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# Research and Development Funding: Fiscal Year 2002

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## SUMMARY

President Bush is requesting $95.253 billion for federal R&D in FY2002, a 5.8% increase over the estimated $90.010 billion appropriated for FY2001. Defense R&D (DOD's plus DOE's weapons R&D activities) would increase 8.1% to $48.579 billion. This increase reflects the Administration's first installment of increasing DOD's annual RDT&E budget by $20 billion over the next five years. 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 which is scheduled to expire in FY2004.

Funding for basic research 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 total $44.905 billion, or 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%.

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 a number of issues about the composition of the research portion of the federal R&D budget. The Administration's proposed $23.042 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.

In response to this concern, the Senate-passed FY2002 Budget Resolution (S.Con.Res. 20) includes an additional $2.7 billion for civilian R&D (including an additional $600 million for NIH). Specifically, the Senate-passed amendments contain an additional $674 million for NSF, $469 million DOE science, $518 million for NASA, and $353 million for DOD research. The House-passed budget resolution mirrors the Administration's proposed FY2002 budget, maintaining a 4% increase for discretionary spending, while the Senate approved an 8% increase. However, the House and Senate conference report reduced funding for the General Science function, (containing NSF, DOE, and NASA), below the President's request, which could jeopardize the Senates' passed increases for those three agencies.

## MOST RECENT DEVELOPMENTS

*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 House passed FY2002 Budget Resolution (H.Con.Res. 83, passed March 28th) increases overall discretionary spending 4%, matching the President's request, while the Senate's passed budget resolution (S.Con.Res. 20, incorporated into H.Con.Res. 83, passed Senate April 6) increases discretionary spending 8%, to, among other spending provisions, help accommodate an additional $2.7 billion for R&D. On May 9,and 10, the House and Senate, respectively, passed the H.Con.Res. 83 conference report (see H.Rept. 107-55) which contains a 5% increase for overall discretionary spending.*

## 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 ARS has 105 research laboratories throughout the United States and abroad. 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 NRI will continue research in the areas of biotechnology and animal and plant genetics, animal waste management, human nutrition research, and value added agricultural commodities.

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.

## Table 1. U.S. Department of Agriculture FY1999-FY2002

($ millions)

| | FY1999 Act. | FY2000 Act. | FY2001 Est. | FY2002 Req.[d] |
|---|---|---|---|---|
| **Agric. Research Service (ARS)** | | | | |
| Soil & Water Conservation | 85.6 | 88.0 | 92.1 | 90.0 |
| Plant Science | 301.5 | 296.0 | 336.4 | 324.8 |
| Animal Science | 127.0 | 135.0 | 142.8 | 147.1 |
| Commodity Conversion & Delivery | 162.2 | 175.0 | 185.5 | 202.3 |
| Human Nutrition | 68.4 | 72.0 | 75.3 | 75.7 |
| Integration of Agricultural Systems | 30.1 | 32.0 | 37.1 | 37.6 |
| Information and Library Sciences | 19.0 | 18.0 | 19.5 | 19.8 |
| Repair and Maintenance | 18.3 | 19.0 | 18.2 | 18.2 |
| Contingencies & Trust Funds | 20.9 | 20.0 | 23.0 | 23.0 |
| **Subtotal** | **785.5** | **855.0** | **938.6** | **938.6** |
| Buildings & Facilities | 56.4 | 53.0 | 74.2 | 30.5 |
| **Total, ARS** | **861.9[a]** | **908.0** | **1,012.8** | **969.1** |
| **Coop. St. Res. Ed. & Ext. (CSREES)** | | | | |
| Research and Education | | | | |
| Hatch Act Formula | 180.5 | 180.5 | 180.5 | 180.1 |
| Cooperative Forestry Research | 21.9 | 21.9 | 21.9 | 21.9 |
| 1890 Colleges and Tuskegee Univ. | 29.7 | 30.7 | 32.7 | 32.7 |
| Special Research Grants | 63.1 | 63.2 | 85.7 | 2.8 |
| NRI Competitive Grants | 119.3 | 119.3 | 106.0 | 106.0 |
| Animal Health & Disease Res. | 5.1 | 5.1 | 5.1 | 5.1 |
| Federal Administration | 10.7 | 14.8 | 18.1 | 4.5 |
| Higher Education[b] | 23.4 | 28.0 | 34.0 | 35.0 |
| **Total, Coop. Res. & Educ.[c]** | **481.2** | **490.0** | **506.2** | **407.3** |
| **Extension Activities** | | | | |
| Smith-Lever Sections 3b&c | 276.5 | 276.5 | 276.5 | 275.9 |
| Smith-Lever Sections 3d | 106.6 | 88.5 | 100.6 | 100.5 |
| Renewable Resources Extension | 3.2 | 3.2 | 3.2 | 3.2 |
| 1890 Research & Extension | 56.1 | 58.0 | 28.2 | 28.2 |
| Federal Admin. & Special Grants | 11.7 | 26.0 | 18.1 | 5.7 |
| **Total, Extension Activities[c]** | **438.0** | **424.9** | **432.0** | **413.4** |
| **Total, CSREES[c]** | **919.2** | **1,074.0** | **1,138.0** | **994.0** |
| Economic Research Service | 65.8 | 64.0 | 67.0 | 67.2 |
| National Agric. Statistics Serv. | 104.0 | 99.0 | 100.7 | 113.8 |
| **TOTAL, Research, Education & Economics** | **$1,971.9** | **$2,145.0** | **$2,318.5** | **$2,144.1** |

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 is requesting $7.99 billion for all R&D activities: Energy Resources, Science, National Security, and Environmental Quality. This request is a decrease of 2.9% below the FY2001 level. For civilian R&D (see **Table 2**) programs (Energy Resources and Science), the request is $4.40 billion, a 5.8% decrease from FY2001. For defense R&D (National Security and Defense Environmental Management), the F request is $3.60 billion a 0.5% increase over FY2001. DOE states that its FY2002 request is designed to meet Administration priorities and to respond to policy reviews currently underway.

For Energy Resources R&D, DOE is requesting $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 is proposing $150 million for a clean coal power initiative. Other activities within Energy Resources R&D would receive funds to continue current services while they are examined as part of the ongoing national energy policy review.

For Science, DOE is requesting $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. The BER program would be reduced by $19.5 million as a result of not funding any of the activities mandated by Congress for FY2001. DOE is requesting an increase of $17.4 million for continued construction of the Spallation Neutron Source. One new Science initiative — the Genome to Life project — is being proposed for inclusion in the BER program.

For National Security R&D, DOE is requesting $3.399 billion for FY2002, 2.3% above the FY2001 level. Included in the request are $2.506 billion for nuclear weapons R&D, $206.1 million for nonproliferation R&D, and $688.0 million for naval reactors. The weapons R&D program would see an increase of $147.6 million. For the National Ignition Facility (NIF), DOE is requesting $245 million for construction, $46 million above FY2001. Nonproliferation R&D would decline by $29.4 million as the Administration reviews this program in context of a review of Russian nuclear proliferation programs. For Defense Environmental Management, DOE is requesting $196.0 million, 22.3% below the FY2001 level.

Some of the key issues that may arise during consideration of the DOE FY2002 budget request concern the shift in focus of energy resource R&D and the large reductions in conservation, renewable energy, and nuclear energy R&D; the contribution of DOE's Office of Science to the portfolio of basic research funded by the federal government; the extent to which the request for weapons R&D will help with rehabilitation of the nation's nuclear weapons production infrastructure; and whether the National Ignition Facility can be completed with no further cost increases.

**Table 2. DOE R&D Budget**
($ millions)

| | FY1999 Appro. | FY2000 Appro. | FY2001 Appro. | FY2002 Request |
|---|---|---|---|---|
| **Energy Resources** | **1265.5** | **1325.3** | **1505.7** | **1232.4** |
| Clean Coal Technology [a] | (101.0) | (146.0) | 9.0 | 82.0 |
| Fossil Energy | 377.2 | 396.7 | 450.5 | 449.0 |
| Nuclear Energy | 83.7 | 91.0 | 109.1 | 85.6 |
| Renewable Energy | 331.3 | 306.1 | 373.2 | 276.2 |
| Conservation | 473.3 | 531.5 | 572.9 | 421.1 |
| **Science** | **2781.1** | **2746.1** | **3160.6** | **3164.8** |
| High Energy Physics | 682.8 | 683.5 | 712.0 | 716.1 |
| Nuclear Physics | 338.5 | 340.9 | 360.5 | 360.5 |
| Basic Energy Sciences | 791.7 | 752.0 | 991.7 | 1004.7 |
| Adv Scientific Computing | 153.5 | 122.3 | 165.8 | 163.0 |
| Biological & Environmental | 425.9 | 416.0 | 462.5 | 443.0 |
| Fusion Energy Sciences | 220.6 | 238.3 | 248.5 | 248.5 |
| Other | 168.2 | 193.7 | 199.7 | 229.0 |
| **Defense Programs** | **2988.1** | **3073.6** | **3325.0** | **3399.8** |
| Nuclear Weapons | 2113.1 | 2182.2 | 2359.0 | 2505.7 |
| Nonprolif & Verification | 204.8 | 221.8 | 244.5 | 206.1 |
| Naval Reactors | 670.2 | 669.6 | 687.3 | 688.0 |
| Adv Accel Apps | 0 | 0 | 33.9 | 0 |
| **Environmental Quality** | **236.7** | **229.4** | **252.1** | **196.0** |
| Science and Technology | 236.7 | 229.4 | 252.1 | 196.0 |
| **TOTAL, DOE** | **7271.4** | **7374.4** | **8243.4** | **7993.0** |

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

# Department of Defense (DOD)

The Bush Administration is requesting $42.4 billion in research and development for the Department of Defense (DOD) in FY2002. Most of this ($41.8 billion) is for the Department's Research, Development, Test and Evaluation (RDT&E) program (see **Table 3**). Another $578 million is for the Department's Health Program ($421 million) and for the Army's Chemical Agents and Munitions Destruction Program ($157 million). In addition, the Bush Administration is requesting a $2.6 billion transfer account that would allow the Secretary of Defense to transfer additional funds into RDT&E programs upon completion of the Administration's internal review of military strategy. The Administration has suggested that this money could go toward supporting programs that would reduce systems costs, to improve test and evaluation centers, and accelerate ballistic missile defense programs. The Bush Administration has proposed increasing DOD's annual research and development by $20 billion over the next 5 years.

Table 3 below shows the total obligational authority for just the RDT&E program over the last 3 years plus this year's request. The request is approximately $700 million over what was made available for RDT&E in FY2001, which was about $3 billion above the

Clinton Administration request for FY2001. FY2002 funding for DOD's Science and Technology part of the RDT&E program (i.e. basic and applied research and advanced technology development) would all increase and stay ahead of the goal set by Congress in its FY1999 authorization bill of annual increases of inflation plus 2% (using the FY1999 budget request as the baseline).

**Table 3. Department of Defense RDT&E**

($ millions)

| | FY1999 | FY2000 | FY2001 est. | FY2002 request |
|---|---|---|---|---|
| **Accounts** | | | | |
| Army | 5,031 | 5,314 | 6,280 | 6,415 |
| Navy | 8,942 | 9,063 | 9,456 | 9,666 |
| Air Force | 13,732 | 14,527 | 13,993 | 14,225 |
| Defense Agencies | 10,093 | 9,552 | 11,053 | 11,260 |
| (DARPA) | (1,888) | | | |
| (BMDO[a]) | (3,910) | | | |
| Dir. Test & Eval | 258 | 265 | | |
| Dir. Op.Test/Eval | 47 | 31 | 225 | 230 |
| **Total Ob. Auth.** | **$38,104** | **$38,752** | **$41,007** | **$41,795** |
| **Budget Activity** | | | | |
| Basic Research | 1,063 | 1,136 | 1,317 | 1,342 |
| Applied Res. | 3,057 | 3,409 | 3,664 | 3,751 |
| Advanced Dev. | 3,453 | 3,767 | 3,999 | 4,076 |
| Demonstr./Valid. | 7,364 | 6,536 | 7,831 | 7,983 |
| Engrg/Mftg. Dev. | 7,646 | 8,889 | 8,736 | 8,900 |
| Mgmt. Support[b] | 2,553 | 3,127 | 2,639 | 2,691 |
| Op. Systems Dev. | 11,967 | 11,888 | 12,822 | 13,052 |
| **Total Ob. Auth.** | **$38,104** | **$38,752** | **$41,007** | **$41,795** |

**Source:** FY2002 Budget of the United States Government. Appendix. pp 291-297. 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.

## National Aeronautics and Space Administration

The National Aeronautics and Space Administration (NASA) is requesting $9.773 billion for R&F for FY2002 (see **Table 4**), which is 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. For FY2002, NASA has made the first step in a multi-year transition to a full cost accounting budget, assigning all of the mission support activities to their respective enterprise accounts. The second FY2002 column in Table 4 gives the new format while the first FY2002 column gives the request in the old format for comparison to previous years.

For the International Space Station (ISS) within the Human Space Flight account, NASA is requesting $2.087 billion, 1.2% below the FY2001 level. In March, NASA announced that a new cost estimate of the ISS revealed that up to an additional $4 billion might be needed to complete the station as currently configured. In order to accommodate this finding, NASA has proposed scaling back the ISS to include just those units already constructed and awaiting launch. This would carry construction forward through 2004. In addition, NASA added about $1 billion to the ISS budget over the next five years. Finally, it proposed 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.

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

| | FY1999 Appro | FY2000 Appro | FY2001 Appro | FY2002 Request | FY2002 Request |
|---|---|---|---|---|---|
| **Human Space Flight (R&D only)** | **2,411.0** | **2,408.3** | **2,186.2** | **2,162.6** | **2,581.6** |
| Space Station | 2,304.7 | 2,323.1 | 2,112.9 | 2,087.4 | 2,087.4 |
| Eng and Tech Base | 106.3 | 85.2 | 73.3 | 75.2 | 75.2 |
| Mission Support | 0.0 | 0.0 | 0.0 | 0.0 | 429.0 |
| **Science, Aeronautics, and Technology** | **5,273.8** | **5,174.6** | **5,655.3** | **5,695.5** | **7,191.7** |
| Space Science | 2,119.2 | 2,192.8 | 2,321.0 | 2,453.0 | 2,786.4 |
| Biological & Physical Research | 263.5 | 274.7 | 312.9 | 291.3 | 360.9 |
| Earth Science | 1,413.8 | 1,443.4 | 1,484.6 | 1,278.0 | 1,515.0 |
| Aero-Space Technology. | 1,338.9 | 1,124.9 | 1,404.1 | 1,504.1 | 2,375.7 |
| Academic Programs | 138.4 | 138.8 | 132.7 | 132.7 | 153.7 |
| **Mission Support** | **1,784.7** | **1,761.2** | **1,821.3** | **1,951.2** | **0.0** |
| **Total NASA R&D** | **9,469.7** | **9,344.1** | **9,662.8** | **9,773.3** | **9,773.3** |

For FY2002, NASA is requesting $2.786 billion ($2.453 billion under the old format) for Space Science, an increase of 5.7% above the FY2001 level. The Mars Exploration Program has been restructured and expanded following the lost missions in 1999, 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. Despite the requested increase, there may be efforts to increase NASA's Space Science budget even more as part of attempts to expand federal support of basic research in the physical sciences.

For Aero-Space Technology, NASA is requesting $2.376 billion ($1.504 billion under the old format) for FY2002, 7.1% above the FY2001 level. Included in the request is a 64% increase for the 2nd generation reusable launch vehicle program. After removing the CRV program, this requested increase is close to that projected in the FY2001 budget request, indicating the Administration has approved continuation of this effort. Although NASA has stated that it will turn the program over to the private sector when the enabling technology is developed, it is not certain whether that will happen without continued substantial NASA subsidies. 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.

## 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 does not count in this 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, potentially contentious issues in several areas of research oversight will likely 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.

## 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 of the 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)

| | FY1999 Act. | FY2000 Act. | FY2001 Est. | FY2002 Req. |
|---|---|---|---|---|
| Res. & Related Act. | | | | |
| Biological Sciences | $392.1 | $418.3 | $485.4 | 483.1 |
| Computer & Inform. Sci. & Eng. | 298.6 | 388.6 | 477.9 | 470.4 |
| Engineering | 370.1 | 379.8 | 430.8 | 431.1 |
| Geosciences | 478.0 | 487.6 | 562.2 | 558.5 |
| Math & Physical Sci. | 733.7 | 755.9 | 850.8 | 863.6 |
| Social, Behav. & Econ. Sci. | 142.0 | 162.1 | 164.4 | 163.2 |
| U.S. Res. Prog. | 183.0 | 190.0 | 210.8 | 214.0 |
| U.S. Antarctic Log. Act. | 62.6 | 68.4 | 62.5 | 62.6 |
| Integrative Activities | 161.6 | 129.2 | 97.8 | 80.6 |
| **Subtotal Res. & Rel. Act** | **2,821.6** | **2,979.9** | **3,342.6** | **3,327.0** |
| Ed. & Hum. Resr. | 662.7 | 683.6 | 785.6 | 872.4 |
| Major Res. Equip. | 56.7 | 105.0 | 121.3 | 96.3 |
| Salaries & Expenses | 144.1 | 149.3 | 160.5 | 170.0 |
| Office of Inspec. Gen. | 5.4 | 5.6 | 6.3 | 6.8 |
| **Total NSF** | **$3,690.5** | **$3,923.4** | **$4,416.4** | **$4,472.5** |

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). The focus of the CLTs will be on developing the next generation of professionals to manage and direct the development of instructional materials, large scale assessments, and education research and evaluation. 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. (The American Competitiveness in the 21st Century Act, P.L. 106-313, increased the funds available by increasing the petitioner fees).

# 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).

In FY2002, the largest increases are slated for NMFS R&D funding, for fisheries information collection and analysis, and for research grants to States involved in endangered species conservation and management. The latter includes $29 million for Stellar Sea Lion research. Other notable increases in R&D funding are 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 is proposed for R&D for Satellite Observation Systems under NESDIS. However, this decrease represents a transition from research to operation for NPOESS and GOES satellite systems funded in the operational budget.

### National Institute of Standards and Technology

In his FY2002 budget proposal, President Bush is requesting $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 would be $347.3 million, 11% over the current fiscal year and includes $5.4 million for the Baldrige Quality Program. The Manufacturing Extension Program (MEP) would be financed at $106.3 million, while the Advanced Technology Program (ATP) would be suspended pending an evaluation, although $13 million would be provided to support on-going project commitments. Construction efforts would be funded at $20.9 million.

The FY2001 appropriation for NIST is $598.3 million, a 6% reduction from the previous fiscal year. Most of this decrease is due to a significantly smaller construction budget reflecting completion of the new advanced measurement laboratory. Concurrently, there is an 11% increase in support for the laboratory's internal R&D activities under the STRS account. Included in this FY2001 funding figure is $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.

# 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.

# Environmental Protection Agency (EPA)

The Administration requests $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. 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 |