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Federal Research and Development: Budgeting and Priority-Setting Issues, 109th Congress

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Summary

This report summarizes current research and development (R&D) priority-setting issues — in terms of expenditures; agency, topical, or field-specific priorities; and organizational arrangements to determine priorities. It will be updated as needed. Federal R&D funding priorities reflect presidential policies and national needs. Defense R&D predominated in the 1980s, decreasing to about 50% of federal R&D in the 1990s. In non-defense R&D, space R&D was important in the 1960s as the nation sought to compete with the Soviet Union; energy R&D was a priority during the energy-short 1970s, and, since the 1980s, health R&D has predominated in non-defense science. This Administration's R&D priorities include weapons development, homeland security, space launch vehicles, and, beginning in 2006, more support for physical sciences and engineering. For FY2007, R&D is requested at almost $137 billion of budget authority, about 1.8% more than enacted in FY2006. The request would increase funding for physical sciences and engineering programs in the National Science Foundation (NSF), the Department of Energy's (DOE) Office of Science, and National Institute of Standards and Technology (NIST) laboratories as part of the President's American Competitiveness Initiative (ACI) to enhance innovation. Funding for the National Aeronautics and Space Administration's (NASA) R&D would increase by about 8% largely to develop human space vehicles, but cuts would be made in aeronautics, life sciences, and other research activities. Continuing previous emphases, the budget would slightly increase in real dollar terms support for defense development. National Institutes of Health (NIH) R&D funding would be flat and R&D funding for all other agencies would decrease from FY2006 enacted levels.

The latest estimated expenditure for national (public and private) R&D is $312.1 billion for FY2004. Federal R&D expenditures, at $93.4 billion, have grown, but have declined to 30% of the total, with industrial expenditures increasing. Proposals to increase incentives for industrial R&D include H.R. 1454, H.R. 1736, S. 14, S. 627, S. 2199, and S. 2720, which would make permanent the R&D tax credit. The tax reconciliation measure H.R. 4297, would have extended the credit through the end of 2007, but conferees excluded language relating to this topic. Debates continue about which fields of federal R&D should be increased and how to set priorities. The FY2007 budget would fund three interagency R&D initiatives: networking and information technology; climate change science; and nanotechnology. Proposals to coordinate R&D include a continuing priority-setting mechanism; a cabinet-level S&T body; functional R&D budgeting; and reestablishment of a technology assessment function. The Administration opposes R&D earmarking, estimated at $2.4 billion in budget authority for FY2006. The Administration is using performance measures for R&D budgeting, including the Government Performance and Results Act and the Program Assessment Rating Tool. Some critics say better data and concepts are needed before performance budgeting can be used to identify priorities for research and development. This report replaces CRS Issue Brief IB10088.

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Background and Analysis

This report, which replaces CRS Issue Brief 10088, summarizes current research and development priority-setting issues — in terms of spending priorities, topical or field-specific priorities, and organizational arrangements to determine priorities. Federal R&D funding priorities have shifted over time, reflecting presidential preferences, congressional appropriations, and national priorities. Defense R&D predominated in the 1980s but decreased to about 50% of total federal R&D in the 1990s, reflecting Clinton Administration policies. In non-defense R&D, space was important in the 1960s as the nation sought to compete with the Soviet Union in the space race; energy R&D joined space as a priority during the 1970s; and since the 1980s, health R&D funding has grown as the cohort of aged population increases and the promise of life sciences and biotechnology affects national expectations. Defense and counterterrorism R&D funding have been increased since the 9/11 terrorist attacks. Together, DOD and NIH funding total about 77% of the FY2007 R&D request. (See **Figure 1** and the **Appendix** table.)

R&D Budgets

R&D budgets are developed over an 18-month period before a fiscal year begins. Often advisory committees, influenced by professional scientific groups, recommend R&D priorities to agencies, which use this information, internally generated information, and the White House's Office of Management and Budget (OMB) and Office of Science and Technology Policy (OSTP) guidance to determine priorities. Agencies and OMB negotiate funding request levels during the preparation of the budget before it is sent to Congress. After standing committees recommend budget levels for matters within their jurisdiction to the budget committees, Congress is to pass a budget resolution, which sets spending levels and recommends levels for each budget function that appropriations committees use in setting discretionary (302b) spending allocations for each appropriations subcommittee. The resolution also gives outyear projections based on budget and economic assumptions. Each of the appropriations subcommittees is to report approved funding levels for agencies within their jurisdiction; appropriations bills, which give agencies spending authority, are to be sent to the floor, usually beginning in the summer.

FY2005 Budget Action Summary. For FY2005, R&D appropriations totaled about $131.8 billion of budget authority, about 54% going to defense R&D.

Non-defense R&D funding was increased about 0.2%. The largest increases went to R&D in NIH and DOD; smaller increases were made for R&D budget authority in USDA, DHS, DOT, NASA, and NIH. FY2005 congressional action reduced NSF's budget by 0.3% below the FY2004 level. Congress appropriated less than the FY2004 level for R&D in the Department of Education and the Environmental Protection Agency (EPA). In the Department of Commerce (DOC), the President sought again to eliminate the Advanced Technology Program (ATP), whose R&D was funded at $134.0 million in FY2004. Congress increased R&D funding for NOAA by 10%, and funded ATP R&D at $114.0 million, about 15% less than in FY2004. (See the **Appendix** table.)

FY2006 Budget Action Summary. For FY2006, Congress enacted R&D budget authority of about $134.8 billion, $2.2 billion more than in FY2005. More than 90% of the increase went to DOD research, development, testing, and evaluation (RDT&E), largely for weapons development, and the rest to NASA, largely for space exploration. DOT received a 14% increase for R&D. Other agencies' R&D budgets were reduced or flat if inflation is considered. Congress also enacted a 1% across-the-board cut for all discretionary R&D, in effect lowering enacted appropriations amounts. Of the major R&D support agencies, FY2006 appropriations action reduced R&D funding below the FY2005 level for NIH, USDA, and DOE. (See the **Appendix** table.)

FY2007 Budget Request. For FY2007, R&D was requested at almost $137 billion of budget authority, about 1.8% more than enacted in FY2006. The request seeks to double funding over 10 years (for a total of about $50 billion) for three key federal agencies that support basic research in physical sciences and engineering, that is for NSF, DOE's Office of Science (for advanced energy research), and for the NIST laboratories, as part of the American Competitiveness Initiative (ACI) introduced in the 2006 State of the Union address to enhance U.S. innovation. Also, funding for NASA R&D would be increased by about 8% largely for a development program called Constellation Systems to develop human space vehicles to replace the Space Shuttle. Cuts would be made in NASA research programs in aeronautics, life sciences, and other research activities. Continuing previous emphases, the budget would slightly increase over FY2006 support in real dollar terms for defense development. NIH funding would be flat and R&D funding for all other agencies would be decreased from FY2006 enacted levels. Over the next five years, the Administration's budget projects reducing budget deficits by cutting discretionary spending, so that while NASA and the three ACI-emphasized agencies would continue to receive increases, other R&D funding agencies would be subject to real dollar cuts after adjusting for expected inflation rates. (See the **Appendix** table.) The ACI initiative would also make the R&D tax credit permanent, and increase support for mathematics and science education teacher training and curricula.

On March 16, 2006, the Senate passed S.Con.Res. 83, its version of the FY2007 congressional budget resolution. The resolution included higher discretionary spending levels than requested by the President and did not include any reconciliation instructions to reduce mandatory spending or to reduce taxes. On May 18, 2006, the House passed its version of the resolution. Notable differences between the two resolutions have prevented agreement.

House Appropriations Committee action so far would increase funding above inflation for DOE's Office of Science and for NSF; and would generate small increases for the U.S. Geological Survey, Department of Veterans Affairs and the Department of Commerce . Cuts proposed for USDA R&D would be smaller than proposed; proposed cuts would be reversed for DOT and EPA R&D. DOD R&D funding would be increased above the requested levels. Cuts proposed in NIH and DHS appropriations would be sustained. (See the **Appendix** table.)

Priority-Setting Issues

Current priority-setting debates focus on the functions and size of federal R&D funding as a part of national R&D and on how to balance priorities in the portfolio of federal non-defense R&D, especially between health and nonhealth R&D.

Trends in R&D Support Patterns. The NSF projects that national (public + private) R&D expenditures will total $312.1 billion for FY2004, the latest year for which data are available, and about 51% more than in 1990.[1] Federal R&D expenditures as a part of the total have also risen, to $93.4 billion (mostly to fund work performed in non-governmental sectors), but have declined significantly as a part of the total from 46% in 1983 to about 30% in 2004. The United States performs over twice as much R&D as the second largest funding nation, Japan. However, in terms of the ratio of R&D expenditures to gross domestic product (GDP), the United States ranks sixth, at 2.7%, following Israel, Sweden, Finland, Japan, and Iceland. Funding patterns figure prominently in priority-setting debates.

Industry is the largest supporter and performer of the nation's R&D; universities and colleges are the second-largest performer. It is estimated that industry funded 64% of all U.S. R&D performed in 2004 and conducted 70%; industry funded about 89% of the R&D it conducted. The amount of R&D supported by various industries varies; most industrial R&D is for near-term applied work and product or prototype development. In 2004, industrial R&D expenditures supported 82% of the nation's development work and provided 36% of national research expenditures (exclusive of development), largely for applied research. Industry allocated 5% of its R&D expenditures to basic research, and supported 17% of the nation's total basic research. Federal support for development, which totaled about 34% of federal R&D, goes largely for defense R&D performed by industry. The federal government is the largest supporter of the nation's basic and applied research (i.e., research *per se*), and supplied 49% of total national basic research expenditures in 2004. The federal government was the single largest supporter of the nation's basic research, funding 62% of national basic research expenditures, largely in universities, and,

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[1] Data in this section are based on U.S. National Science Foundation, *National Patterns of Research and Development Resources: 2003*, pp. 9-10, (NSF 05-308) and on Brandon Shackelford, "U.S. R&D Continues to Rebound in 2004," *NSF InfoBrief*, Jan. 2006, NSF 06-306. Expenditure data, rather than budget authority data, need to be used to compare federal and nonfederal funding levels. Shackelford acknowledges that the expenditure data he uses are not the same as R&D funding totals reported by the Federal agencies. The largest difference appears concentrated in DOD-supported funding of industry R&D. Expenditures do not equal outlays or budget authority. See also Elisa Eiseman, et al., *Federal Investment in R&D*, RAND, Sept. 2002, MR-1639.0-OSTP.

thus, is the largest supporter of the nation's scientific knowledge base. Universities and colleges conducted 55% of nationally funded basic research; the federal government funded about 65% of this university-performed basic research. About 42% of total federal research dollars goes to universities and 22% to mission-oriented work in intramural federal agency laboratories, largely at DOD, NIH, and USDA.

OMB's historical trend data indicate that in constant dollar terms, federal R&D funding declined from about 18% of total federal discretionary outlays in FY1965 to about 16% today. In part because of economic pressures and budgetary caps, during the years FY1991 to FY2002, federal R&D funding was below the previous constant-dollar high of FY1990. Subsequently, as a result of congressional action, constant-dollar R&D appropriations started to eclipse the FY1993 level beginning with FY2001. However, concerns that had been raised about the declines in federal R&D funding have not abated because of a return to deficit spending, and likely future reductions in discretionary R&D spending. As constrained federal R&D budgets focus more on defense, homeland security, and biomedical R&D, fewer resources may be available for other areas of R&D. National defense-related R&D outlays constituted 55% of federal R&D outlays in FY2000 and are requested at an amount which would constitute 59% in FY2007. (It should be noted that recommendations have been made to improve the types and quality of econometric and research and development data used in making science policies, especially the information developed by NSF.[2])

Observations on the Role of the Federal Government in Supporting R&D. As shown in the preceding funding data, federal government support for R&D serves primarily the objectives of defense and homeland security, biomedical research, basic research knowledge generation, and enhancement of academic research capacity (which some call the "seed corn" of future scientific and technological development). Only a small percentage of federal non-defense R&D spending supports industrial R&D and innovation directly. Some observers contend that federal research support should be funded at increasingly higher levels to generate knowledge as a public good. Some contend that other actions should be taken to enhance the U.S. ability to advance scientifically; to enhance the stature of U.S. academic institutions; to increase scientific literacy, the number of science and engineering personnel, and research capacity in an increasingly competitive global environment where countries like China, India, Korea, and Japan are challenging U.S. output in knowledge generation and innovative industrial production capabilities. For instance, these issues and proposals to deal with them were discussed in *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, a report released in 2005 by a National Academies committee in response to congressional requests by members of the Senate Committee on Energy and Natural Resources and the House Committee on Science; in an American Electronics Association report, *Losing the Competitive Advantage? The Challenge for Science and Technology in the United States*, 2005; and at the

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[2] Lawrence D. Brown, et al., *Measuring Research and Development Expenditures in the U.S. Economy*, National Academy of Sciences Press, 2004; John H. Marburger, "Wanted: Better Benchmarks," *Science*, May 20, 2005, p. 1087.

"The National Summit on Competitiveness: Investing in U.S. Innovation," December 6, 2005, a meeting of industrial, academic, and governmental leaders.

Although there is controversy about it, some observers theorize that innovation and technological development are as important or more important than labor and capital as macro-economic drivers of economic growth.[3] Some contend that industrial R&D and innovation benefit indirectly from federal investments in basic research and academic science[4] and that such funding should be increased. For example, President Bush's FY2002 budget supported the view that "More than half of the Nation's economic productivity growth in the last 50 years is attributable to technological innovation and the science that supported it" (p. 29). The President's FY2006 budget reported "Basic research is the source of tomorrow's discoveries and new capabilities and this long-term research will fuel further gains in economic productivity, quality of life, and homeland and national security."[5]

Others say that data are inadequate to support the notion that basic research knowledge leads to technological innovation as a crucial determinant of economic growth. Because of the lack of credible data and disagreement among experts, policymakers do not know exactly how much increased federal research support would enhance growth and which R&D fields or programs warrant funding in order to promote technological innovation.[6] As a result, some say that federal policy for industrial innovation, and its likely byproduct, economic growth, should focus more on improving the climate for industrial R&D, such as by tax incentives, altered regulatory policies, and wider liability protections.

The benefits of federal R&D investments are likely to be discussed in the context of long-term economic projections of deficits, decreasing outyear federal R&D budgets, and reductions in domestic discretionary spending. There are other related issues. For instance, will federal, state, and industrial policies to increase support for academic research — but often for short-term applied studies — overwhelm traditional academic research which traditionally has tended toward the conduct of basic research studies?[7] Could state-supported funding supplant federal funding in some areas, as evidenced by initiatives in California and other states to fund stem cell research and biotechnology R&D?[8] Other issues of debate focus on diversifying priorities for fields of support. There are also issues of organizing the government to fund and generate research knowledge, modifying funding

[3] See Congressional Budget Office, *R&D and Productivity Growth*, June 2005, 41 p.

[4] See NSF, *Science and Engineering Indicators*, 2006, pp. 4-7 and 4-19.

[5] OMB, *Analytical Perspectives, FY2006*, p. 61.

[6] William B. Bonvillian, "Meeting the New Challenge to U.S. Economic Competitiveness," *Issues in Science and Technology*, Oct. 1, 2004.

[7] NSTC, *Implementation of the NSTC Presidential Review Directive-4: Renewing the Federal Government-University Research Partnership....*, Jan. 2001.

[8] The NAS held "Planning Meeting on the Role of State Funding of Research," July 13, 2001. See RAND/OSTP, *Discovery and Innovation: Federal R&D Activities in the Fifty States*, June 2000.

mechanisms, and enhancing accountability for federal R&D investments. For instance, a 2005 report of the Center for Strategic and International Studies, entitled *Waiting for Sputnik: Basic Research and Strategic Competition*, stressed the need to increase federal basic research funding and discussed options, such as redirecting funds from development and testing of defense technologies; dedicating at least a minimum percentage of R&D funding for basic research in physical sciences; making basic research funding an entitlement, not discretionary; increasing tax credits for increased industrial support of academic basic research; establishing independent consortia for basic research supported by both government and private resources; creating a special class of Treasury bonds dedicated to basic research; or creating a loan-guarantee program for third party bonds (issued by states, for example) to finance basic research (pp. 29-31).

Among the legislative responses in the first session of the 109th Congress to the various expert reports and recommendations were: outlining of a "Democratic Innovation Agenda," by House Minority Leader Nancy Pelosi (to increase funding for NSF and physical sciences research, and to create research centers of excellence); introduction of the "National Innovation Act of 2005," S. 2109, a bipartisan bill, which would double NSF funding, create a Presidential Council on Innovation, and encourage agencies to devote 3% of their R&D budgets to high-risk research (associated bill H.R. 4654); introduction of a package of several innovation enhancing bills, including Democratic leadership proposals, H.R. 4434 to increase the number of U.S. mathematics and science teachers; H.R. 4435 to create an energy-related Advanced Project Agency; and H.R. 4596 to increase basic research funding and support high-risk, high-payoff research.

Arguments have been made to give more attention to education. The U.S. Commission on National Security 21st Century, in *Road Map for National Security: Imperative for Change, The Phase III Report*, 2001, concluded that threats to the nation's scientific and educational base endanger U.S. national security. It recommended doubling the federal R&D budget by 2010 and improving the competitiveness of less capable U.S. academic R&D institutions. A 2006 National Science Board report, *America's Pressing Challenge-Building A Stronger Foundation*, published by the NSF in conjunction with release of the NSF's *Science and Engineering Indicators, 2006*, called for a series of "drastic changes within the Nation's science and mathematics classrooms," to avoid "... raising generations of students and citizens who do not know how to think critically and make informed decisions based on technical and scientific information." The Council on Competitiveness, in a December 2004 report, *Innovate America*, included proposals to increase to an average of 3% the amount of federal agency budgets for basic research, to improve the regulatory climate for corporations, to increase federal investment in selected areas of applied research, and to improve science and engineering education. A National Academy of Engineering report, *Trends in Federal Support of Research and Graduate Education*, 2001, recommended that the Administration and Congress should evaluate federal research funding by field, assess implications for knowledge generation and industrial growth, and increase budgets for underfunded disciplines. Similar recommendations were made in *New Foundations for Growth: The U.S. Innovation System Today and Tomorrow*, released by the National Science and Technology Council on January 10, 2001.

During the second session of the 109th Congress, the President's "American Competitiveness Initiative" (ACI) emphasizes funding for basic physical sciences and engineering research at NSF, NIST, and DOE's Office of Science to enhance U.S. innovative capacity and ability to compete internationally. (This is described above in the section on the FY2007 budget.) ACI would also support additional training in mathematics and science education at the pre-college level and training for part-time science and math teachers.[9] Several bills have been introduced in the second session of the 109th Congress to address these issues, including the bipartisan-supported "Protecting America's Competitive Edge" (PACE) Acts; that is, S. 2197, focusing on the DOE and creation of an Advanced Research Projects Agency-Energy (amended, with written report, Senate Rept. 109-249 on April 24, 2006) from the Senate Committee on Energy and Natural Resources; S. 2198, focusing on education, on which hearings were held; and S. 2199 (regarding the R&D tax credit for industry). The House Science Committee held hearings on March 9, 2006 regarding the energy advanced research projects agency. Related bills are S. 2390, S. 2357, H.R. 4845, and H.R. 5502. Democratic members of the House Science Committee have critiqued the President's proposals contending that additional programs warrant funding.[10] On June 7, 2006, the House Science Committee marked up H.R. 5358, Science and Mathematics Education for Competitiveness Act; H.R. 5356, Early Career Research Act; and H.R. 5357, Research for Competitiveness Act. H.R. 4734 and S. 3502 would give urgency to initiating education programs similar to national defense education acts of the past, which focused on improving education to deal with space and defense challenges posed by the former Soviet Union.

Priorities Among Fields of Federally Funded Research

Important questions are what should be the balance among fields of federally supported research, and specifically, since health/life sciences research has in recent years received priority, should more non-defense R&D funding go to support other fields of science? Some critics are concerned that the emphasis on health R&D may presage a scarcity of knowledge in physical sciences, math, and engineering.[11] They maintain that funding should be increased for all R&D fields, and others cite the need to allocate more federal funding to nonhealth R&D.

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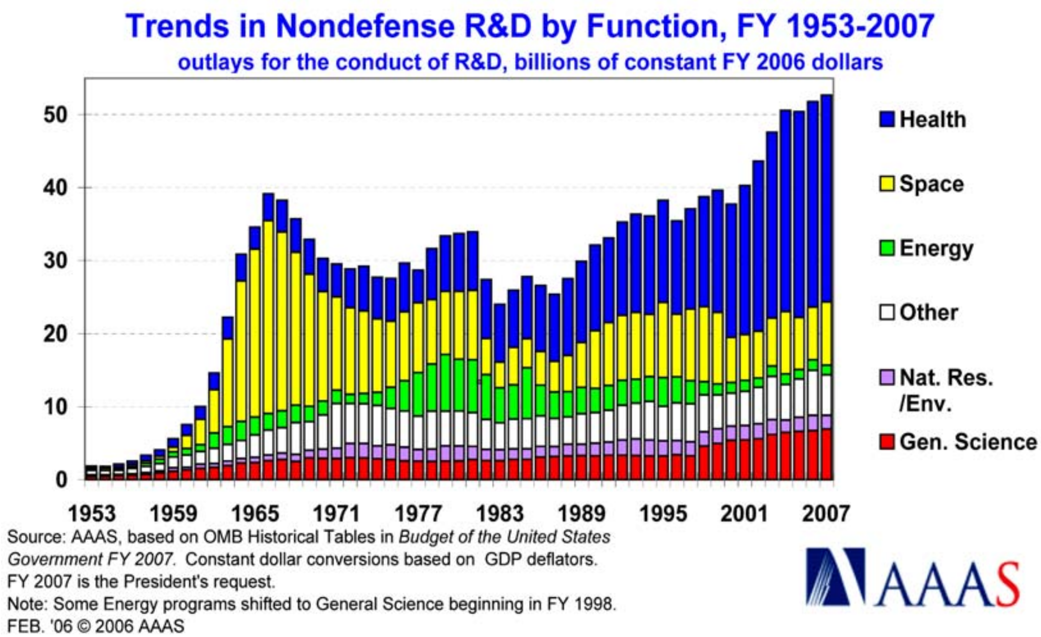
[9] For additional information, see CRS Report RL33434, *Science, Technology, Engineering, and Mathematics (STEM) Education Issues and Legislative Options*, by Jeffrey J. Kuenzi, Christine M. Matthews, and Bonnie F. Mangan.

[10] House Science Committee, "Science, Competitiveness Shortchanged In Administration Budget," Minority Committee Office, Press Release, Feb. 15, 2006, [http://sciencedems.house.gov/press/PRArticle.aspx?NewsID=1042].

[11] NSB, *The Science and Engineering Workforce/Realizing American's Potential*, NSB-03-69, 2003.

Figure 1. AAAS Data on Trends in Non-defense R&D Funding by Function, FY1953-FY2007



AAAS granted CRS permission to use this figure.

As shown in **Figure 1**, health sciences R&D has grown as a priority for about the last 20 years. Over the period FY1995 to FY2007 as requested, R&D funding in constant dollars, will have increased at NIH by 103% compared to DOD, 65%; NSF, 48%; USDA, 6%; DOE, 11%; and NASA, 1%. R&D funding decreased in constant dollars for EPA and the Departments of the Interior, Transportation, and Commerce. For FY2007 as requested, it is estimated in terms of constant dollars that federally funded health-related R&D, primarily at NIH, would receive over 54% of the federal non-defense R&D budget. In terms of constant dollar funding by field, federal obligations for life sciences increased from $13.4 billion in FY1994 to an estimated $29.3 billion in FY2004, or about 119%, while at the same time, between those years funding for physical sciences increased 7%; mathematics and computer sciences, 83%; and engineering, 40%. [12]

The issue of whether the National Science Foundation should support social and behavioral sciences research was addressed in the 1950s shortly after the agency was established and also again in the 1980s during the first Reagan Administration. Questions were raised about whether these fields were scientific and if support for these topics would detract from support for chemistry, physical sciences, life sciences and mathematics.[13] NSF started to support the social sciences under its "permissive

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[12] Based on NSF data and AAAS data. See AAAS, "Guide to R&D Funding Data-Historical Data," at [http://www.aaas.org/spp/rd/guihist.htm].)

[13] For an overview of this history, see Chapter II of U.S. Congress, House, Committee on Science and Technology, *Research Policies for the Social and Behavioral Sciences (Science*

(continued...)

authority" to support "other sciences" and, in 1968, was given explicit authority to support these fields (P.L. 90-407), although some Members of Congress continued to question this function in NSF. In September 2005, Senator Kay Bailey Hutchison, chairman of the Senate Commerce Subcommittee on Science and Space that has authorizations jurisdiction for NSF, and a member of the Senate Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies that appropriates funds for NSF, again questioned the propriety of NSF's support for social sciences research and recommended that NSF "focus firmly" on "the hard sciences," — biology, chemistry, and physics, and not direct additional resources to support social sciences research.[14] She reiterated her concerns in 2006, specifically raising questions about the appropriateness of some specific NSF social sciences awards and about whether the social sciences should benefit from the doubling in NSF's research budget proposed in President Bush's ACI initiative or whether such doubling should be limited to the other fields of science NSF supports.[15] According to news reports, a draft of S. 2802, the FY2007 NSF authorizations bill would have limited NSF's budget increase to support physical sciences research but subsequently after amendment, a compromise was reached, which the full authorizations committee reported on May 18, 2006. It included language which would not restrict NSF funding for areas of research that the agency deems to be consistent with its mandate.[16] Full Senate action has not yet occurred.

Congressional Views About the Balance in Federal R&D Funding. There are various perspectives on the issue of balance, focusing on both types and fields of R&D supported. Funding for biomedical research has been a priority in recent years. In 1998, an amendment to S.Con.Res. 86, the FY1999 Senate budget resolution, expressed the sense of the Senate that the NIH budget should double within the next five years, which occurred by FY2003, although the budget has started to decrease from FY2003 in terms of constant dollars.[17] Critics allege that other fields of science have received inadequate federal attention as a result of the health science emphasis. Partially in reaction, P.L. 107-368, the NSF authorization bill for FY2003, authorized increases for NSF (which supports all areas of research) that would double its budget by 2008. NSF funding has not been appropriated at a rate to meet this target.

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[13] (...continued)
Policy Study Background Report No. 6), Report prepared by the Congressional Research Service, Library of Congress, transmitted to the Task Force on Science Policy. September 1986, 99th Congress, 2nd session.

[14] "Ensuring a Healthy Future America," Sept. 30, 2005, [http://hutchison.senate.gov/cchealthfuture.htm].

[15] Jeffrey Mervis, "Senate Panel Chair Asks Why NSF Funds Social Sciences," *Science,* May 12, 2005, p. 829.

[16] Jeffrey Mervis, "Senate Panel Backs Social Sciences at NSF," *Science,* May 26, 2006, p. 1117.

[17] For additional information, see the section on NIH by Pamela Smith, in CRS Report RL33345, *Federal Research and Development Funding: FY2007*, by Michael E. Davey (coordinator).

Professional Groups' Views About Balance. Some professional groups argue for increased federal health sciences funding[18] and others contend that more balance or support for other fields is needed. For instance, 32 Nobel laureates and industrialists wrote to President Bush in April 2003, urging more balance and increased funding for physical sciences, mathematics, and engineering in the 2005 budget.[19] In response to language in appropriations reports, in November 2004, the NIH and NSF held a conference on "Research at the Interface of the Life and Physical Sciences: Bridging the Sciences," to identify opportunities, challenges, and issues at the interface of the life and physical sciences that could result in major advances and to develop approaches for bridging the separate fields.[20] The President's Council of Advisors on Science and Technology (PCAST) released *Assessing the U.S. R&D Investment*, January 2003,[21] that recommended targeting physical sciences and engineering to bring "them collectively to parity with the life sciences over the next 4 budget cycles" in order to better balance budget allocations. The Alliance for Science and Technology Research in America supports increased R&D funding for all fields.[22]

Legislative Proposals to Broaden Incentives for Private R&D. Legislation has been introduced again in the 109th Congress to make permanent the Research and Experimentation (R&D) tax credit that provides credits for industrially funded R&D support in industry and universities that expired on December 31, 2005.[23] Some proposals are H.R. 1454, H.R. 1736, S. 14, S. 627, S. 2199, and S. 2720. The credit is intended to spur innovative research that companies might not pursue because of the lack of immediate market rewards. The Administration has sought to have the credit made permanent. H.R. 4297, a tax reconciliation measure passed by the House and amended and passed in the Senate, would have extended the credit through the end of 2007. Conferees did not include language dealing with the tax credit. However, it was reported in *Congress Daily*, that " If pension conferees are able to reach a deal [on H.R. 2830, the "Pension Security and Transparency Act of 2005"], there is already an understanding between the two chairmen that the conference report will include one-year extensions of expiring tax provisions including the research and development credit ...."[24] There is analysis indicating that if the credit were extended for a year and expanded, the cost to the Treasury could be about $10 billion and that instead the credit should focus more on supporting basic

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[18] For instance, see Federation of American Societies for Experimental Biology, *Federal Funding for Biomedical and Related Life Sciences Research, FY2007*.

[19] "Nobel Laureates and Corporate Leaders Urge Higher FY 2005 S&T Funding," *FYI, The AIP Bulletin of Science Policy News*, No. 58, Apr. 25, 2003

[20] Jeffrey Mervis, "What Can NIH Do for Physicists?," *Science*, Nov. 26, 2004, p. 1463.

[21] "PCAST Releases Report on U.S. R&D Investment," *CFR Weekly Wrapup*, Feb. 14, 2003.

[22] See [http://www.aboutastra.org/_images/pdfs/astrabriefs205.pdf] and David Malakoff, "Perfecting the Art of the Science Deal," *Science*, May 4, 2001, pp. 830-835.

[23] See CRS Report RL31181, *Research Tax Credit: Current Status, Legislative Proposals, and Policy Issues*, by G. Guenther.

[24] Martin Vaughan, "Taxes - Push On Pension Bill Could Leave Charity Reforms Behind," *Congress Daily*, June 12, 2006.

and applied research and less on product development which is claimed by some companies under the credit.[25] Legislative proposals containing tax incentives for bioterror countermeasures research and manufacturing include S. 3, S. 975, S. 1873, and S. 1880.[26] Proposals to provide incentives for pharmaceutical research focusing on liability protection and/or tax incentives include H.R. 417 and S. 95.

NSF Funding. NSF funds research across all disciplines and is the main federal source for most non-health related academic research. P.L. 107-368, the NSF authorization bill for FY2003, authorized increases in NSF's budget by 15% for each of FY2003, FY2004, and FY2005, which according to the sponsors, would "put the NSF on the track to double its budget within five years" (FY2008), similar to the NIH doubling track. Another objective was to increase federal support for science fields which in recent years have not experienced the larger percentage increases which have gone to biomedical R&D. The law also required increased oversight of NSF facilities programs; a report was prepared by the National Science Board (NSB).[27] Congress appropriated about $4.1 billion in budget authority for NSF's FY2004 R&D funding, almost 5% more than FY2003, and about $1.0 billion less than envisioned in the authorization act. For FY2005, congressional action reduced NSF's budget authority below the FY2004 level. The President's FY2006 budget requested an R&D budget increase of almost 3% that would go largely to facilities support. Appropriations action increased NSF's FY2006 R&D budget authority by about 1.6%, and up to the level enacted for FY2004. The FY2007 request would increase NSF's R&D budget by 8.3% over the FY2006 level.

P.L. 107-368 also required the NSB, which governs NSF together with the Director, to report on how NSF's increased funding should be used. In a 2003 report, *Fulfilling the Promise: A Report to Congress on the Budgetary and Programmatic Expansion of the National Science Foundation* (NSB-2004-15), the Board recommended meeting unmet needs by funding NSF annually at $18.7 billion, including about $12.5 billion for R&D, and outlined priorities for support. Because the budget levels recommended in that report had not been attained, the National Science Board released a final report in January 2006, *2020 Vision for the National Science Foundation* (NSB 05-142), which identified four main investment principles, attainment goals, and enabling strategies. Prominent among groups which in the past recommended increased funding for NSF is the Coalition for National Science Funding (CNSF), which represents many universities and professional science associations.

Homeland Security R&D Funding. Homeland security R&D funding has grown from about 2.5% of the FY2002 federal non-defense R&D budget to about 6.8% of the FY2007 request for non-defense R&D budget authority. See **Table 1** for trends based on data compiled by the American Association for the Advancement of

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[25] "Revisiting the R&D Credit," *National Journal's Congress Daily*, Jan. 26, 2006. AM edition.

[26] See Frank Gottron, CRS Report RS21507, *Project BioShield*.

[27] The draft NSB report is at [http://www.nsf.gov/nsb/documents/2005/large_facilities _draft.pdf].

Science (AAAS). Homeland security R&D funding is becoming an increasingly significant issue in priority-setting discussions. OMB's term "combating terrorism" R&D includes homeland security R&D and overseas combating terrorism R&D.[28] An appendix to OMB's FY2007 *Analytical Perspectives* budget request volume includes data on homeland security funding, but these data do not clearly identify R&D funding. The largest FY2007 programs are in NIH largely for bioterrorism R&D and for containment facilities. This is followed in size by the requests for DHS, DOD, NSF, USDA, EPA, NASA, DOE, and the DOC's NIST.

P.L. 107-296, the Homeland Security Act of 2002, mandated DHS to coordinate federal agency homeland security R&D programs. The law also consolidated some federal homeland security R&D programs in DHS. DHS's R&D funding has almost quintupled since FY2002 but for FY2007, DHS R&D would be reduced about 10% below the FY2006 budget, according to AAAS (which reports it corrected mistakes in OMB's data after examining DHS budget documents). DHS is emphasizing support of development over research, with the result that basic and applied research in DHS would be reduced by about 20% for FY2007.[29]

Table 1. Funding for Homeland Security R&D and R&D Facilities

(Budget authority dollars in millions)

Agency	FY2002 Actual	FY2003 Actual	FY2004 Actual	FY2005 Actual	FY2006 Estimate	FY2007 Request
USDA	$175	$155	$40	$161	$105	$100
DOC	20	16	23	59	62	68
DOD	259	212	267	1,079	1,166	1,074
DOE	50	48	47	67	68	71
DHHS	177	1,653	1,724	1,795	1,899	2,014
(NIH)	*(162)*	*(1,633)*	*(1,703)*	*(1,774)*	*(1,878)*	*(1,993)*
DHS	266	737	1,028	1,240	1,281	1,149
DOT	106	7	3	2	3	1
EPA	95	70	52	33	52	92
NASA	73	73	88	89	93	83
NSF	229	271	321	326	329	371
All other	48	47	32	42	41	47
Total R&D	**1,499**	**3,290**	**3,626**	**4,893**	**5,099**	**5,070**
Total Non-defense HS R&D	1,240	3,078	3,359	3,814	3,933	3,996

Note: Data in italics are non-additive. Totals may not add due to rounding. Based on data in a table entitled "Federal Homeland Security R&D by Agency," prepared by AAAS, Feb. 21, 2006, available at [http://www.aaas.org/spp/rd/hs07p.pdf], a link found at "Guide to R&D Funding Data-R&D in the FY2007 Budget," [http://www.aaas.org/spp/rd/guify07.htm]. According to AAAS, the data are "...

[28] For additional details, see CRS Report RS21270, *Homeland Security Research and Development Funding, Organization, and Oversight*; CRS Report RL32481, *Homeland Security Research and Development Funding and Activities in Federal Agencies: A Preliminary Inventory*; and CRS Report RL32482, *Federal Homeland Security Research and Development Funding: Issues of Data Quality*, all by Genevieve J. Knezo.

[29] AAAS, "DHS R&D Falls in 2007 Budget," [http://www.aaas.org/spp/rd/dhs07p.htm].

based on OMB data from OMB's *2003 Report to Congress on Combating Terrorism and Budget of the U.S. Government FY2007*. Figures [are] adjusted from OMB data by AAAS to include conduct of R&D and R&D facilities, and revised estimates of DHS R&D. Figures do not include non-R&D homeland security activities. DOD has expanded its reporting of homeland security spending beginning in 2005. Funding for all years includes regular appropriations and emergency supplemental appropriations."

Federal R&D Priority-Setting Structures

Some observers recommend more centralized R&D priority-setting in Congress and in the executive branch. Others say that congressional jurisdiction for R&D, split as it is among a number of committees and subcommittees, prevents examination of the R&D budget as a whole. This means that R&D funding can serve particular local or program interests, but may not be appropriate for a national R&D agenda. But opponents see value in a decentralized system in which budgets are developed, authorized, and appropriated separately by those most familiar with the needs of specific fields of R&D — the department or agency head and the authorizing and appropriations subcommittees with jurisdiction. Other issues center on interagency initiatives, R&D policy coordination, developing a technology assessment capacity, earmarking, and R&D funding accountability.

Unified Federal Science and Technology (FS&T) Budget. In a 1995 report, *Allocating Federal Funds for Science and Technology*, the National Academies recommended that Congress consider the R&D budget as a unified whole before its separate parts for each agency are considered by individual congressional committees. It recommended that R&D budget request data be reconfigured as an S&T budget, excluding defense development, testing and evaluation activities, to denote basic and applied R&D and the creation of new knowledge. Since the FY2002 budget request, OMB has used a modified version of this format and has identified a "Federal Science and Technology (FS&T) budget table," which, for FY2007, includes less than half of total federal R&D spending but also some non-R&D funding, such as education and dissemination of information.[30] Table 5-2 of *Analytical Perspectives* projects a decrease in FS&T funding of about 1% from FY2006 to FY2007 as requested. Continued use of this alternative format may pave the way for congressional consideration of a realigned and unified S&T budget. S.Amdt. 2235 to the Senate budget resolution (S.Con.Res. 86) for FY1999 expressed the sense of the Senate that for FY2000-2004, all federal civilian S&T spending should be classified under budget function 250. In 2004, Senator Jeff Bingaman said: "It would be valuable to have joint hearings across the relevant committees in the Senate on the overall shape of our S&T spending. It might be worth considering whether the functional nature of the budget itself should be revised to put the entire federal S&T budget in one place, so that there is much more transparency as to what the real trends are...."[31]

Interagency R&D Initiatives. Executive Order 12881, issued by President Clinton, established the National Science and Technology Council (NSTC) with cabinet-level status. Located in the Executive Office of the President, it recommends

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[30] Section 5, *FY2006 Budget, Analytical Perspectives*.

[31] "Bingaman: A Revitalized Science and Technology Policy Badly Needed," Feb. 11, 2004, Office of Sen. Bingaman.

agency R&D budgets to help accomplish national objectives, advises OMB on agency R&D budgets, and coordinates presidential interagency R&D initiatives. Beginning with the FY1996 budget request, NSTC identified interagency R&D budget priorities. The FY2007 budget identified agency funding for two interagency R&D initiatives whose reporting is required by statute, "Networking and Information Technology R&D," requested at $3.1 billion, a 2% decrease from the estimated FY2006 amount, and "Climate Change Science Program," requested at $1.7 billion, a level flat with the FY2006 estimate. Another priority interagency initiative is for nanotechnology, requested at $1.3 billion, a 2% decrease from the FY2006 amount. Other FY2007 interagency R&D initiatives include combating terrorism R&D and hydrogen R&D.

Proposals to Coordinate Federal R&D. The 2001 National Science Board (NSB) report, *Federal Research Resources: A Process for Setting Priorities* (NSB 01-160) recommended a "continuing advisory mechanism" in Congress and the executive branch and strengthening the OMB/OSTP relationship to coordinate R&D priorities. It said that federal R&D funding should be viewed as a five-year planned portfolio, rather than as the sum of the requirements and programs of departments. AAAS President Mary Good, recommended creating a *cabinet-level post for S&T* to help achieve balance in R&D and coordinate federal R&D and handle research policy issues.[32] The aforementioned Commission on National Security recommended empowering the President's science advisor to establish "functional budgeting," to identify non-defense R&D objectives that meet national needs, strengthen the OSTP, NSTC and PCAST, and improve coordination with OMB to enhance stewardship of national R&D. The congressional science policy report, *Unlocking Our Future*, 1998, spearheaded by Representative Vernon Ehlers, called for balance in the federal research portfolio and said that while OMB can fulfill the coordination function in the executive branch, "no such mechanism exists in the Congress. ... [I]n large, complex technical programs, ... committees should ... consider holding joint hearings and perhaps even writing joint authorization bills" (p. 7).

Legislation on Technology Assessment. The aforementioned NSB report also recommended that Congress develop "an appropriate mechanism to provide it with independent expert S&T review, evaluation, and advice" (p. 16). Some believe that this could pertain to reestablishing the Office of Technology Assessment (OTA), which was active between 1972 and 1995 as a congressional support agency. It prepared in-depth reports and discussed policy options about the consequences of applying technology. Sometimes congressional committees used these reports to set R&D priorities in authorizations and appropriations processes. OTA was eliminated as part of the reductions Congress made in a FY1996 appropriations bill. Proponents of "resurrecting" OTA or variants of it cite the need for better congressional support for S&T analysis.[33] The OTA is still authorized, but funds would have to be

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[32] Rebecca Spieler, "AAAS President Concerned About Imbalances in Nation's R&D Portfolio...," *Washington Fax*, Feb. 21, 2001.

[33] Wil Lepkowski, "The Mummy Blinks," *Science and Policy Perspectives*, June 25, 2001; D. Malakoff, "Memo to Congress: Get Better Advice," *Science*, June 22, 2001: 2229-2230; and M. Davis, "A Reinvented Office of Technology Assessment May Not Suit Congressional Information Requirement...," *Washington Fax*, June 18, 2001; M. Granger
(continued...)

appropriated for it. The pros and cons of reviving OTA or re-creating a similar body have been examined since its termination and several proposals were introduced during the 107th Congress and 108th Congresses to address this issue.[34] Since 2002, at congressional direction, the Government Accountability Office (GAO) has conducted three pilot technology assessments, *Technology Assessment: Using Biometrics for Border Security*, GAO-03-174, 2002, *Cybersecurity for Critical Infrastructure Protection*, GAO-04-321, and *Protecting Structures and Improving Communications During Wildland Fires*, GAO-05-380, and has one underway on port security. During the 109th Congress no legislative action has occurred on the topic of re-creating an OTA-like agency. Issues under debate relating to restoring a technology assessment capability have included questions about the need for assessments, funding arrangements, the utility of GAO's assessment reports, and options for institutional arrangements, including conducting technology assessments simultaneously with conducting R&D.[35]

Earmarking. There is controversy about congressional designation of R&D funding for specific projects, also called earmarking. When using this practice, Congress, in report language or law, directs that appropriated funds go to a specific performer or designates awards for certain types of performers or geographic locations. Typically an agency has not included these awards in its budget request and often such awards may be made without prior competitive peer review. The Administration seeks to discourage earmarking, saying that it distorts agency R&D priorities and seldom is an effective use of taxpayer funds. Supporters believe the practice helps to develop R&D capability in a wide variety of institutions, that it compensates for reduced federal programs for instrumentation and facilities, and that it generates R&D-generated industrial and economic growth in targeted regions. OMB did not publish funding data on R&D earmarks in the FY2007 budget request, although it had done so in the past. It reported that AAAS-accumulated data show that $2.4 billion was appropriated for earmarked R&D for FY2006, an increase of 13% over the estimate for FY2005. This would constitute 1.7% of total federal R&D funding for FY2006.[36] According to AAAS, FY2006 R&D earmarks were mainly for projects in DOD, DOE, USDA, NASA, DOC (NIST), and DOT, in that order.

Government Performance and Results Act (GPRA) and Performance Assessment Rating Tool (PART). The Government Performance and Results Act of 1993 (GPRA), P.L. 103-62, is intended to produce greater efficiency,

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[33] (...continued)
Morgan and John M. Peha, *Science and Technology Advice for Congress,* Washington, Resources for the Future, 2003, pp. 208-227.

[34] For additional information, see CRS Report RS21586, *Technology Assessment in Congress: History and Legislative Options*, by Genevieve J. Knezo.

[35] On this point, see Michael Rodemeyer, Daniel Sarewitz, and James Wilsdon, *The Future of Technology Assessment*, Woodrow Wilson Center for Scholars, Dec. 2005, non-paginated.

[36] Based on data in Office of Science and Technology Policy, "Earmarks, Research and Development Funding in the President's 2007 Budget," Press release, [Feb. 2006]. See also [http://www.aaas.org/spp/rd/earm06c1.pdf].

effectiveness, and accountability in federal spending and to ensure that an agency's programs and priorities meet its goals. It also requires agencies to use performance measures for management and, ultimately, for budgeting.

Recent actions have required agencies to identify more precisely R&D goals and measures of outcomes. As underscored in *The President's Management Agenda,* since FY2001, the Bush Administration has emphasized the importance of performance measurement, including for R&D. In a memorandum dated June 5, 2003, signed jointly by the directors of OSTP and OMB regarding planning for the FY2005 R&D budgets, the Administration announced it would expand its effort to base budget decisions on program performance (OMB M-03-15). OMB referred to this memorandum again in the FY2007 R&D budget guidance, which reiterated the importance of performance assessment for R&D programs (Joint OMB/OSTP M-05-18). According to Section 5 of *Analytical Perspectives, FY2007,* agencies were required to use OMB criteria to measure research outcomes, focusing on relevance, quality, and performance. R&D performed by industry is to meet additional criteria relating to the appropriateness of public investment and to identification of decision points to transition the activity to the private sector.

The Administration has assessed some R&D programs with the Program Assessment Rating Tool (PART), which uses the OMB R&D criteria and other measures. PART results for 102 R&D programs evaluated over the past four years were used when making budget decisions. OMB's *Analytical Perspectives* volume reported that of these, at least 29 programs were effective and 41 were moderately effective. Commentators have pointed out that it is particularly difficult to define priorities for most research and to measure the results quantitatively, since research outcomes cannot be defined well in advance and often take a long time to demonstrate, possibly precluding use of performance measures to recommend budget levels for most R&D. Some observers say that many congressional staff are not yet comfortable with using performance measurement data to make budget decisions and prefer to use traditionally formatted budget information, which focuses on inputs, rather than outputs.[37] Congress may increase attention to the use of R&D performance measures in authorization and appropriations actions especially as constraints grow on discretionary spending. In June 2005, OMB sent Congress draft legislation to authorize results commissions to evaluate programs and recommend restructuring or termination of those deemed ineffective.[38]

The NAS's most recent report advising on use of performance measures for research is *Implementing the Government Performance and Results Act for Research: A Status Report, 2001*. As for congressional interest, the House Science Committee's

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[37] Amelia Gruber, "Lawmakers Remain Skeptical of Linking Budget, Performance," *GovExec.com,* Jan. 13, 2004, and GAO, *Performance Budgeting: Observations on the Use of OMB's Program Assessment Rating Tool for the Fiscal Year 2004 Budget,* GAO-04-174, Jan. 2004.

[38] Available at [http://www.govexec.com/dailyfed/0605/063005a1.htm]. See also CRS Report RL32671 *Federal Program Performance Review: Program Assessment and Results Act and Other Developments,* by Virginia A. McMurtry.

science policy report, *Unlocking Our Future*, 1998, commonly called the Ehlers report, recommended that a "portfolio" approach be used when applying GPRA to basic research. The House adopted a rule with the passage of H.Res. 5 (106^{th} Congress) requiring all "committee reports [to] include a statement of general performance goals and objectives, including outcome-related goals and objectives for which the measure authorizes funding."

Appendix Table. R&D in the Budget, by Agency, Based Largely on AAAS Data

(Budget authority in millions of dollars)

Selected agencies & programs	FY2000 actual	FY2001 actual	FY2002 actual	FY2003 actual	FY2004 actual	FY2005 actual	FY2006 estimate	FY2007 request	FY2007 House Apps. Comm.	% Change FY06-FY11	
										Current $	Constant $
Department of Agriculture total	$1,776	$2,181	$2,112	$2,334	$2,222	$2,410	$2,411	$2,012	$2,312	-20.2%	-28.2%
(Agr. Res. Service)	—	*(1,012)*	*(1,234)*	*(1,294)*	*(1,165)*	*(1,310)*	*(1,288)*	*(1,027)*	*(1,216)*	—	—
(CSREES)	—	*(594)*	*(532)*	*(608)*	*(616)*	*(654)*	*(667)*	*(540)*	*(635)*	—	—
(Forest Service)	—	*(245)*	*(265)*	*(265)*	*(312)*	*(316)*	*(313)*	*(302)*	*(321)*	—	—
Department of Commerce total	1,174	1,030	1,328	1,200	1,137	1,121	1,074	1,064	1,190	13.9	2.5
(NOAA)	*(643)*	*(561)*	*(611)*	*(666)*	*(640)*	*(646)*	*(617)*	*(578)*	*(509)*	*(-10.0)*	*(-19.1)*
(NIST)	*(471)*	*(413)*	*(460)*	*(491)*	*(457)*	*(444)*	*(423)*	*(450)*	*(445)*	*(49.9)*	*(34.9)*
(ATP) ((Within NIST))	*(116)*	*(118)*	*(150)*	*(153)*	*((134))*	*((111))*	*((60))*	*((0))*	*((0))*	—	—
Department of Defense Total	39,959	42,740	49,877	59,296	65,948	70,269	72,485	74,076	76,208	-1.7	-11.6
(S&T (6.1-6.3+ medical))	*(8,632)*	*(9,365)*	*(10,337)*	*(11,186)*	*(12,377)*	*(13,564)*	*(13,778)*	*(11,214)*	*(13,688)*	—	—
Department of Education	238	264	265	282	299	308	302	299		-5.1	-14.6
Department of Energy total	6,956	7,733	8,078	8,312	8,763	8,620	8,721	9,047	9,326	19.3	7.3
(Atomic/Defense)/(NNSA+Defense)	*(3,201)*	*(3,462)*	*(3,855)*	*(4,049)*	*(4,198)*	*(4,009)*	*(4,062)*	*(3,975)*	*(4,057)*	*(5.9)*	*(-4.8)*
(Energy & Science)	*(3,755)*	*(4,271)*	*(4,224)*	*(4,263)*	*(4,565)*	*(4,611)*	*(4,659)*	*(5,072)*	*(5,269)*	—	—
Dept. of HHS Total	18,182	21,045	23,696	27,411	28,521	29,161	29,111	29,062	28,997	-2.5	-12.3
(NIH)	*(17,234)*	*(19,807)*	*(22,714)*	*(26,398)*	*(27,248)*	*(27,875)*	*(27,805)*	*(27,810)*	*(27,714)*	*(-2.3)*	*(-12.1)*
Dept. of Homeland Security*	—	—	266	737	1,028	1,240	1,281	1,149	1,081	6.1	-4.6
Dept. of the Interior Total	618	621	641	643	627	621	635	595	631	-10.2	-19.2
(U.S. Geological Survey)	—	*(566)*	*(583)*	*(550)*	*(553)*	*(546)*	*(559)*	*(532)*	*(595)*	—	—
Dept. of Transportation Total	607	718	778	700	665	707	838	767	846	-9.5	-18.6
(FAA)	*(220)*	*(301)*	*(359)*	*(271)*	*(248)*	*(263)*	*(310)*	*(235)*	*(305)*	—	—
(FHA)	*(261)*	*(294)*	*(275)*	*(291)*	*(332)*	*(304)*	*(380)*	*(397)*	*(397)*	—	—
(NHTSA)	*(51)*	*(58)*	*(59)*	*(61)*	*(7)*	*(61)*	*(58)*	*(61)*	*(55)*	—	—

Selected agencies & programs	FY2000 actual	FY2001 actual	FY2002 actual	FY2003 actual	FY2004 actual	FY2005 actual	FY2006 estimate	FY2007 request	FY2007 House Apps. Comm.	% Change FY06-FY11	
										Current $	Constant $
Department of Veterans Affairs	645	719	756	819	866	742	765	765	790	-2.5	-12.3
Environmental Protection Agency	558	574	592	567	662	641	600	557	608	-8.2	-17.4
NASA Total	9,494	9,887	10,224	10,681	10,803	10,618	11,295	12,202		57.3	41.5
(Space Flight)	*(3,014)*	*(2,901)*	*(2,461)*	*(3,613)*	—	—	—	—		—	—
(Science, Aeronautics, Tech.)	*(6,481)*	*(7,024)*	*(7,840)*	*(7,386)*	—	—	—	—		—	—
*(Other)***	—	—	—	—	*(1,829)*	*(1,567)*	*(1,574)*	*(1,811)*		—	—
*(Science, Aeronautics, Exploration)***	—	—	—	—	*(8,974)*	*(9,051)*	*(9,721)*	*(10,524)*		—	—
National Science Foundation	2,931	3,320	3,525	3,926	4,123	4,102	4,175	4,523	4,522	42.5	28.2
All other R&D	630	702	912	391	724	729	773	767		-1.7	-11.6
Total	83,769	91,534	102,899	117,439	126,389	131,289	134,465	136,885		5.5	-5.1
Non-Defense	40,609	45,332	49,167	54,552	56,046	56,648	57,565	58,496		14.6	3.1
Non-Defense Minus NIH	*(23,374)*	*(25,525)*	*(26,453)*	*(28,243)*	*(28,798)*	*(28,773)*	*(29,760)*	*(30,686)*		—	—
Defense/Energy Defense	43,160	46,202	53,731	62,887	70,344	74,641	76,900	78,388		-1.2	-11.2

Notes: Totals may not add due to rounding. Data include conduct of R&D and R&D facilities. Not all subagency R&D data is given, therefore the sums may not equal the agency total. Based largely on data in tables prepared by the American Association for the Advancement of Science (AAAS), including data from "AAAS Analysis of R&D in the FY2007 Budget — Revised (Part 2 of 2) — Tables," Revised March 8, 2006, at [http://www.aaas.org/spp/rd/prev07tb.htm]. Data from previous years' tables appear at [http://www.aaas.org/spp/rd/]. AAAS bases its tables on OMB data, agency budget justifications, information from agency budget offices, and appropriations action. Data in italics in parentheses are parts of the total and have been included in agency totals. See also CRS Report RL33345, *Federal Research and Development Funding: FY2007*, by Michael E. Davey (coordinator). The final FY2005 figures include adjustments to reflect across-the-board reductions in the FY2005 omnibus bill.

* FY2002 data for comparison purposes only. DHS began operations in FY2003. DHS figures include programs that were transferred from other agencies.
** Categories were changed after FY2003. Other includes largely space station exploration capability funding.