 budget assumes that $120 million will be available for the Initiative for Future Agriculture and Food Systems. In addition, $30 million will be available for rural development and research, education, and extension projects supported by the Fund for Rural America.

Department of Energy (DOE)

For FY2002, DOE requested $8.00 billion (see **Table 2**), 2.9% below the FY2001 level, for all R&D activities: Energy Resources, Science, National Security, and Environmental Quality. DOE stated that its FY2002 request is designed to meet Administration priorities and to respond to policy reviews currently underway. Congress approved the conference reports (P.L.107-63/H.Rept.107-234 and H.R.2311/H.Rept.107-258) for the two appropriations bills responsible for DOE R&D programs, providing $8.77 billion for R&D for FY2002, 9.6% above the request and 6.3% above the FY2001 level.

For Energy Resources R&D, DOE requested $1.232 billion, 18.2% below the FY2001 level. Conservation and Renewable Energy R&D would be reduced by 26.3% percent from FY2001. DOE states that some of these programs have been ineffective and the nation's current energy situation requires a new focus for energy resource R&D. To that end, DOE proposed $150 million for a clean coal power initiative. Congress agreed to an increase of 36.8% for Conservation R&D above the request. They also approved the full request for the clean coal power initiative, although a portion of the funds are to come from funds previously appropriated for the Clean Coal Technology program.

For Science, DOE requested $3.165 billion for FY2002, 0.1% above FY2001. All programs except Biological and Environmental Research (BER) would be funded at or slightly above this year's levels. In the final appropriations bill, Congress approved $3.251 billion for DOE's science programs. Most of the programs would receive funding at their requested levels. Funding for the BER program would be well above the request, primarily

because of the presence of many congressional specified activities. Congress fully funded the FY2002 construction request for the Spallation Neutron Source within the Basic Energy Sciences program.

For National Security R&D, DOE requested $3.399 billion for FY2002, 2.3% above the FY2001 level. The weapons R&D program would see an increase of $147.6 million. For the National Ignition Facility (NIF), DOE requested $245 million for construction, $46 million above FY2001. In the final appropriations bill, Congress approved $3.611 billion for national security R&D including the full request for NIF. The act provides an increase over the request of 4.9% for weapons R&D and 18.4% for nonproliferation R&D.

Congress appears to be focusing on the role of energy R&D in helping to address the nation's energy problems. The House stated that there appears to be a disconnect between the Administration's National Energy Policy and the DOE budget request, but that DOE needed to do a better job setting goals and priorities in its renewable energy program. Congressional support for the Office of Science is strong, but limited budget resources appear to be constraining any increases. Congressional support for the stockpile stewardship program remains strong, with some concern that the program is not receiving adequate resources.

Table 2. DOE R&D Budget

($ millions)

	FY2001 Appro.	FY2002 Request	FY2002 House[c]	FY2002 Senate[c]	FY2002 Conf[c]
Energy Resources	**1505.7**	**1242.7**	**1632.7**	**1741.1**	**1675.7**
Clean Coal Technology[a]	9.0	82.0	14.0	33.7[b]	(6.3)[b]
Fossil Energy	450.5	449.0	579.0	570.4	582.8
Nuclear Energy	109.1	85.6	93.2	128.6	106.2
Renewable Energy	373.2	276.2	376.8	435.6	396.0
Conservation	572.9	431.4	583.7	606.5	590.7
Science	**3160.6**	**3164.8**	**3173.3**	**3273.7**	**3250.8**
High Energy Physics	712.0	716.1	716.1	725.1	716.1
Nuclear Physics	360.5	360.5	361.5	373.0	360.5
Basic Energy Sciences	991.7	1004.7	1006.7	1040.7	1003.7
Adv Scientific Computing	165.8	163.0	163.0	163.0	158.1
Biological & Environmental	462.5	443.0	445.9	490.0	527.4
Fusion Energy Sciences	248.5	248.5	248.5	248.5	248.5
Other	199.7	229.0	231.6	233.4	236.3
Defense Programs	**3325.0**	**3399.8**	**3342.4**	**3791.3**	**3611.3**
Nuclear Weapons	2359.0	2505.7	2438.3	2790.1	2629.0
Nonprolif & Verification	244.5	206.1	216.1	258.2	244.3
Naval Reactors	687.3	688.0	688.0	688.0	688.0
Adv Accel Apps	33.9	0	0	55.0	50.0
Environmental Quality	**252.1**	**196.0**	**226.9**	**271.7**	**255.8**
Science and Technology	252.1	196.0	226.9	271.7	255.8
TOTAL, DOE	**8243.4**	**8003.3**	**8375.7**	**9078.0**	**8774.3**

[a] Accounts for previously appropriated funds. The amounts are not included in the totals.

[b] These include $33.7 million of previously appropriated funds to be applied to the Clean Coal Power Initiative within Fossil Energy R&D. The Conference agreement defers $40.0 million of such funds to FY2003.
[c] The totals and subtotals do not include general reductions or offsets for charges for reimbursable work because those adjustments have not yet been applied to the individual programs.

Department of Defense (DOD)

In its amended FY2002 budget for the Department of Defense (DOD), the Bush Administration requested an additional $5.6 billion for DOD's Research, Development, Test and Evaluation (RDT&E) account. The total RDT&E request is now $47.4 billion. This does not include the $578 million in RDT&E funding for the Defense Health Program ($421 million) and the Army's Chemical Agents and Munitions Destruction Program ($157 million). The amended RDT&E request is $6.4 billion above the amount appropriated for RDT&E in FY2001. Much of this increase is directed at ballistic missile defense. The Ballistic Missile Defense Organizations RDT&E request has risen to $7.0 billion. BMDO's RDT&E appropriation for FY2001 was $4.3 billion. It should be noted, however, that the BMDO program is changed somewhat, with some more mature BMDO programs transferred to the Services (e.g. Patriot PAC-3) and other less mature ballistic missile defense- related program managed by the Services transferred back to BMDO (e.g. the Air Force's Airborne Laser program). The amended request also gives greater emphasis to programs the Administration believes to be more suitable to far term threats, including those to counter unconventional attacks and attacks with weapons of mass destruction, and systems (including unmanned systems) that can locate, track, and attack targets with greater speed and at greater distances.

While the amended budget raised the total RDT&E request, the Science and Technology (S&T) part of the RDT&E program was reduced. In its "Blueprint" budget of last April, the Administration requested $9.1 billion for S&T programs. The amended budget reduces this to $8.8 billion. This is still over $1.5 billion more that what the Clinton Administration had proposed to spend on S&T in FY2002, but less than what Congress appropriated for S&T for FY2001 ($9.0 billion). The Administration notes that the amended S&T request amounts to 2.7% of the total DOD budget, within the range Under Secretary Pete Aldridge has set as a target. The $8.8 billion for S&T is still above the target set by Congress in its FY1999 defense authorization bill. That target was to increase S&T by 2% above inflation through FY2008, using the FY1999 S&T budget request as a baseline. According to that target, S&T funding for FY2002 should be approximately $8.0 billion.

The House appropriations committee has recommended appropriating $48.6 billion for RDT&E. The bill establishes a new appropriations title (Tile IX - Counter-Terrorism and Defense Against Weapons of Mass Destruction). The new title consolidates the funding of major Defense-wide programs the committee feels targets the new threats the nation faces. The pace of transitioning the force structure to meet these new threats (terrorism, weapons of mass destruction, cyber attacks and other asymmetric threats) has been debated for some time. The Bush Administration expressed its goal of accelerating that transition. The House appropriations committee felt it would be easier to track and evaluate that transition by consolidating relevant defense-wide programs into the new title. The new title includes all of the Ballistic Missile Defense program, all of the procurement and RDT&E associated with the Chemical and Biological Defense Program (including DARPA's biological warfare

defense program), all of the Defense Threat Reduction Program, and the Cooperative Threat Reduction program.

In addition, the committee recommended an additional $1.7 billion for a Counter-Terrorism and Operational Response Transfer Fund. This fund would allow the Secretary of Defense and the Director of Central Intelligence the flexibility to allocate these funds were needed to accelerate efforts in the war on terrorism. Of this $1.7 billion, $155 million is to be directed toward RDT&E in chem/bio defense and in information assurance programs.

S&T funding under the bill would increase to $9.7 billion. However, there are adjustments associated with a Joint DOE Research effort and a waiver for BMDO of P.L. 102-564, which allows for increases in contributions to the Small Business Innovative Research Program.

Table 3. Department of Defense RDT&E

($ millions)

	FY2000	FY2001 est.	FY2002 amended request	House Apprn.
Accounts				
Army	5,314	6,280	6,694	7,115
Navy	9,065	9,458	11,123	10,896
Air Force	14,527	13,993	14,344	14,884
Defense Agencies	9,551	11,053	15,051	15,438[c]
(DARPA)	(1,850)	(2,010)	(2,281)	(2,206)
(BMDO[a])	(3,457)	(4,204)	(7,036)	(7,054)
Dir. Test & Eval	265			
Dir. Op.Test/Eval	31	225	217	245
Total Ob. Auth.	**$38,753**	**$41,009**	**$47,429**	**$48,579**
Budget Activity				
Basic Research	1,139	1,317	1,304	1,358
Applied Res.	3,409	3,676	3,659	3,948
Advanced Dev.	3,789	4,000	3,815	4,383
Demonstr./Valid.	6,514	7,830	11,381	11,341
Engrg/Mftg. Dev.	8,879	8,735	10,249	10,031
Mgmt. Support[b]	3,076	2,634	3,003	2,814
Op. Systems Dev.	11,947	12,816	14,235	14,506
Total Ob. Auth.	**$38,753**	**$41,008**	**$47,429**	**$48,381[d]**

Source: FY2000 to FY2002 figures based on Department of Defense Amended Budget, Fiscal Year 2002 R-1, June 2001. FY1999 figures come from Department of Defense Budget for Fiscal Year 2000, RDT&E Programs (R-1), February 2000. 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.This includes funds from both Title IV and the new Title IX, including the additional $155 million for RDT&E in the Counter-Terrorism and Operational Response Transfer Fund.

d.The total obligational authority broken down by activity does not include the $20 million reduction for the DOE Joint Research adjustment, does not include the additional $255 million in RDT&E funding for the Chem/Bio and Information Assurance programs in the Counter-terrorism and Operational Response Transfer Fund in the new Title IX of the House appropriation bill, and does not include the $39 million reduction associated with waiving P.L. 102-564 for BMDO, since it is not known which activities these adjustments will affect.

National Aeronautics and Space Administration

The National Aeronautics and Space Administration (NASA) requested $9,773.3 million for R&D for FY2002 (see **Table 4**), 1.1% above the FY2001 level. According to NASA, the budget request emphasizes space exploration and science and provides "strong" support of the space launch initiative, improving aviation safety, and the Space and Earth Sciences programs. On November 8, 2001, Congress approved $9,964.7 million (H.R.2620, H.Rept.107-272), 2.0% above the request and 3.1% above the FY2001 level.

For the International Space Station (ISS), NASA requested $1,831.3 million, which included a transfer of $283.6 million for ISS research to the Biological and Physical Research program. Earlier this year, NASA announced that a new ISS cost estimates revealed that an additional $4.8 billion over the next several years might be needed to complete the station as currently configured. In order to accommodate these findings, NASA proposed scaling back the ISS to include just those units already constructed and awaiting launch, adding about $1 billion to the ISS budget over the next five years, and cancelling the crew return vehicle (CRV) project. The changes proposed could have a significant impact on the station's ultimate use as a research facility. Congress approved $1,963.6 million for the ISS including support (civil service) costs. No funding was provided for the CRV. Actual funding for the ISS would be $75 million below the request. Congress reduced funding in an attempt to get NASA to do a better job in getting station costs under control.

Table 4. National Aeronautics and Space Administration
($ millions)

	FY2001 Appro	FY2002 Request	FY2002 House	FY2002 Senate	FY2002 Conf
Human Space Flight (R&D only)	**2,186.2**	**2,298.0**	**2,336.0**	**2,165.5**	**2,107.6**
Space Station	2,112.9	1,831.3	1,831.8	1,681.3	1,756.3
Eng and Tech Base	73.3	75.2	75.2	55.2	75.2
Mission Support	409.7	429.0	429.0	429.0	276.1
Science, Aeronautics, and Technology	**7,066.9**	**7,475.3**	7,606.3	7,699.0	**7,857.1**
Space Science	2,624.7	2,786.4	2,759.4	2,764.9	2,848.9
Biological & Physical Research	378.8	644.5	710.9	694.5	714.4
Earth Science	1,716.2	1,515.0	1,516.7	1,557.6	1,573.4
Aero-Space Technology.	2,214.5	2,375.7	2,430.8	2,469.9	2,489.6
Academic Programs	132.7	153.7	188.5	212.1	230.8
Total NASA R&D	**9,662.8**	**9,773.3**	**9,942.3**	**9,864.5**	**9,964.7**

For FY2002, NASA requested $2.786 billion for Space Science, 5.7% above the FY2001 level. The Mars Exploration Program has been restructured and expanded and now plans four missions this decade including one launched in April. NASA plans to launch several space science missions in FY2002 including the last of the great observatories, the Space InfraRed Telescope Facility. NASA also announced that the Pluto/Kuiper mission will be placed on indefinite deferral because of cost considerations. Congress provided $2,848.9 million for Space Science, 2.2% above the request and 8.5% above the FY2001 level. The

amount approved included $30 million for the Pluto/Kuiper mission. Congress directed NASA to proceed with that mission. Congress also directed NASA to provide it with a plan for the Mars program beyond the missions proposed for 2007.

For Aero-Space Technology, NASA requested $2,375.7 million for FY2002, 7.1% above the FY2001 level. Included in the request is a 64% increase for the Space Launch Initiative (SLI). NASA is also proposing a refocused aeronautics R&D program that is aimed at a 21st Century aerospace vehicle. The features of this program are not well defined and some concern has been raised that it may not be what the commercial aviation industry needs at this point. Congress approved $2,489.6 million for the AST program, 4.8% above the request and 12.4% above the FY2001 level. The appropriation included a reduction of $10.0 million from the request for the SLI. Congress also directed NASA to provide a separate accounting of aeronautics research in future budget submissions.

National Institutes of Health (NIH)

The Bush Administration has requested $23.11 billion for NIH for FY2002, an increase of $2.75 billion or 13.5% over the comparable FY2001 appropriation of $20.36 billion (see **Table 5**). Both figures include NIH's main appropriation from the Labor, Health and Human Services, Education and Related Agencies (L-HHS) appropriations act ($23.04 billion in the request), plus an additional increment ($70 million in the request) from the appropriations act covering the Departments of Veterans Affairs, Housing and Urban Development (VA-HUD) and several independent agencies, including the Environmental Protection Agency (EPA). NIH has responsibility for some hazardous waste research and worker training programs under the Superfund Act that previously have been funded by interagency transfer from EPA, and not counted in the NIH budget. Starting with the FY2001 VA-HUD appropriation, a separate account gives the money directly to NIH.

The President has said he is committed to continuing the path to doubling the NIH budget over the 5-year period ending in FY2003 (the Superfund money did not count in the original calculation). His request for FY2002 is not quite large enough to be precisely "on track" for the doubling; the biomedical research advocacy community is calling on Congress to provide an increase of $3.4 billion or 16.5% to reach a FY2002 total of $23.7 billion. With the lower amount proposed in the request for FY2002, the Bush budget projects that for FY2003 an increase of nearly18% would be needed to reach the target total of $27.2 billion. Three "installments" on the doubling have been provided in L-HHS appropriations since the FY1998 base year budget level of $13.6 billion: the appropriation was increased by $2.0 billion or 14.6% to $15.6 billion in FY1999; by $2.2 billion or 14.2% to $17.8 billion in FY2000; and by $2.5 billion or 13.9% to $20.3 billion in FY2001.

NIH's plans for spending these large sums focus around four broad "research themes" representing opportunities across all institutes and centers for new scientific knowledge and applications to strategies for diagnosing, treating, and preventing disease. These areas of research potential include: (1) genetic medicine/exploiting genomic discoveries (DNA sequencing, identification of disease genes, development of animal models); (2) reinvigorating clinical research (strengthening clinical research centers, clinical trials, and clinical training, including support of four new loan repayment programs); (3) infrastructure and enabling technologies, including interdisciplinary research (advanced instrumentation, biocomputing and bioinformatics, engaging other scientific disciplines in medical research on drug design,

imaging studies, biomaterials); and (4) eliminating health disparities in minorities and other medically underserved populations. No specific funding levels are mentioned for these "theme" areas. Two new entities created by Congress last year, the National Institute of Biomedical Imaging and Bioengineering (NIBIB) and the National Center on Minority Health and Health Disparities (NCMHD), would be funded at $40 million and $158 million, respectively.

The request continues NIH's emphasis on support of extramural research, particularly basic research, through independent investigator-initiated research project grants. Over 36,100 competing and non-competing projects would be supported, a record number, with the same number of new and competing awards (9,158) as in FY2001. Other funding mechanisms, including research training, research centers, contracts, intramural research, and research management would receive increases ranging from 9% to 20%. Intramural construction would be nearly doubled, including funding for a new Neurosciences Research Center and a new animal facility, while extramural construction would increase 28% to $100 million.

The request for the fourth year of substantial new resources for NIH raises several questions for Congress and the agency. In the face of restraints on the growth of discretionary spending, Congress must decide how to handle the growing disparity between funding for health research and support of other fields of science, as well as the impact of large increases for NIH on the other programs funded in the Labor-HHS appropriations act. NIH itself is struggling with the increasing strain on its research management and support system, funding for which has not kept pace with its growing responsibilities from large budget increases. In addition, NIH is making plans for the expected transition from the years of plentiful resources during the doubling effort to subsequent years of a maintenance level of effort. The agency is currently analyzing strategies to "maximize budgetary and management flexibility," including whether some grants and contracts might be given full funding in their first year to lessen the burden of commitments in future years. Another strategy under study is support of more one-time activities such as high-priority construction and renovation projects that will not require funding commitments in the future. Finally, contentious issues in several areas of research oversight continue to draw attention: research on human stem cells, human embryo research, cloning, human subjects protection, gene therapy, and conflicts of interest on the part of researchers.

The House voted on its Labor/HHS/Education bill (H.R.3061). The House Appropriations Committee had recommended $22.9 billion for NIH. The Senate appropriations committee reported out its Labor/HHS/Education bill (S.1536), recommending appropriations of $23.7 billion for NIH.

Table 5. National Institutes of Health (NIH)

($ millions)

Institutes and Centers (ICs)	FY1999 actual [a,b]	FY2000 comp [a,c]	FY2001 comp [a,d]	FY2002 request [a]
Cancer (NCI)	$2,918.0	$3,299.6	$3,737.9	$4,177.2
Heart/Lung/Blood (NHLBI)	1,788.0	2,024.9	2,299.1	2,567.4
Dental/Craniofacial Research (NIDCR)	233.6	268.9	306.2	341.9
Diabetes/Digestive/Kidney Dis. (NIDDK)	991.1	1,141.3	1,303.8	1,457.9
Neurological Disorders/Stroke (NINDS)	900.2	1,029.8	1,177.0	1,316.4
Allergy/Infectious Diseases (NIAID)	1,565.2	1,812.4	2,063.0	2,355.3
General Medical Sciences (NIGMS)	1,203.1	1,371.1	1,540.2	1,720.2
Child Health/Human Developmt (NICHD)	748.6	861.4	978.9	1,096.6
Eye (NEI)	394.6	449.9	510.6	571.1
Environmental Health Sciences (NIEHS)	374.5	443.3	503.1	561.8
Aging (NIA)	594.6	688.0	786.5	880.0
Arthritis/Musculoskeletal/Skin (NIAMS)	307.2	349.2	396.6	443.6
Deafness/Communication Dis. (NIDCD)	229.2	264.1	301.1	336.8
Nursing Research (NINR)	69.6	90.3	105.2	117.7
Alcohol Abuse/Alcoholism (NIAAA)	258.9	293.1	340.6	382.0
Drug Abuse (NIDA)	601.6	686.8	781.0	907.4
Mental Health (NIMH)	858.5	974.1	1,106.7	1,238.3
Human Genome Research (NIHGR)	279.0	335.5	382.1	426.7
Biomedical Imaging/Bioenginrg (NIBIB) [e]	0	0.2	2.0	40.2
Research Resources (NCRR)	562.1	674.6	817.3	974.0
Complementary/Alt. Medicine (NCCAM)	40.5	78.4	89.1	100.1
Minority Health/Disparities (NCMHD) [f]	0	97.6	132.1	158.4
Fogarty International Center (FIC)	35.3	43.3	50.5	56.4
Library of Medicine (NLM)	181.0	215.0	246.4	275.7
Office of Director (OD)	255.6	162.2	187.5	232.1
Buildings & Facilities (B&F)	216.9	165.4	153.8	306.6
[AIDS/Off of AIDS Research (non-add)] [g]	[1,792.7]	[2,004.4]	[2,243.4]	[2,501.4]
Subtotal,NIH Progs (L-HHS Approp)	**$15,606.8**	**$17,820.2**	**$20,298.3**	**$23,041.9**
Superfund (VA-HUD Approp to NIEHS) [h]	60.0	60.0	62.9	70.2
Total,NIH Budget Authority	**$15,666.8**	**$17,880.2**	**$20,361.1**	**$23,112.1**

Source: NIH FY2002 Justification of Estimates for Appropriations Committees.
Note: Columns may not add due to rounding.

a. Does not include these transfers: funds for diabetes research (NIDDK) that were pre-appropriated in the Balanced Budget Act of 1997 and the Benefits Improvement and Protection Act of 2000 (FY99 and FY00=$27 million; FY01 and FY02=$93.2 million); and $9.5 million (FY00-02) to NIDA from Office of National Drug Control Policy ($9.670 million in FY99).

b. FY1999 (actual obligations, not comparable) reflects transfer of $4.967 million to DHHS under the Secretary's 1% transfer authority and rescission of $10.230 million in administrative and travel funds.

c. FY2000 reflects rescission of $99.883 million, transfer of $3.516 million to DHHS under Secretary's 1% transfer authority, transfer of $20 million from NIAID to Centers for Disease Control, transfer to NIAID of $19.883 million for NIH Challenge Grants. Comparable for Central Services formula adjustments and AREA Awards. Includes $40 million advance appropriation for Buildings and Facilities from FY1999 appropriation.

d. FY2001 reflects rescission of $8.666 million, $0.139 reduction in Superfund activities, transfer of $5.8 million to DHHS for Office for Human Research Protection, and comparable adjustments for the AREA Awards from OD to the ICs.

e. National Institute for Biomedical Imaging and Bioengineering was established Dec. 2000. Activities were previously funded by the OD Office of Bioengineering, Bioimaging, and Bioinformatics.

f. National Center for Minority Health and Health Disparities was established Nov. 2000. Activities were previously funded by the OD Office of Research on Minority Health.
g. All AIDS funding is appropriated to the individual institutes and centers. Total AIDS spending, as jointly determined by the NIH Director and the Director, Office of AIDS Research, is shown in brackets.
h. Separate account starting in FY2001. In FY1999 and FY2000, the appropriation was made to the Environmental Protection Agency, which reimbursed NIEHS for Superfund activities.

The National Science Foundation (NSF)

The FY2002 request for the National Science Foundation (NSF) is $4,472.5 million, 1.3% ($56.1 million)above the FY2001. (see **Table 6**). The FY2002 request provides support for several interdependent priority areas: biocomplexity in the environment ($58.1 million, 5.9% above FY2001), information technology research ($272.5 million, 5% above FY2001), learning for the 21st century ($125.5 million, 3% above FY2001), and nanoscale science and engineering ($173.7 million, 16% above FY2001). NSF will continue its lead role in the multi-agency National Nanotechnology Initiative. The request includes $200 million in support of the President's New Math and Science Partnerships Initiative (MSPI). The MSPI will provide funding for states and local school districts to join with colleges and universities to strengthen K-12 science and mathematics education. The NSF will provide leadership in the MSPI. In addition to the math and science partnerships, the request highlights increased funding for graduate students ($26.2 million) and interdisciplinary mathematics research ($20 million). The FY2002 budget provides funding of approximately $25.6 million to initiate a new cohort of six to eight science and technology centers. The NSF will continue its support of plant genome research, proposing $65 million in FY2002.

Table 6. National Science Foundation

($ millions)

	FY2001 Est.	FY2002 Req.	FY2002 House	FY2002 Senate
Res. & Related Act. Biological Sciences	$485.4	483.1	–	–
Computer & Inform. Sci. & Eng.	477.9	470.4	–	–
Engineering	430.8	431.1	–	–
Geosciences	562.2	558.5	–	–
Math & Physical Sci.	850.8	863.6	–	–
Social, Behav. & Econ. Sci.	164.4	163.2	–	–
U.S. Res. Prog.	210.8	214.0	–	–
U.S. Antarctic Log. Act.	62.5	62.6	–	–
Integrative Activities	97.8	80.6	–	–
Subtotal Res. & Rel. Act	**3,342.6**	**3,327.0**	**3,642.3**	**3,514.5**
Ed. & Hum. Resr.	785.6	872.4	885.7	872.4
Major Res. Equip.	121.3	96.3	135.3	108.8
Salaries & Expenses	160.5	170.0	170.0	170.0
Office of Inspec. Gen.	6.3	6.8	6.8	6.8
Total NSF	**$4,416.4**	**$4,472.5**	**$4,840.2**	**$4,672.5**

Included in the FY2002 request is $3,327 million for Research and Related Activities (R&RA), 0.5% ($15.7 million) below FY2001 estimate of $3,342.6 million. R&RA funds research projects, research facilities, and education and training activities. In the FY2002 request, the NSF has placed an emphasis on funding rates for new investigators and on

increasing grant size and duration. The R&RA includes Integrative Activities (IA), created in FY1999, which funds cross-disciplinary research, major research instrumentation, intellectual infrastructure, and the Science and Technology Policy Institute. The FY2002 request for IA is $80.6 million, a decrease of $17.1 million below FY2001.

Research project support in the FY2002 request totals $2,219.8 million, a decrease of 1.4% below FY2001. 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 $325 million. NSF supports a variety of individual centers and center programs. The request provides $45 million for Science and Technology Centers (STC). Continued support is provided for an additional five new centers initiated in FY1999. Twelve STCs that explore interdisciplinary research activities are being phased down as planned. Funding resulting from the phasing down of those STCs will allow for the establishment of a new cohort of centers in FY2002. The support for Information Technology Centers, initiated in FY2000, is $53 million. Research facility support in FY2002 is $1,024 million, 3.5% below FY2001.

The Major Research Equipment (MRE) account requested $96.3 million in FY2002, 20.6% ($25 million) below the FY2001 level. The MRE, established in FY1995, supports the construction of major research facilities that are at the "cutting edge of science and engineering." Three projects are supported in this account for FY2002: the Terascale Computing Systems ($55 million), the Large Hadron Collider ($16.9 million), and the Network for Earthquake Engineering simulation ($24.4 million). The Atacama Large Millimeter Array (previously referred to as the Millimeter Array) is provided $9 million from the R&RA. This support is tentative, pending a review of facilities management issues. No funds are requested in FY2002 for the High-Performance Instrumented Airborne Platform for Environmental Research (HIAPER). Funding was completed in FY2001 for the South Pole Station Modernization.

The FY2002 request for the Education and Human Resources Directorate (EHR) is $872.4 million, 11% ($86.8 million) above the FY2001 estimate. Support at the various educational levels in the FY2002 request is as follows: precollege, $357.7 million; undergraduate, $150.6 million; and graduate, $103.6 million. Support at the precollege level includes an investment of $200 million to initiate the MSPI. The MSPI addresses such issues as teacher preparation and training, curriculum construction, and science and mathematics standards. The MSPI is the centerpiece of EHR's education activities at this level, resulting in the redirection of $110 million from other EHR programs. Funding remains constant at $20.7 million in FY2002 for Centers for Learning and Teaching (CLT). Support will continue for the Systemic Reform Initiatives and Instructional Materials Development.

Major programs at the undergraduate level are Advanced Technological Education, Louis Stokes Alliances for Minority Participation, Scholarship for Service, Minority-Servicing Institutions, and Course Curriculum, and Laboratory Improvement. The increased support at the graduate level allows NSF to raise the stipend of graduate fellows and to increase the number of offers to new fellowships. Support at this level is directed at the Graduate Research Fellowship, Graduate Teaching Fellows in K-12 Education, Integrative Graduate Education and Research Traineeships, and Alliances for Graduate Education and the Professoriate (formerly the Minority Graduate Education program). Funding for the Experimental Program to Stimulate Competitive Research (EPSCoR) is $74.8 million (an

additional $24.6 million from R&RA will support EPSCoR activities). It is anticipated that the H-1B nonimmigrant petitioner fees collected in FY2002 will approximate $144 million.

On July 25, 2001, the House Appropriations Committee reported H.R. 2620 (H.Rept. 107-159), VA, HUD, and Independent Agencies Bill. The bill provides a total of $4,840.2 million for NSF in FY2002, $367.7 million above the President's request. Included in the total is $3,642.3 million for R&RA, an increase of $315.3 million over the request. The Senate reported its version on July 20 (S. 1216, S.Rept. 107-43). The Senate provides a total of $4,672.5 million for NSF in FY2002, $200 million more than the request and $167.7 million less than the House version. The Senate provides $3,514.5 million for R&RA, $187.5 million above the request, and $127.8 million below the House version.

Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

For FY2002, The President requests $649 million for NOAA R&D **(See Table 7)**, approximately 21% of the total budget for the agency ($3.1 billion). This amount includes funding for R&D equipment and R&D facilities construction and maintenance. The FY2002 request is about 2.2% greater than FY2001 appropriations (Budget officials at NOAA contend that FY2002 request for R&D is actually $751 million. OMB and NOAA officials are reviewing FY2002 R&D estimates.) NOAA provides R&D funding to its budget line offices from Operations, Research, and Facilities (ORF); Procurement, Acquisition, and Construction (PAC); and Other accounts. R&D funding requested for ORF for FY2002 would be divided as follows: National Ocean Service (NOS)-$64 million; National Marine Fisheries Service (NMFS)-$302 million; Oceanic and Atmospheric Research (OAR)-$279 million; National Weather Service (NWS)-$17 million; National Environmental Satellite Data and Information Service (NESDIS)-$11million; Program Support (PS)-$52 million; Fleet Maintenance & Planning (FM&P)-$8 million. Funding for PAC would be $16 million and Other Accounts $2.4 million (PDAF).

Some 37% of NOAA's R&D funding request for FY2002 would go to OAR and would fund 12 environmental research labs which do research that supports NOAA operational programs in weather, climate, and atmosphere, and Great Lakes and oceanic research. OAR funds intramural research and also provides grants to states through the National Sea Grant College and National Underwater Research Programs (NURP). NMFS would receive 40% of total R&D funding for fisheries research and research on endangered species. Together OAR and NMFS lines would account for about 77% of all NOAA R&D Funding for FY2002. Remaining R&D funding is distributed to other ORF budget lines including NOS, NWS and NESDIS, and would also fund maintenance of research facilities (including non-OAR laboratories).

For FY2002, the largest R&D increases were slated for NMFS fisheries information collection and analysis, and for research grants to States involved in endangered species conservation and management. The latter included $29 million for Stellar Sea Lion research. Other notable increases in R&D funding were for Climate and Observation Services; NWS Operations and Research for Central Forecast Guidance; U.S. Weather Research Program; 2002 Ocean Exploration Initiative; PS Aircraft Services, and PDAF. A decrease was

proposed for R&D for Satellite Observation Systems under NESDIS. However, this decrease represented a transition from research to operation for NPOESS and GOES satellite systems funded in the operational budget. As of October 2001, the American Association for the Advancement of Science (AAAS) has estimated FY2002 appropriations for R&D at NOAA to be $744 million, as approved by the House, and $835 million as approved by the Senate in H.R. 2500, Commerce appropriations for FY2002.

National Institute of Standards and Technology

In his FY2002 budget proposal, President Bush requested $487.5 million in funding for the National Institute of Standards and Technology (NIST), 19% less than the FY2001 appropriation (see **Table 7**). Support for the Scientific and Technical Research and Services (STRS) account that funds in-house R&D would be $347.3 million, 11% over the current fiscal year. The Manufacturing Extension Program (MEP) would be financed at $106.3 million, while new grants under the Advanced Technology Program (ATP) would be suspended pending an additional evaluation pf the activity. However, $13 million would be provided for on-going project commitments. Construction efforts would be funded at $20.9 million.

As passed by the House, H.R. 2500, the FY2002 appropriations bill would provide $490 million for NIST, an 18% decrease in support primarily due to an absence of funding for ATP. The STRS account would receive $348.6 million (a 12% increase over FY2001) while financing for ITS would total $119.5 million. Of this amount, $106.5 million is for the MEP and $13 million is to cover prior funding agreements under ATP although this program would be eliminated. The construction budget would be $20.9 million.

The Senate-passed version of H.R. 2500 would fund NIST at $696.5 million, 42% above the figure contained in the House bill and 16% more than FY2001. Internal R&D under the STRS account would receive $343.3 million (a 10% increase) while ITS would be financed at $309.3 million including $105.1 million for MEP and $204.2 million for ATP (40% over the current fiscal year). The Committee report to accompany S. 1215, the original Senate appropriations bill, states that the ATP activity should be continued contrary to the President's budget proposal. Funding for construction at NIST would total $43.9 million, more than double that contained in the House bill and the Administration request.

In the conference report (H.Rept. 107-278), the conference committee provided $321 million for STRS, $107 million for ITS, $185 million for ATP (including $61 million for new projects), and $62 million for construction, with the additional resources directed at specific projects.

The FY2001 appropriation for NIST was $598.3 million, a 6% reduction from the previous fiscal year. Most of this decrease was due to a significantly smaller construction budget reflecting completion of the new advanced measurement laboratory. Concurrently, there was an 11% increase in support for the laboratory's internal R&D activities under the STRS account. Included in this FY2001 funding figure was $312.6 million for STRS, $105.1 million for MEP (a 4% increase), $145.7 million for ATP (1.5% above the previous year), and $34.9 million for construction.

Department of the Interior (DOI)

The Department of the Interior's proposed budget for FY2002 includes $593 million for R&D, a 6.2% decrease from the $632 million estimate for FY2001 (see **Table 7**). The U.S. Geological Survey is the primary science and research arm of the DOI. The USGS is the nation's primary provider of earth and life science information related to natural hazards; the environment; and energy, mineral, water, and biological resources. Other DOI agencies that perform R&D are the Park Service, the Bureau of Land Management, the Bureau of Reclamation, and, the Minerals Management Service, whose budget would increase 49% in FY2002 to $47 million.

Funding for USGS would decline 11% to $491 million, $59 million below the $550 million it receives in FY2001. Of its three major research areas, Water Resources Investigations activity is scheduled to drop 21%, with the elimination of some programs, including a significant reduction in the National Water Quality Assessment Program. The Biological Research Program would decline $11.3 million, or 7% to $ $149.2 million. Most of the cuts come from the Biological Information Management and Delivery program. The third area of research, Geological Hazards, Resources and Processes, or earth sciences, is requesting $213.8 million, $11.5 million less than FY2001 estimated level. Geological Landscape and Coastal assessments would receive $10 million less than FY2001.

The House passed its appropriations for Interior (H.R. 2217) on June 21. The bill adds to the President's request in all of the USGS accounts mentioned above. In the case of both Water Resources and Biological Research, recommended funding levels exceed last year's appropriations by a few million dollars. The Senate passed its version of the Interior appropriations on July 12. It, too, voted similar increases for the above mentioned research programs. The conference report, signed into law November 5, provides $914 million for all USGS activities. The biological research activity was funded at $166 million.

Department of Transportation (DOT)

The Department of Transportation requests a total of $795 million for R&D during FY2002 (see **Table 7**). The total R&D proposal is a 6.9% increase over the estimated total $743 million for FY2001. Many of DOT's R&D activities receive funds from transportation trust funds, rather than discretionary portion of the budget. The Federal Highway Administration's R&D programs are estimated to receive $374 million, $81 million, or 27% above FY2001. The Federal Aviation Administration will receive $276 million, a decrease of $26 million below FY2001 funding. The National Highway Transportation Safety Administration's R&D activities will increase $1 million to $59 million for FY2002. The House passed its appropriation bill for Transportation (H.R. 2299) on June 26.

Environmental Protection Agency (EPA)

The Administration requested $575 million for EPA's R&D activities in FY2002. This is a 6% reduction from the FY2001estimated budget of $612 million (see **Table 7**). According to the Office of Management and Budget, the majority of the reduction is due to the Administration's elimination of numerous congressionally designated research projects, that will not be continued in FY2002. The House approved VA-HUD spending bill H.R. 2620 on July 30, 2001 with an increase for EPA Research of $39 million over the President's request, to a total of $680 million, $16 million below FY2001. The Senate approved S. 1216 on August 3, 2001 with an increase for EPA S&T of $25 million above the budget request, to $666 million, $30 million below the enacted level. S. 1216 also transfers $37 million from the Superfund account for a total of $702 million for S&T. A major continuing congressional concern is the quality of science upon which EPA bases its regulations, criteria, and programs. R&D in EPA is also referred to as the "S&T Account," which incorporated elements of the former research and development account (also called extramural research) as well as EPA's in-house R&D and technology efforts.

Table 7. R&D Budgets of Preceding Agencies

($ millions)

	FY1999 Act.	FY2000 Act.	FY2001 Est.	FY2002 Request
Nat. Oceanic & Atmos. Admin.	577	596	634	649
Nat. Instit. of Stand. & Tech.	641	636	598	488
Dept. of the Interior	532	618	632	593
Dept. of Transportation	500	603	743	795
Envir. Protection Agency	660	559	612	575