Federal Research and Development Funding: FY2015

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Summary

President Obama's budget request for FY2015 includes $135.352 billion for research and development (R&D), a $1.670 billion (1.2%) increase from the FY2014 level of $133.682 billion. The request represents the President's R&D priorities; Congress may opt to agree with part or all of the request, or it may express different priorities through the appropriations process. In particular, Congress will play a central role in determining the growth rate and allocation of the federal R&D investment in a period of intense pressure on discretionary spending. Low or negative growth in the overall R&D investment may require movement of resources across disciplines, programs, or agencies to address priorities.

Funding for R&D is concentrated in a few departments and agencies. Under President Obama's FY2015 budget request, seven federal agencies would receive 95.4% of total federal R&D funding, with the Department of Defense (DOD, 47.6%) and the Department of Health and Human Services (HHS, 23.0%) accounting for more than two-thirds of all federal R&D funding. The largest increases in agency R&D funding in the President's request would go to the Department of Energy (DOE, up $950 million, 8.4%), DOD (up $574 million, 0.9%), and HHS (up $157 million, 0.5%). Among the agencies with the largest proposed reductions in R&D funding are the Department of Homeland Security (DHS, down $156 million, 15.1%) and the National Aeronautics and Space Administration (NASA, down $112 million, 1.0%).

In addition to the FY2015 base budget request, the President has proposed an Opportunity, Growth, and Security Initiative (OGSI) that seeks, together with funding for other purposes, $5.3 billion for R&D at certain agencies, including the National Institute of Standards and Technology (NIST, $2.515 billion), National Institutes of Health ($970 million), NASA ($874 million), National Science Foundation (NSF, $552 million), Department of Agriculture ($277 million), and the National Oceanic and Atmospheric Administration ($180 million). Of the NIST funding, $2.4 billion would support the establishment of a National Network for Manufacturing Innovation to promote the development of manufacturing technologies with broad applications.

The R&D budgets of NIST, NSF, and the DOE Office of Science were targeted for doubling over 7 years, from their FY2006 levels, by the America COMPETES Act, and over 11 years by the America COMPETES Reauthorization Act of 2010. Although the President's FY2015 budget requests increases for these accounts, it departs, as did the FY2014 request, from earlier Obama and Bush Administration budgets that explicitly stated the doubling goal.

The President's FY2015 request continues support for three multi-agency R&D initiatives, proposing $1.537 billion for the National Nanotechnology Initiative (NNI), a reduction of $1 million (0.4%) from the FY2014 level; $3.786 billion for the Networking and Information Technology Research and Development (NITRD) program, down $114 million (2.9%); and $2.501 billion for the U.S. Global Change Research Program (USGCRP), down $12 million (0.5%). The request also proposes approximately $200 million in FY2015 for a Brain Research through Advancing Innovative Neurotechnologies (BRAIN) initiative, as well as funding for the Materials Genome Initiative and the National Robotics Initiative.

In recent years, continuing resolutions and sequestration have resulted in the annual appropriations process being completed after the start of the fiscal year. This can affect agencies' execution of their R&D budgets, including the delay or cancellation of planned R&D activities and acquisition of R&D-related equipment.

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Overview

The 113th Congress continues to take a strong interest in the health of the U.S. research and development (R&D) enterprise and in providing support for federal R&D activities. The federal government has played an important role in supporting R&D efforts that have led to scientific breakthroughs and new technologies, from jet aircraft and the Internet to communications satellites, shale gas extraction, and defenses against disease. However, widespread concerns about the federal debt and recent and projected federal budget deficits are driving difficult decisions about the prioritization of R&D, both in the context of the entire federal budget and among competing needs within the federal R&D portfolio.

The U.S. government supports a broad range of scientific and engineering R&D. Its purposes include specific concerns such as national defense, health, safety, the environment, and energy security; advancing knowledge generally; developing the scientific and engineering workforce; and strengthening U.S. innovation and competitiveness in the global economy. Most of the R&D funded by the federal government is performed in support of the unique missions of individual funding agencies.

The federal R&D budget is an aggregation of the R&D components of each federal agency. There is no single, centralized source of funds that is allocated to individual agencies. In fact, agency R&D budgets are developed internally as part of each agency's overall budget development process and may be included in accounts that are entirely for R&D and accounts that include funding for non-R&D activities. These budgets are subjected to review, revision, and approval by the Office of Management and Budget and become part of the President's annual budget submission to Congress. The federal R&D budget is then calculated by aggregating the R&D components of the appropriations provided by Congress to each federal agency.

Congress plays a central role in defining the nation's R&D priorities as it makes decisions about the level and allocation of R&D funding—overall, within agencies, and for specific programs. Some Members of Congress have expressed concerns about the level of federal spending (for R&D as for other purposes) in light of the current federal deficit and debt. As Congress acts to complete the FY2015 appropriations process, it faces two overarching issues: the extent to which federal R&D investments can grow in the face of increased pressure on discretionary spending and the prioritization and allocation of the available funding. Low or negative growth in the overall R&D investment may require movement of resources across disciplines, programs, or agencies to address priorities. Moving funding between programs/accounts/agencies can become more complex and difficult if the funding for programs/accounts/agencies is provided through different appropriations bills.

Structurally, this report begins with a discussion of the overall level of R&D funding requested in the President's budget, followed by analyses of requested R&D funding from a variety of perspectives and for selected multiagency R&D initiatives. The report concludes with discussion and analysis of the R&D budget requests of selected federal departments and agencies that, collectively, account for about 98% of total federal R&D funding. A list of definitions associated with federal R&D funding is provided in the text box on the following page.

Definitions Associated with Federal Research and Development Funding

Two key sources of definitions associated with federal research and development funding are the Office of Management and Budget and the National Science Foundation.

Office of Management and Budget. The Office of Management and Budget provides the following definitions of R&D-related terms in OMB Circular No. A-11, "Preparation, Submission, and Execution of the Budget," (July 2013). This document provides guidance to agencies in the preparation of the President's annual budget and instructions on budget execution.

Conduct of Research. Research and development activities comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture, and society, and the use of this stock of knowledge to devise new applications. Includes administrative expenses for R&D, including the operating costs of research facilities and equipment; does not include physical assets for R&D such as R&D equipment and facilities or routine product testing, quality control, mapping, collection of general-purpose statistics, experimental production, routine monitoring and evaluation of an operational program, and the training of scientific and technical personnel.

Basic Research. Basic research is defined as systematic study directed toward fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. Basic research, however, may include activities with broad applications in mind.

Applied Research. Applied research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development. Development is defined as systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

R&D Equipment. Amounts for major equipment for research and development. Includes acquisition or design and production of movable equipment, such as spectrometers, research satellites, detectors, and other instruments. At a minimum, this line should include programs devoted to the purchase or construction of R&D equipment.

R&D Facilities. Amounts for the construction and rehabilitation of research and development facilities. Includes the acquisition, design, and construction of, or major repairs or alterations to, all physical facilities for use in R&D activities. Facilities include land, buildings, and fixed capital equipment, regardless of whether the facilities are to be used by the Government or by a private organization, and regardless of where title to the property may rest. Includes fixed facilities such as reactors, wind tunnels, and particle accelerators.

National Science Foundation. The National Science Foundation provides the following definitions of R&D-related terms in its *Science and Engineering Indicators: 2014* report.

Research and Development. Research and development, also called research and experimental development; comprises creative work undertaken on a systematic basis to increase the stock of knowledge—including knowledge of man, culture, and society—and its use to devise new applications.

R&D Plant. In general, R&D plant refers to the acquisition of, construction of, major repairs to, or alterations in structures, works, equipment, facilities, or land for use in R&D activities. Data included in this section refer to obligated federal dollars for R&D plant.

Basic Research: The objective of basic research is to gain more comprehensive knowledge or understanding of the subject under study without specific applications in mind. Although basic research may not have specific applications as its goal, it can be directed in fields of present or potential interest. This is often the case with basic research performed by industry or mission-driven federal agencies.

Applied Research: The objective of applied research is to gain knowledge or understanding to meet a specific, recognized need. In industry, applied research includes investigations to discover new scientific knowledge that has specific commercial objectives with respect to products, processes, or services.

Development: Development is the systematic use of the knowledge or understanding gained from research directed toward the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes.

The President's FY2015 Budget Request

On March 4, 2014, President Obama released his proposed FY2015 budget. Using FY2014 as the base comparison year, this report provides government-wide, multi-agency, and individual agency analyses of the President's FY2015 request as it relates to R&D and related activities. The President's budget seeks $135.352 billion for R&D in FY2015, a 1.2 % increase over the estimated FY2014 R&D funding level of $133.682 billion.[1] Adjusted for anticipated inflation of 1.7%, the President's FY2015 R&D request represents a decrease of 0.5% from the FY2014 estimated level.[2]

President Obama's FY2015 budget reflects a reduced focus on a primary science and technology policy effort that Congress and two Administrations have pursued for the past eight years. Referred to frequently as the "doubling effort," Congress and Presidents Obama and Bush have sought to increase support for the physical sciences and engineering by doubling funding for accounts at three federal agencies with a strong R&D emphasis in these disciplines: the Department of Energy (DOE) Office of Science, the National Science Foundation (NSF), and the Department of Commerce (DOC) National Institute of Standards and Technology (NIST) core laboratory research and construction of research facilities (collectively referred to as the "targeted accounts"). The doubling goal was expressed in President Bush's American Competitiveness Initiative, in budget requests from President Obama before FY2014, and implicitly in the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358). The America COMPETES Act and the reauthorization act set appropriations authorization levels consistent with a doubling pace of 7 years and 11 years, respectively.[3] In aggregate, appropriations provided to these accounts fell short of the levels authorized in P.L. 110-69 and P.L. 111-358. In the FY2015 budget, the President is requesting a 1.2% increase in aggregate funding for the targeted accounts, a pace that would require more than 58 years to double and one that is below the expected rate of inflation (1.7%). See "Efforts to Double Certain R&D Accounts" for more details.

More broadly, in a 2009 speech before members of the National Academy of Sciences, President Obama put forth a goal of increasing the national (public and private) investment in R&D to more than 3% of the U.S. gross domestic product (GDP). President Obama did not provide details on how this goal might be achieved (e.g., through increases in direct federal R&D funding or through indirect mechanisms such as the research and experimentation (R&E) tax credit).[4]

[1] Funding levels included in this document are in current dollars unless otherwise noted. Inflation diminishes the purchasing power of federal R&D funds, so an increase that falls short of the inflation rate may reduce real purchasing power.

[2] As calculated by CRS using the GDP (chained) price index for FY2014 and FY2015 in Table 10.1, Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2018, *Budget of the United States Government, Fiscal Year 2015*, http://www.whitehouse.gov/sites/default/files/omb/budget/fy2014/assets/hist10z1.xls.

[3] As used in this report, the term "doubling pace" means the number of years required for funding for the targeted accounts to double, relative to the FY2006 baseline year, if the compound annual growth rate (CAGR) were to continue. For example, the doubling pace of the America COMPETES Act is based on the 10.3% CAGR from FY2006 to FY2010, the last year of authorizations under the act. At 10.3% annual growth, funding for the targeted accounts would double in approximately 7 years. Similarly, the CAGR for the reauthorization act, which authorized appropriations through FY2013, was 6.3%, a rate that would take approximately 11 years to double.

[4] The research and experimentation tax credit is frequently referred to as the research and development tax credit or R&D tax credit, through the credit does not apply to development expenditures. For additional information about the (continued...)

Achieving the 3% goal would likely require a substantial increase in government and corporate R&D spending. When President Obama set forth the goal in 2009, total U.S. R&D expenditures were approximately 2.90% of GDP. In 2012, R&D as a percentage of GDP was 2.89%, with the federal government contributing 0.86% (down from 0.91% in 2009) and non-federal sources contributing 2.02% (up from 1.98% in 2009).[5]

Analysis of federal R&D funding is complicated by several factors, such as inconsistency among agencies in the reporting of R&D and the inclusion of R&D in accounts with non-R&D activities. As a result of these and other factors, figures reported by the Office of Management and Budget (OMB) and Office of Science and Technology Policy (OSTP), including those shown in **Table 1**, may differ somewhat from the agency budget analyses that appear later in this report. Another complicating factor in the President's FY2015 budget request is the Opportunity, Growth, and Security Initiative (OGSI), discussed in the next section.

Opportunity, Growth, and Security Initiative

In addition to the FY2015 base budget request,[6] President Obama has proposed an Opportunity, Growth, and Security Initiative that seeks $56 billion, for various purposes, including $5.3 billion for R&D. A large fraction of the OGSI R&D funding ($2.4 billion) would go to the NIST to support the establishment of a National Network for Manufacturing Innovation to promote the development of manufacturing technologies with broad applications (see "National Network for Manufacturing Innovation" for more details). Among other R&D agencies that would receive funding under the OGSI proposal are: Department of Defense (DOD), National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), NSF, Department of Agriculture (USDA), Department of Transportation (DOT), National Oceanic and Atmospheric Administration (NOAA), and the Department of the Interior (DOI). There are few details on how agency OGSI funding would be allocated between R&D and non-R&D activities.

The President's request refers to the OGSI as "separate" and "fully-paid-for."[7] The funding requested in the President's base budget seeks to comply with the FY2015 discretionary spending cap set by the Bipartisan Budget Act of 2013 (Division A of P.L. 113-67). The OGSI seeks funding above the cap and would be offset by an equal amount of proposed additional revenue produced by spending reforms and changes in the tax code. Analyses in this report address only the R&D funding included in the base request, except as specifically noted.

(...continued)

R&E tax credit, see CRS Report RL31181, *Research Tax Credit: Current Law and Policy Issues for the 113th Congress*, by Gary Guenther.

[5] GDP figures from Bureau of Economic Analysis, *Survey of Current Business*, May 31, 2012; R&D figures from National Science Foundation, National Center for Science and Engineering Statistics, *National Patterns of R&D Resources* (annual series).

[6] The term "base budget" is used in the President's budget to distinguish the main request from additional funding requested as part of the OGSI.

[7] Executive Office of the President (EOP), OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth ," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

Federal R&D Funding Perspectives

Federal R&D funding can be analyzed from a variety of perspectives that provide different insights. The following sections examine the data viewed by agency, by the character of the work supported, by a combination of these two perspectives, and by defense-related and nondefense-related R&D.

Federal R&D by Agency

Congress makes decisions about federal R&D funding through the authorization and appropriations process primarily from the perspective of individual agencies and programs. **Table 1** provides data on R&D by agency for FY2013 (actual), FY2014 (estimate), and FY2015 (request) as reported by OSTP.

Under President Obama's FY2015 budget request, seven federal agencies would receive more than 95% of total federal R&D funding: the Department of Defense (DOD), 47.6%; Department of Health and Human Services (HHS) (primarily NIH), 23.0%; DOE, 9.1%; NASA, 8.5%; NSF, 4.2%; USDA, 1.8%; and DOC, 1.2%. This report provides an analysis of the R&D budget requests for these agencies, as well as for the Department of Homeland Security (DHS), Department of the Interior (DOI), Department of Transportation (DOT), Department of Veterans Affairs (VA), and Environmental Protection Agency (EPA). In total, these 12 agencies account for more than 98% of current and requested federal R&D funding.

The largest agency R&D increases in the President's FY2015 request (in dollars, not percentages), compared with FY2014, are for DOE, $950 million (8.4%); DOD, $574 million (0.9%); HHS, $157 million (0.5%); Interior, $85 million (10.1%); USDA, $29 million (1.2%); and DOT, $12 million (1.4%). Under the President's FY2015 budget request, DHS R&D funding would be reduced by $156 million (15.1%), NASA by $112 million (1.0%), and DOC by $35 million (2.1%).

Table 1. Federal Research and Development Funding by Agency, FY2013-FY2015

(budget authority, dollar amounts in millions)

				Change, FY2014-FY2015	
Department/Agency	**FY2013 Actual**	**FY2014 Estimate**	**FY2015 Request**	**Dollar**	**Percent**
Department of Defense	$ 63,838	$ 63,856	$ 64,430	$ 574	0.9%
Department of Health and Human Services	29,969	30,912	31,069	157	0.5%
Department of Energy	10,740	11,359	12,309	950	8.4%
National Aeronautics and Space Administration	11,282	11,667	11,555	-112	-1.0%
National Science Foundation	5,319	5,729	5,727	-2	0.0%
Department of Agriculture	2,116	2,418	2,447	29	1.2%
Department of Commerce	1,360	1,632	1,597	-35	-2.1%
Department of Veterans Affairs	1,164	1,174	1,178	4	0.3%

Department/Agency	FY2013 Actual	FY2014 Estimate	FY2015 Request	Change, FY2014-FY2015 Dollar	Change, FY2014-FY2015 Percent
Department of the Interior	785	840	925	85	10.1%
Department of Homeland Security	684	1,032	876	-156	-15.1%
Department of Transportation	829	853	865	12	1.4%
Environmental Protection Agency	532	560	560	0	0.0%
Other	1,714	1,650	1,814	164	9.9%
Total	**130,332**	**133,682**	**135,352**	**1,670.0**	**1.2%**

Source: EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

Notes: Totals may differ from the sum of the components due to rounding.

Federal R&D by Character of Work, Facilities, and Equipment

Federal R&D funding can also be examined by the character of work it supports—basic research, applied research, or development—and by funding provided for construction of R&D facilities and acquisition of major R&D equipment. (See **Table 2**.) President Obama's FY2015 request includes $32.079 billion for basic research, down $331 million (1.0%) from FY2014; $32.641 billion for applied research, up $582 million (1.8%) from FY2014; $68.017 billion for development, up $1.540 (2.3%) from FY2014; and $2.615 billion for facilities and equipment, down $121 million (4.4%) from FY2014.

Table 2. Federal R&D Funding by Character of Work and Facilities and Equipment, FY2013-FY2015

(budget authority, dollar amounts in millions)

	FY2013 Actual	FY2014 Estimate	FY2015 Request	Change, FY2014-FY2015 Dollar	Change, FY2014-FY2015 Percent
Basic research	$ 30,648	$ 32,410	$ 32,079	$ -331	-1.0%
Applied research	31,199	32,059	32,641	582	1.8%
Development	66,614	66,477	68,017	1,540	2.3%
Facilities and Equipment	1,871	2,736	2,615	-121	-4.4%
Total	**130,332**	**133,682**	**135,352**	**1,670**	**1.2%**

Source: EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

Notes: Totals may differ from the sum of the components due to rounding.

Federal Role in U.S. R&D by Character of Work

A primary policy foundation for public investments in basic research and incentives (e.g., tax credits) for the private sector to conduct research is the view, widely-held by economists, that the private sector will, left on its own, underinvest in basic research because the social returns (i.e., all of the benefits (such as rewards, opportunities, improvements) to society resulting from the research) exceed the private returns (i.e., the benefits accruing to the investor (such as increased revenues, higher stock value)). Other factors inhibiting corporate investment in basic research include long time horizons for commercial applications (diminishing the potential returns due to the time value of money), high levels of technical risk/uncertainty, shareholder demands for shorter-term returns; and asymmetric and imperfect information. The federal government is the nation's largest supporter of basic research, funding 52.6% of U.S. basic research in 2012.[8] Industry funded 21.3% of U.S. basic research in 2012, with state governments, universities, and other non-profit organizations funding the remaining 26.0%.[9] In contrast to basic research, industry is the primary funder of applied research in the United States, accounting for an estimated 54.0% in 2012, while the federal government accounted for an estimated 36.2%.[10] Industry also provides the vast majority of funding for development. Industry accounted for 76.4% of development in 2012, while the federal government provided 22.1% of the funding.[11]

Federal R&D by Agency and Character of Work Combined

Combining these perspectives, federal R&D funding can be viewed in terms of each agency's contribution to basic research, applied research, development, and facilities and equipment. (See **Table 3**.) The overall federal R&D budget reflects a wide range of national priorities, from supporting advances in spaceflight to developing new and affordable sources of energy. These priorities and the mission of each individual agency contribute, in part, to the composition of that agency's R&D spending (i.e., the allocation between basic research, applied research, development, and facilities and equipment). In the President's FY2015 budget request, the Department of Health and Human Services, primarily NIH, accounts for somewhat more than half of all federal funding for basic research. HHS is also the largest funder of applied research, accounting for about 45% of all federally funded applied research in the President's FY2015 budget request. DOD is the primary federal agency funder of development, accounting for 84.9% of total federal development funding in the President's FY2015 budget request.[12]

[8] National Science Foundation, National Center for Science and Engineering Statistics, 2013, *National Patterns of R&D Resources: 2011–12 Data Update*, NSF 14-304, http://www.nsf.gov/statistics/nsf14304/. More recent data are not yet available.

[9] Ibid.

[10] Ibid.

[11] Ibid.

[12] EOP, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2015,* Table 21-1.

Table 3. Top R&D Funding Agencies by Character of Work, Facilities, and Equipment, FY2013-FY2015

(budget authority, dollar amounts in millions)

				Change, FY2014-FY2015	
	FY2013 Actual	FY2014 Enacted	FY2015 Request	Dollar	Percent
Basic Research					
Dept, of Health and Human Services	$15,424	$15,861	$16,085	$224	1.4%
National Science Foundation	4,357	4,711	4,708	-3	-0.1%
Dept. of Energy	3,360	3,907	3,086	-821	-21.0%
Applied Research					
Dept. of Health and Human Services	14,294	14,851	14,783	-68	-0.5%
Dept. of Defense	4,158	4,376	4,530	154	3.5%
Dept. of Energy	3,852	3,886	4,269	383	9.9%
Development					
Dept. of Defense	57,774	57,326	57,747	421	0.7%
NASA	5,064	5,162	6,009	847	16.4%
Dept. of Energy	2,466	2,585	2,927	342	13.2%
Facilities and Equipment					
Dept. of Energy	571	842	970	128	15.2%
National Science Foundation	372	538	539	1	0.2%
Dept. of Commerce	217	227	250	23	10.1%

Source: EOP, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2015,* March 2014.

Note: Top three funding agencies in each category based on FY2015 request.

Defense-Related and Nondefense-Related R&D

Federal R&D funding can also be characterized as defense-related or nondefense-related. Defense-related R&D is provided for primarily by the Department of Defense, but it also includes some activities at the Department of Energy and the Federal Bureau of Investigation. Defense-related R&D has constituted more than half of total federal R&D funding, fluctuating between 50% and 70% for more than three decades. Defense-related R&D grew from 52.7% of total federal R&D funding in FY2001 to 60.5% in FY2008, then declined over several years to 56.8% in 2012.[13] The President's FY2015 budget includes $69.465 billion in defense-related R&D funding, or about 51.3% of the total R&D request.[14]

[13] CRS analysis of National Science Board, *Science and Engineering Indicators 2014*, NSB 14-01, 2014, Appendix table 4-33, http://www.nsf.gov/statistics/seind14/.

[14] EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

Multiagency R&D Initiatives

Although this report focuses primarily on the R&D activities of individual agencies, President Obama's FY2015 budget request supports several multiagency R&D initiatives. The following sections discuss several of these.

Efforts to Double Certain R&D Accounts[15]

In 2006, President Bush announced the American Competitiveness Initiative (ACI) which, in part, sought to increase federal funding for physical sciences and engineering research by doubling funding over 10 years (FY2006-FY2016) for targeted accounts at three agencies: the National Science Foundation, the Department of Energy (DOE) Office of Science, and the NIST Scientific and Technical Research and Services (STRS) and construction of research facilities (CRF) accounts.

In 2007, Congress authorized substantial increases for these targeted accounts under the America COMPETES Act (P.L. 110-69), which set the combined authorization levels for these accounts for FY2008 to FY2010 at a seven-year doubling pace from the FY2006 baseline. However, funding provided for these agencies in the Consolidated Appropriations Act, 2008 (P.L. 110-161), the Omnibus Appropriations Act, 2009 (P.L. 111-8), and the Consolidated Appropriations Act, 2010 (P.L. 111-117) fell below these targets.[16] (See **Table 4**.)

In 2010, Congress passed the America COMPETES Reauthorization Act of 2010 (P.L. 111-358) which, among other things, authorized appropriations for the targeted accounts for FY2011 to FY2013.[17] The aggregate authorization levels for the targeted accounts in this act were consistent with an 11-year doubling path. However, aggregate FY2013 funding subsequently appropriated for the targeted accounts was approximately $12.201 billion, $2.904 billion less than authorized in the act. This funding level set a pace to double over 22 years from the FY2006 level—more than triple the length of time originally envisioned in the 2007 America COMPETES Act and about twice as long as the doubling period established by the America COMPETES Reauthorization Act of 2010.

Budget constraints appear to have put the future of the doubling path in question. In his FY2010 *Plan for Science and Innovation,* President Obama stated that he, like President Bush, would seek to double funding for basic research over 10 years (FY2006 to FY2016) at the ACI agencies.[18] In his FY2011 budget documents, President Obama extended the period over which he intended to double these agencies' budgets to 11 years (FY2006 to FY2017).[19] The FY2013 budget request

[15] For more information, see CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

[16] In 2009, the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) provided $5.202 billion in supplemental funding for several of the targeted accounts. This increased aggregate funding for the accounts above the target levels in that year.

[17] For more information, see CRS Report R41231, *America COMPETES Reauthorization Act of 2010 (H.R. 5116) and the America COMPETES Act (P.L. 110-69): Selected Policy Issues*, coordinated by Heather B. Gonzalez.

[18] EOP, OSTP, *The President's Plan for Science and Innovation: Doubling Funding for Key Basic Research Agencies in the 2010 Budget*, May 7, 2009, http://www.whitehouse.gov/files/documents/ostp/budget/doubling.pdf.

[19] EOP, OSTP, *The President's Plan for Science and Innovation: Doubling Funding for Key Basic Research Agencies in the 2011 Budget*, February 1, 2010, http://www.whitehouse.gov/sites/default/files/doubling%2011%20final.pdf.

reiterated President Obama's intention to double funding for the targeted accounts from their FY2006 levels but did not specify the length of time over which the doubling was to take place. President Obama's FY2014 budget expressed a commitment to increasing funding for the targeted accounts, but did not commit to doubling. In the President's FY2015 budget, there is no explicit statement of commitment to increasing funding for the targeted accounts. For FY2015, President Obama is requesting $13.105 billion in aggregate funding for the targeted accounts, an increase of $155 million (1.2%) above the estimated FY2014 aggregate funding level of $12.950 billion. However, adjusted for inflation, funding for the targeted accounts would decline by 0.5%.

Congress has not reauthorized the America COMPETES Reauthorization Act of 2010, major provisions of which (including authorizations for the targeted accounts) expired in FY2013, nor has Congress otherwise authorized appropriations for these accounts in FY2014 or future years. Two bills have been introduced in the House of Representatives that would set authorization levels for two or more of these accounts. H.R. 4186, the Frontiers in Innovation, Research, Science, and Technology Act of 2014, would provide authorizations for FY2014 and FY2015 for NSF and NIST, but not for the DOE's Office of Science. H.R. 4159, the America Competes Reauthorization Act of 2014, would provide authorizations for FY2015 to FY2019 for NSF, NIST, and the DOE Office of Science.

Figure 1 shows total funding for the targeted accounts as a percentage of their FY2006 funding level, and illustrates how actual (FY2006-FY2014), requested (FY2007-FY2015), and authorized appropriations (FY2008-FY2013) compare to different doubling rates using FY2006 as the base year. The thick black line at the top of the chart is at 200%, the doubling level. The data used in **Figure 1** are in current dollars, not constant dollars, thus the effect of inflation on the purchasing power of these funds is not taken into consideration.

Table 4. Funding for Accounts Targeted for Doubling, FY2006-FY2015

(budget authority, in millions of current dollars)

Agency	FY2006 Actual	FY2007 Actual	FY2008 Actual	FY2009 Actual	FY2009 ARRA	FY2010 Actual	FY2011 Actual	FY2012 Actual	FY2013 Actual	FY2014 Est.	FY2015 Req.
NSF	$5,646	$5,884	$6,084	$6,469	$2,402	$6,972	$6,913[a]	$7,033	$6,884	$7,172	$7,255
DOE/Ofc. of Science	3,632	3,837	4,083	4,807	1,633	4,964	4,843	4,874	4,681	5,071	5,111
NIST/STRS	395	434	441	472	220	515	497	567	580	651	680
NIST/CRF	174	59	161	172	360	147	70	55	56	56	59
Total	**9,846**	**10,214**	**10,768**	**11,920**	**4,615**	**12,598**	**12,323**	**12,529**	**12,201**	**12,950**	**13,105**

Sources: NIST budget requests, FY2008-FY2015, available at http://www.nist.gov/public_affairs/budget/index.cfm; DOE budget requests, FY2008-FY2015, available at http://www.cfo.doe.gov/crorgcf30.htm; NSF budget requests, FY2008-FY2015, available at http://www.nsf.gov/about/budget; and the President's FY2015 budget, http://www.whitehouse.gov/omb/budget/Appendix.

Notes: Totals may differ from the sum of the components due to rounding.

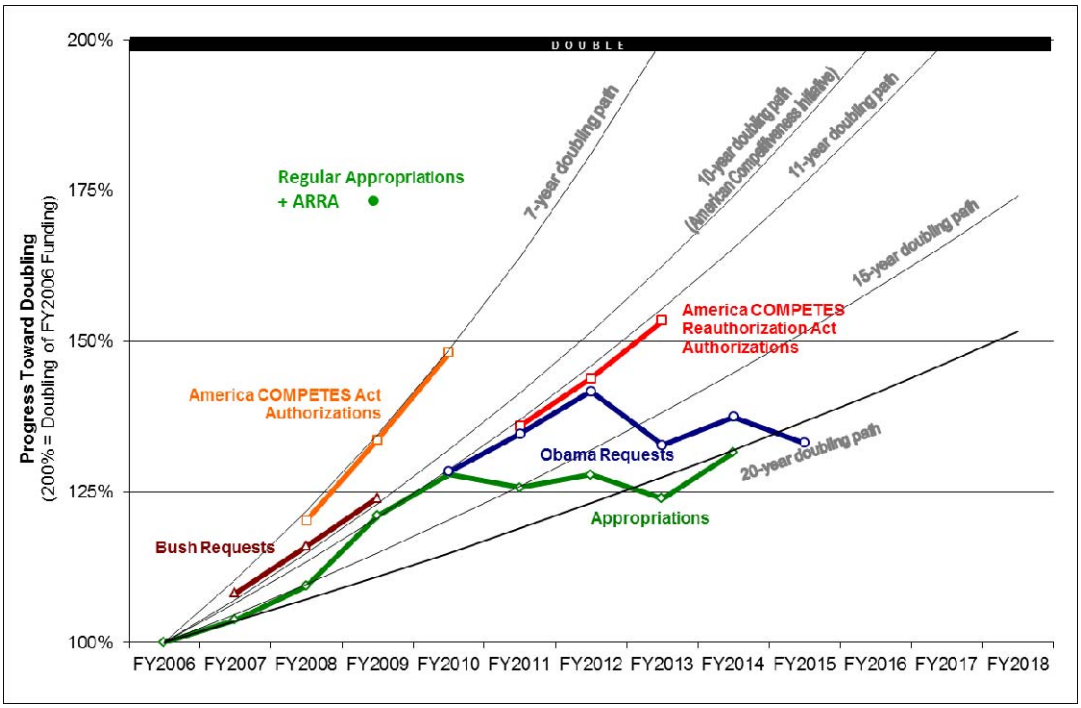
a. Includes $54 million transferred to the U.S. Coast Guard for icebreaking services (per P.L. 112-10).

Some analysts have raised questions about the efficacy and unintended consequences of the doubling policy. Among the questions: What is the basis for asserting that a doubling of funding is the correct target for increases (as opposed to, say, an increase of 30%, 80%, or 120%)? What is the basis for setting the time period (e.g., 7 years, 11 years) for doubling? Is the optimal approach to double funding for specific agencies? If so, should funding for the selected agencies

be done in aggregate or individually? Are the agencies chosen the right agencies? Should specific programs or appropriations accounts be targeted rather than entire agencies? What are the adjustment costs of a post-doubling slowdown in funding increases?

In an effort to understand the potential consequence of the current doubling effort, a 2009 National Bureau of Economic Research paper analyzed the effects of the NIH doubling (which took place from 1988 to 2003) and subsequent funding slowdown on the U.S. biomedical research enterprise. Among its conclusions, the authors found that "future increases in research spending should be seen in terms of increasing the stock of sustainable activity rather than in attaining some arbitrary target (i.e., doubling) in a short period."[20] Similar views were expressed by participants at a roundtable held by the House Committee on Energy and Commerce in 2014.[21]

Figure 1. Funding for Accounts Targeted for Doubling: Appropriations, Authorizations, and Requests versus Selected Doubling Rates



Sources: Prepared by CRS based on data from agency budget justifications for FY2008 to FY2015 and agency authorization levels from the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 (P.L. 111-358).

Notes: The 7-year doubling pace represents annual increases of 10.4%, the 10-year doubling pace represents annual increases of 7.2%, the 11-year doubling pace represents annual increases of 6.5%, the 15-year doubling pace represents annual increases of 4.7%, and the 20-year doubling pace represents annual increases of 3.3%. Through compounding, these rates would achieve the doubling of funding in the specified time period. The lines connecting aggregate appropriations, authorizations, and requests for the targeted accounts are for clarification purposes only.

[20] Richard Freeman and John Van Reenen, "What if Congress Doubled R&D Spending on the Physical," *Innovation Policy and the Economy*, vol. 9 (February 2009), p. 28.

[21] A video of the "21st Century Cures Roundtable" held on May 6, 2014 is available at http://energycommerce.house.gov/event/21st-century-cures-roundtable.

National Nanotechnology Initiative[22]

Launched by President Clinton in his FY2001 budget request, the National Nanotechnology Initiative (NNI) is a multiagency R&D initiative to advance understanding and control of matter at the nanoscale, where the physical, chemical, and biological properties of materials differ in fundamental and useful ways from the properties of individual atoms or bulk matter.[23]

The President is requesting $1.537 billion for the NNI in FY2015, a reduction of $1 million from the FY2014 actual level of $1.538 billion. Among the changes in nanotechnology funding under the Administration's FY2015 request: reductions for DOD ($32 million, 18.1%), DOC ($15 million, 15.6%), and NASA ($4 million, 23.5%) and increases for DOE ($40 million, 13.1%) and DHS ($8 million, 35.2%). Nanotechnology funding for other NNI agencies would remain essentially flat in FY2015.[24]

Table 5. National Nanotechnology Initiative Funding, FY2013-FY2015

(budget authority, in millions of current dollars)

	FY2013 Actual	FY2014 Estimated	FY2015 Request	Change, FY2014-FY2015	
				Dollars	Percent
NNI	$1,550	$1,538	$1,537	-$1	-0.4%

Source: EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

Networking and Information Technology Research and Development Program[25]

Established by the High-Performance Computing Act of 1991 (P.L. 102-194), the Networking and Information Technology Research and Development (NITRD) program is the primary mechanism by which the federal government coordinates its unclassified networking and information technology R&D investments in areas such as supercomputing, high-speed networking, cybersecurity, software engineering, and information management.

President Obama is requesting $3.786 billion in FY2015 for the NITRD program. This is $114 million (2.9%) below the FY2014 funding level. The most substantial agency increases in NITRD funding under the Administration's FY2015 request are for the DOE ($54 million, 9.3%) and DOC ($6 million, 3.8%). The President's budget would reduce NITRD funding at DOD by $146

[22] For additional information on the NNI, see CRS Report RL34401, *The National Nanotechnology Initiative: Overview, Reauthorization, and Appropriations Issues*, by John F. Sargent Jr.

[23] In the context of the NNI and nanotechnology, the nanoscale refers to lengths of 1 to 100 nanometers. A nanometer is one-billionth of a meter, or about the width of 10 hydrogen atoms arranged side-by-side in a line.

[24] EOP, OSTP, *The 2014 Budget: A World-Leading Commitment to Science and Research—Science, Technology, Innovation, and STEM Education in the 2014 Budget,* Table 2, April 10, 2013.

[25] For additional information on the NITRD program, see CRS Report RL33586, *The Federal Networking and Information Technology Research and Development Program: Background, Funding, and Activities*, by Patricia Moloney Figliola.

million (11.9%), DHS by $13 million (13.6%), NASA by $7 million (5.6%), HHS by $6 million (1-1%), and NSF by $2 million (0.2%).[26]

Table 6. Networking and Information Technology Research and Development Program Funding, FY2013-FY2015

(budget authority, in millions of current dollars)

	FY2013 Actual	FY2014 Estimated	FY2015 Request	Change, FY2014-FY2015	
				Dollars	Percent
NITRD	$3,622	$3,900	$3,786	-$114	-2.9%

Source: OSTP, EOP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

U.S. Global Change Research Program[27]

The U.S. Global Change Research Program (USGCRP) coordinates and integrates federal research and applications to understand, assess, predict, and respond to human-induced and natural processes of global change. The program seeks to advance global climate change science and to "build a knowledge base that informs human responses to climate and global change through coordinated and integrated Federal programs of research, education, communication, and decision support."[28] Thirteen departments and agencies participate in the USGCRP.

President Obama is proposing $2.501 billion for the USGCRP in FY2015, $12 million (0.5%) above the FY2014 estimated level of $2.489 billion. The most substantial agency increases in USGCRP funding under the Administration's FY2014 request are for DOE ($29 million, 13.4%), DOC ($19 million, 5.9%), and DOI ($18 million, 34.3%).The most significant decreases in USGCRP funding are for NASA ($39 million, 2.7%) and USDA ($23 million, 20.7%).[29]

Table 7. U.S. Global Change Research Program Funding, FY2013-FY2015

(budget authority, in millions of current dollars)

	FY2013 Actual	FY2014 Estimated	FY2015 Request	Change, FY2014-FY2015	
				Dollars	Percent
USGCRP	$2,379	$2,489	$2,501	$12	0.5%

Source: EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

[26] Ibid.

[27] For additional information on the USGCRP, see CRS Report R43227, *Federal Climate Change Funding from FY2008 to FY2014*, by Jane A. Leggett, Richard K. Lattanzio, and Emily Bruner.

[28] U.S. Global Change Research Program website, http://www.globalchange.gov/about/mission-vision-strategic-plan.

[29] Ibid.

BRAIN Initiative

In April 2013, President Obama launched the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, asserting that

> There is this enormous mystery waiting to be unlocked, and the BRAIN Initiative will change that by giving scientists the tools they need to get a dynamic picture of the brain in action and better understand how we think and how we learn and how we remember. And that knowledge could be—will be—transformative.[30]

Among the agencies participating in the BRAIN Initiative are the Defense Advanced Projects Research Agency (DARPA), NIH, NSF, and the Food and Drug Administration (FDA). The research supported under this initiative seeks to facilitate a better understanding of "how the brain records, processes, uses, stores, and retrieves vast quantities of information, and shed light on the complex links between brain function and behavior,"[31] and to help improve the prevention, diagnosis and treatment of brain diseases such as Parkinson's and Alzheimer's.

According to OSTP, federal investment in the BRAIN initiative was approximately $100 million in FY2014. The President's budget request seeks to double funding to approximately $200 million in FY2015, including $100 million in funding from NIH, $80 million from DARPA, and $20 million from NSF.[32]

Materials Genome Initiative

Announced in June 2011 by President Obama, the Materials Genome Initiative (MGI) is a multi-agency initiative

> to create new knowledge, tools, and infrastructure with a goal of enabling U.S. industries to discover, manufacture, and deploy advanced materials twice as fast than is possible today. Agencies are currently developing implementation strategies for the Materials Genome Initiative with a focus on: (1) the creation of a materials innovation infrastructure, (2) achieving national goals with advanced materials, and (3) equipping the next generation materials workforce.[33]

In congressional testimony, OSTP Director John Holdren stated that the purpose of the Materials Genome Initiative is to "speed our understanding of the fundamentals of materials science, providing a wealth of practical information that American entrepreneurs and innovators will be able to use to develop new products and processes" in much the same way that the Human Genome Project accelerated a range of biological sciences by identifying and deciphering the

[30] The White House, "Remarks by the President on the BRAIN Initiative and American Innovation," speech transcript, April 2013, http://www.whitehouse.gov/photos-and-video/video/2013/04/02/president-obama-speaks-brain-initiative-and-american-innovation#transcript.

[31] The White House, "Fact Sheet: BRAIN Initiative," press release, April 2, 2013, http://www.whitehouse.gov/the-press-office/2013/04/02/fact-sheet-brain-initiative.

[32] EOP, OSTP, "Obama Administration Proposes Doubling Support for The Brain Initiative," press release, March 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/FY%202015%20BRAIN.pdf.

[33] E-mail correspondence between OSTP and CRS, March 14, 2012.

human genetic code.[34] Such research may contribute to the identification of substitutes for critical minerals that are in short supply or have at-risk supply chains; the design, development and use of materials that could reduce the number and severity of traumatic brain injuries resulting from blasts, impacts, and collisions incurred in military engagements, motor vehicle accidents, and athletics; and the development of new lightweight materials for vehicles that could enable new energy storage and propulsion systems and improve fuel efficiency.[35] The President's FY2015 budget does not include a table of agency funding for the MGI. Among the agencies funding MGI R&D are DOE, DOD, NSF, and NIST.

Advanced Manufacturing Partnership

In June 2011, President Obama launched the Advanced Manufacturing Partnership (AMP), an effort to bring together "industry, universities, and the Federal government to invest in emerging technologies that will create high-quality manufacturing jobs and enhance our global competitiveness."[36] Two R&D-focused components of the AMP are the National Robotics Initiative (NRI) and the National Network for Manufacturing Innovation (NNMI).

National Robotics Initiative

The National Robotics Initiative seeks to "develop robots that work with or beside people to extend or augment human capabilities."[37] Among the goals of the program are increasing labor productivity in the manufacturing sector, assisting with dangerous and expensive missions in space, accelerating the discovery of new drugs, and improving food safety by rapidly sensing microbial contamination.[38] In FY2012, four agencies—NSF, NIH, NASA, and USDA—issued a joint solicitation to provide research funding for next-generation robotics. In addition, the Department of Defense, through multiple component agencies, is supporting the NRI through the Defense University Research Instrumentation Program. DOD is supporting the purchase of equipment to assist in robotics research to advance defense technologies and applications, including unmanned ground, air, sea, and undersea vehicles and autonomous systems.[39] The President's FY2015 budget does not include a table of agency funding for the NRI, but the initiative is referred to in the *Analytical Perspectives* supplement to the President's budget.[40]

[34] John P. Holdren, Director, OSTP, EOP, testimony before the Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science and Space, hearing on "Keeping America Competitive Through Investments in R&D," March 6, 2012, http://commerce.senate.gov/public/?a=Files.Serve&File_id=fed566eb-e2c8-49da-aec5-f84e4045890b.

[35] The White House, Materials Genome Initiative, website, "Examples of Materials Applications, May 2014, http://www.whitehouse.gov/mgi/examples.

[36] John P. Holdren, Director, OSTP, EOP, testimony before the Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science and Space, hearing on "Keeping America Competitive Through Investments in R&D," March 6, 2012, http://commerce.senate.gov/public/?a=Files.Serve&File_id=fed566eb-e2c8-49da-aec5-f84e4045890b.

[37] Ibid.

[38] EOP, OSTP, website, August 3, 2011, http://www.whitehouse.gov/blog/2011/08/03/supporting-president-s-national-robotics-initiative.

[39] Ibid.

[40] EOP, OMB, *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2014*, p. 371.

National Network for Manufacturing Innovation[41]

The President's FY2015 budget again proposes the establishment of a National Network for Manufacturing Innovation to promote the development of manufacturing technologies with broad applications. This request is not part of the President's FY2015 base budget request, but rather a part of the adjunct $56 billion Opportunity, Growth, and Security Initiative proposal. (For more information, see "Opportunity, Growth, and Security Initiative" section.) The OGSI includes $2.4 billion to establish up to 45 NNMI institutes. The President's two previous budget requests sought mandatory appropriations to NIST of $1 billion in support of up to 15 NNMI manufacturing innovation institutes.

As originally conceived, the NNMI would consist of

> a network of institutes where researchers, companies, and entrepreneurs can come together to develop new manufacturing technologies with broad applications. Each institute would have a unique technology focus. These institutes will help support an ecosystem of manufacturing activity in local areas. The Manufacturing Innovation Institutes would support manufacturing technology commercialization by helping to bridge the gap from the laboratory to the market and address core gaps in scaling manufacturing process technologies.[42]

Though the NNMI program has not been authorized or funded, four NNMI-like institutes have been awarded, one is being competed, and a funding commitment has been made by the President for four more. These centers are being led by DOD and DOE, with additional funding and/or support being provided by NIST, NASA, NSF, and other agencies.

Reorganization of STEM Education Programs

In FY2014, the Obama Administration proposed a major overhaul of the federal science, technology, engineering, and mathematics (STEM) education portfolio. That plan would have affected about 50% of the federal STEM education effort and involved the transfer of STEM education budget authority between federal agencies.

Although many legislators expressed conceptual support for reorganization as a means to improve the portfolio, the joint explanatory statement that accompanied the Consolidated Appropriations Act, 2014 (P.L. 113-76) rejected the proposal overall. It stated that the proposal "contained no clearly defined implementation plan, had no buy-in from the education community, and failed to sufficiently recognize or support a number of proven, successful programs." Some FY2014 appropriations reports accepted some changes on a case-by-case basis. In a March 2014 progress report the Administration stated that the number of federal STEM education programs had been reduced by 40% between FY2012 (228 programs) and FY2014 (138 programs).

For FY2015, the Obama Administration proposes what it describes as a "fresh" reorganization of the federal STEM education portfolio. Unlike the FY2014 proposal, which sought to transfer funding between agencies, the FY2015 proposal would consolidate funding within agencies.

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[41] For additional information on the NNMI, see CRS Report R42625, *The Obama Administration's Proposal to Establish a National Network for Manufacturing Innovation*, by John F. Sargent Jr.

[42] DOC, *FY2014 Budget in Brief*, February 2012, p. 123, http://www.osec.doc.gov/bmi/budget/FY13BIB/fy2013bib_final.pdf.

According to the Office of Management and Budget, the FY2015 reorganization would consolidate or eliminate 31 programs at 9 agencies, affecting $145 million in FY2014 budget authority. The FY2015 budget request aims to further reduce STEM education programs to 111 from their FY2014 level of 138. For additional information, see CRS Insights IN10011, *The Administration's Proposed STEM Education Reorganization: Where Are We Now*, by Heather B. Gonzalez; CRS Report IF00013, *The President's FY2015 Budget and STEM Education (In Focus)*, by Heather B. Gonzalez; and CRS Report R42642, *Science, Technology, Engineering, and Mathematics (STEM) Education: A Primer*, by Heather B. Gonzalez and Jeffrey J. Kuenzi.

Department of Defense[43]

Responsibility for ensuring the security of the nation and the country's interests abroad, and for developing and sustaining the necessary military force to fulfill that responsibility, falls largely to the Department of Defense (DOD). To meet this responsibility, DOD supports the development of the nation's future military hardware, and software and the technology base upon which those products rely. It does so primarily through its Research, Development, Test, and Evaluation (RDT&E) appropriation. For example, the RDT&E appropriation supports projects as diverse as the multi-billion development of the F-35 fighter aircraft (the latest generation of fighter aircraft for the Air Force and Navy) and fundamental basic research using advances in DNA nanotechnology to build new electronic and computational devices of potential future use to the military.

Nearly all of what DOD spends on RDT&E is appropriated in Title IV of the defense appropriation bill. (See **Table 8**.) However, RDT&E funds are also appropriated in other parts of the bill. For example, RDT&E funds are appropriated as part of the Defense Health Program and the Chemical Agents and Munitions Destruction Program. Prior to FY2015, RDT&E funds were also requested as part of the National Defense Sealift Fund.[44] The Defense Health Program supports the delivery of health care to DOD personnel and their families. Program funds are requested through the Operations and Maintenance appropriations request. The program's RDT&E funds support congressionally directed research in such areas as breast, prostate, and ovarian cancer, as well as other medical conditions. Congress appropriates funds for this program in Title VI (Other Department of Defense Programs) of the defense appropriations bill. The Chemical Agents and Munitions Destruction Program supports activities to destroy the U.S. inventory of lethal chemical agents and munitions to avoid future risks and costs associated with storage. Funds for this program are requested through the Defensewide Procurement appropriations request. Congress appropriates funds for this program also in Title VI. The National Defense Sealift Fund supported the procurement, operation and maintenance, and research and development of the nation's naval reserve fleet and supported a U.S. flagged merchant fleet that could serve in time of need. The RDT&E funding for this effort was transferred to the Navy's Shipbuilding and Conversion RDT&E program.

The Joint Improvised Explosive Device Defeat Fund (JIEDDF) also contains RDT&E monies. However, the fund does not contain an RDT&E line item as do the programs mentioned above.

[43] This section was written by John D. Moteff, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[44] The Administration requested no funding for the National Defense Sealift Fund in FY2015, but transferred funding for those activities to other programs.

The Joint Improvised Explosive Device Defeat Office, which administers the fund, tracks (but does not report) the amount of funding allocated to RDT&E. The JIEDDF funding is not included in the table below.

RDT&E funds also have been requested and appropriated as part of DOD's separate funding to support efforts in what the Bush Administration termed the Global War on Terror (GWOT) and the Obama Administration refers to as Overseas Contingency Operations (OCO). Typically, the RDT&E funds appropriated for GWOT/OCO activities go to specified Program Elements (PEs) in Title IV. However, they are requested and accounted for separately. The Bush Administration requested these funds in separate GWOT emergency supplemental requests. The Obama Administration, while continuing to identify these funds uniquely as OCO requests, has included these funds as part of the regular budget, not in emergency supplementals. However, the Obama Administration has asked for additional OCO funds in supplemental requests, if the initial OCO funding was not enough to get through the fiscal year. The OCO budget has been declining as operations in Iraq and Afghanistan were reduced.

In addition, GWOT/OCO-related requests/appropriations often include money for a number of transfer funds. These have included in the past the Iraqi Freedom Fund (IFF), the Iraqi Security Forces Fund, the Afghanistan Security Forces Fund, and the Pakistan Counterinsurgency Capability Fund. Another transfer fund is the Mine Resistant and Ambush Protected Vehicle Fund (MRAPVF). Congress typically makes a single appropriation into each of these funds, and authorizes the Secretary to make transfers to other accounts, including RDT&E, at his discretion.

For FY2015, the Obama Administration has requested $63.534 billion for DOD's baseline Title IV RDT&E. This is $569 million above what was enacted for FY2014. The Administration indicates that it will request an additional $79 billion for OCO activities, but how much of that would be directed at RDT&E is not yet known, as an OCO budget for FY2015 has not yet been released.

In addition to the baseline Title IV RDT&E request, the Administration has requested $655 million in RDT&E through the Defense Health Program and $596 million in RDT&E through the Chemical Agents and Munitions Destruction program for FY2015. The Administration has requested no RDT&E funding through the National Defense Sealift Fund for FY2015. RDT&E funding for these activities has been transferred to other Navy accounts.

DOD RDT&E funding can be analyzed in several ways. Each of the military departments request and receive their own RDT&E funding. So, too, do various DOD agencies (e.g., the Missile Defense Agency and Defense Advanced Research Projects Agency); these are aggregated in the Defensewide account. RDT&E funding also can be characterized by budget activity (i.e., the type of RDT&E supported). The budget activities designated as 6.1, 6.2, and 6.3 (basic research, applied research, and advanced technology development, respectively) constitute what is called DOD's Science and Technology (S&T) Program and represent the more research-oriented part of the RDT&E program. Budget activities 6.4 and 6.5 focus on the development of specific weapon systems or components (e.g., the Joint Strike Fighter and missile defense systems) for which an operational need has been determined and an acquisition program established. Budget activity 6.6 provides management support, including support for test and evaluation facilities. Budget activity 6.7 supports system improvements in existing operational systems. These various categories are shown in the table.

Many congressional policymakers are particularly interested in S&T funding since these funds support the development of new technologies and the underlying science. Some in the defense community see ensuring adequate support for S&T activities as imperative to maintaining U.S. military superiority. The knowledge generated at this stage of development can also contribute to advances in commercial technologies. The FY2015 Title IV baseline S&T funding request is $11.515 billion, $494 million below what was enacted in FY2014.

Within the S&T program, basic research (6.1) receives special attention, particularly by the nation's universities. DOD is not a large supporter of basic research, when compared to NIH or NSF. However, over half of DOD's basic research budget is spent at universities, and DOD is the largest source of funds in some areas of science and technology, such as electrical engineering and material science. The Administration has requested $2.018 billion for DOD basic research for FY2015, $149 million less than the enacted level for FY2014.

Table 8. Department of Defense RDT&E

(in millions of dollars)

	FY2014 Enacted		FY2015 Request	
Budget Account	**Base**	**OCO**	**Base**	**OCO[a]**
Title IV				
Army	$ 7,123	$ 14	$ 6,594	
Navy	14,946	34	16,266	
Air Force	23,572	9	23,740	
Defensewide	17,078	78	16,766	
Dir. Test & Eval.	246		167	
Total Title IV—By Account	**62,965**	**135**	**63,534**	
Budget Activity				
6.1 Basic Research	2,167		2,018	
6.2 Applied Research	4,641		4,457	
6.3 Advanced Dev.	5,201		5,040	
6.4 Advanced Component Dev. and Prototypes	11,629	7	12,334	
6.5 Systems Dev. and Demo	11,517	7	11,087	
6.6 Management Support[b]	4,309		4,216	
6.7 Op. Systems Dev.[c]	23,502	122	24,382	
Total Title IV—by Budget Activity	**62,965**	**135**	**63,534**	
Title V—Revolving and Management Funds				
National Defense Sealift Fund	45		0[d]	
Title VI—Other Defense Programs				
Defense Health Program	1,552		655	
Chemical Agents and Munitions Destruction	634		596	

Budget Account	FY2014 Enacted		FY2015 Request	
	Base	OCO	Base	OCO[a]
Opportunity, Growth, and Security Initiative			2,100[e]	
DOD, Total	**65,196**	**135**	**66,885**	

Source: CRS, adapted from the Department of Defense Budget, Fiscal Year 2015 RDT&E Programs (R-1), March 2014 and relevant FY2015 Budget Justification (R-2) documents.

Notes: Figures may not add due to rounding.

a. The FY2015 OCO request is not yet available.

b. Includes funding for Director of Test and Evaluation.

c. Includes funding for classified programs.

d. Transferred to other Navy RDT&E accounts.

e. See EOP, OSTP, "The 2015 Budget: Science, Technology, and Innovation for Opportunity and Growth," March 2014, pg. 4. Available at http://www.whitehouse.gov/administration/eop/ostp/rdbudgets.

Department of Homeland Security[45]

The Department of Homeland Security (DHS) has identified five core missions: to prevent terrorism and enhance security, to secure and manage the borders, to enforce and administer immigration laws, to safeguard and secure cyberspace, and to ensure resilience to disasters. New technology resulting from research and development can contribute to all these goals. The Directorate of Science and Technology (S&T) has primary responsibility for establishing, administering, and coordinating DHS R&D activities. The Domestic Nuclear Detection Office (DNDO) is responsible for R&D relating to nuclear and radiological threats. Other components, such as the U.S. Coast Guard, conduct R&D relating to their specific missions.

The President has requested $1.394 billion in FY2015 for R&D and related programs in the Department of Homeland Security. This is an 8.5% decrease from $1.524 billion in FY2014. The total includes $1.072 billion for the Directorate of Science and Technology, $304 million for the Domestic Nuclear Detection Office, and $18 million for Research, Development, Test, and Evaluation (RDT&E) in the U.S. Coast Guard. (See **Table 9**.)

The S&T Directorate is the primary DHS R&D organization.[46] Led by the Under Secretary for Science and Technology, it performs R&D in several laboratories of its own and funds R&D performed by the DOE national laboratories, industry, universities, and others. It also conducts testing and other technology-related activities in support of acquisitions by other DHS components. The Administration's request of $1.072 billion for the S&T Directorate in FY2015 is 12.2% less than the FY2014 appropriation of $1.220 billion. The decrease results largely from the request in Laboratory Facilities for $300 million, versus $404 million in FY2014, for construction

[45] This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[46] For more information, see CRS Report R43064, *The DHS S&T Directorate: Selected Issues for Congress*, by Dana A. Shea.

of the National Bio and Agro-Defense Facility (NBAF). Within the request for Research, Development, and Innovation, border security R&D would increase by $7 million; Apex projects would receive the same funding as in FY2014; and the other four thrust areas would all decrease. The proposed reduction of $9 million for University Programs would decrease the annual funding rate for existing university centers of excellence and might also reduce the number of centers supported.

The NBAF is a planned replacement for the current Plum Island Animal Disease Center. Site preparation has been completed, and construction of a central utility plant is under way. DHS expects to award a contract for construction of the main laboratory in FY2015. According to DHS, the FY2015 budget request, together with previously appropriated federal and state funds and additional anticipated funds from the State of Kansas, would fully fund the NBAF construction contract. Despite receiving $404 million for NBAF construction in FY2014, DHS does not intend to begin construction until full funding for the project is appropriated. The estimated total project cost for NBAF is $1.250 billion, up from $1.230 billion in the FY2014 budget. DHS expects NBAF construction and commissioning to be completed in the third quarter (Q3) of FY2021, one year later than the estimate of Q3 FY2020 provided in the FY2014 budget. The previous estimate for NBAF, given in the FY2012 budget, was a total project cost of $725 million with a completion date of the first quarter of 2016.

DNDO is the primary DHS organization for combating the threat of nuclear attack. It is responsible for nuclear detection research, development, testing, evaluation, acquisition, and operational support. The Administration has requested $304 million for DNDO in FY2015, an increase of 6.7% from the FY2014 appropriation of $285 million. In the Systems Acquisition account, funding for the Securing the Cities program would decrease by $10 million, while funding for Human Portable Radiation Detection Systems would increase by $37 million to support the procurement of handheld radioisotope identification devices (RIIDs) for U.S. Customs and Border Protection.

In September 2012, the Government Accountability Office (GAO) reported that although the S&T Directorate, DNDO, and the Coast Guard are the only DHS components that report R&D activities to the Office of Management and Budget, several other DHS components also fund R&D and activities related to R&D.[47] The GAO report found that DHS lacks department-wide policies to define R&D and guide reporting of R&D activities, and, as a result, DHS does not know the total amount its components invest in R&D. The report recommended that DHS develop policies and guidance for defining, reporting, and coordinating R&D activities across the department, and that DHS establish a mechanism to track R&D projects. In March 2013, the explanatory statement for the Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) directed the Secretary of Homeland Security, through the Under Secretary for Science and Technology, to establish a review process for all R&D and related work within DHS.[48] In April 2013, citing its September 2012 report, GAO listed DHS R&D as an area of concern in its annual report on fragmented, overlapping, or duplicative federal programs.[49] In January 2014, the joint explanatory statement for the Consolidated Appropriations Act, 2014 (P.L.

[47] U.S. Government Accountability Office, *Department of Homeland Security: Oversight and Coordination of Research and Development Should Be Strengthened*, GAO-12-837, September 12, 2012.

[48] *Congressional Record*, March 11, 2013, p. S1547.

[49] U.S. Government Accountability Office, *2013 Annual Report: Actions Needed to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits*, GAO-13-279SP, April 2013.

113-76) directed DHS to implement and report on new policies for R&D prioritization, and to review and, in accordance with GAO's recommendations, to implement policies and guidance for defining and overseeing R&D department-wide.[50]

Table 9. Department of Homeland Security R&D and Related Programs

(budget authority in millions of dollars)

	FY2014 Enacted	FY2015 Request
Directorate of Science and Technology	**$1,220**	**$1,072**
Management and Administration	129	130
R&D, Acquisition, and Operations	1,091	942
Research, Development, and Innovation	462	434
Laboratory Facilities	548	435
Acquisition and Operations Support	42	42
University Programs	40	31
Domestic Nuclear Detection Office	**285**	**304**
Management and Administration	37	37
Research, Development, and Operations	205	199
Systems Architecture	21	18
Systems Development	21	22
Transformational R&D	71	70
Assessments	39	38
Operations Support	30	32
National Technical Nuclear Forensics Center	23	20
Systems Acquisition	43	68
Radiation Portal Monitors Program	7	5
Securing the Cities	22	12
Human Portable Radiation Detection Systems	14	51
U.S. Coast Guard RDT&E	**19**	**18**
DHS, Total	**1,524**	**1,394**

Sources: DHS FY2015 congressional budget justification, http://www.dhs.gov/dhs-budget.

Note: Totals may differ from sum of components due to rounding.

[50] *Congressional Record*, January 15, 2014, p. H927.

National Institutes of Health[51]

The National Institutes of Health (NIH) is the primary agency of the federal government charged with performing and supporting biomedical and behavioral research. It also has major roles in training biomedical researchers and disseminating health information. An agency in the Department of Health and Human Services (HHS), the NIH mission is "to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability."[52]

The President's FY2015 budget has requested a program level (explained on following page) total of $30.362 billion for the National Institutes of Health, an increase of $211 million (0.7%) over the FY2014 level of $30.151 billion (see **Table 10**). Under the President's proposed Opportunity, Growth, and Security Initiative, NIH would also receive an additional $970 million, increasing the NIH budget to a total program level of $31.3 billion in FY2015. These funds would provide added resources for the BRAIN Initiative, improve the sharing and analysis of complex biomedical data sets, expand research on Alzheimer's disease and vaccine development, further accelerate efforts to identify and develop new therapeutic drug targets, and support other innovative projects.[53] (For more information about the OGSI, see earlier discussion at "Opportunity, Growth, and Security Initiative.")

NIH Organization and Sources of Funding. NIH supports and conducts a wide range of basic and clinical research, research training, and health information dissemination across all fields of biomedical and behavioral sciences. About 83% of NIH's budget goes out to the extramural research community in the form of grants, contracts, and other awards. This funding supports research performed by more than 300,000 non-federal scientists and technical personnel who work at more than 2,500 universities, hospitals, medical schools, and other research institutions around the country and abroad.[54] The agency's organization consists of the Office of the NIH Director and 27 institutes and centers. The Office of the Director (OD) sets overall policy for NIH and coordinates the programs and activities of all NIH components, particularly in areas of research that involve multiple institutes. The institutes and centers (collectively called ICs) focus on particular diseases, areas of human health and development, or aspects of research support. Each IC plans and manages its own research programs in coordination with OD. As shown in **Table 10**, Congress provides separate appropriations to 24 of the 27 ICs, to OD, and to an intramural Buildings and Facilities account. The other three centers, which perform centralized support services, are funded through assessments on the IC appropriations.

Funding for NIH comes primarily from the annual Departments of Labor, Health and Human Services, and Education, and Related Agencies (Labor/HHS) appropriations bill, with an additional amount for Superfund-related activities from the appropriations bill for the Department of the Interior, Environment, and Related Agencies (Interior/Environment). Those two bills

[51] This section was written by Judith A. Johnson, Specialist in Biomedical Policy, CRS Domestic Social Policy Division. For background information on NIH, see CRS Report R41705, *The National Institutes of Health (NIH): Organization, Funding, and Congressional Issues*, by Judith A. Johnson.

[52] National Institutes of Health, About the National Institutes of Health, at http://www.nih.gov/about/mission.htm.

[53] Department of Health and Human Services, *Fiscal Year 2015 Budget in Brief*, Washington, DC, March 4, 2014, p. 39, http://www.hhs.gov/budget/fy2015/fy-2015-budget-in-brief.pdf.

[54] Ibid.

provide NIH's discretionary budget authority. In addition, NIH receives mandatory funding of $150 million annually that is provided in the Public Health Service (PHS) Act for a special program on type 1 diabetes research, and also receives $8.2 million annually for the National Library of Medicine from a transfer within PHS. The total funding available for NIH activities, taking account of add-ons and transfers, is known as the program level.

Except for the mandatory diabetes funding, Congress does not usually specify amounts for particular diseases or research areas. Similarly, NIH does not expressly budget by disease category.[55] Some bills may propose authorizations for designated research purposes, but funding generally remains subject to discretionary appropriations and the NIH peer review process.

NIH and other HHS agencies and programs that are authorized under the PHS Act are subject to a budget assessment called the PHS Program Evaluation Set-Aside, also called the evaluation tap. Section 241 of the PHS Act (42 U.S.C. §238j) authorizes the Secretary to use a portion of eligible appropriations to study the effectiveness of federal health programs and to identify ways to improve them. Congress sets the percentage level of the tap in the annual Labor/HHS appropriations act, and also directs specific amounts of funding from the tap for transfer to a number of HHS programs. The set-aside has the effect of redistributing appropriated funds for specific purposes among PHS and other HHS agencies. NIH, with the largest budget among the PHS agencies, becomes the largest "donor" of program evaluation funds, and is a relatively minor recipient. For FY2015, the President's Budget again proposes increasing the set-aside from 2.5% to 3.0%.[56] By convention, budget tables such as **Table 2** do not subtract the amount of the evaluation tap from the agencies' appropriations.[57]

President's FY2015 Budget Request. Most of the institutes and centers would receive essentially flat funding compared to FY2014 with very few exceptions, such as a $50 million (9%) increase for the Common Fund, and a $25 million (4%) increase for the National Center for Advancing Translational Sciences (NCATS).

Basic Research and Big Data. About 54% of the proposed budget is targeted for basic research on the causes of disease onset and progression. The multi-agency Brain Research through Application of Innovative Neurotechnologies initiative develops and applies new tools for the study of complex brain functions. This collaboration with the National Science Foundation and the Defense Advanced Research Projects Agency plans on spending a total of $200 million in FY2015. The NIH portion of about $100 million is an increase of $60 million over FY2014. Insights into brain circuitry and activity gained via the BRAIN initiative are expected to help reveal the underlying problems in numerous brain disorders and may provide therapeutic or prevention approaches for conditions such as Alzheimer's disease, autism, epilepsy, schizophrenia, depression, chronic pain, addiction, post-traumatic stress disorder, and traumatic

[55] See NIH website, "Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC)," http://report.nih.gov/categorical_spending.aspx.

[56] Section 205 of the FY2012 Labor/HHS appropriations act capped the set-aside at 2.5%, which drew over $700 million from the NIH budget. The same percentage was assessed in FY2013 under the continuing appropriations act. The FY2014 President's Budget proposed increasing the PHS set-aside to 3.0%. The Senate committee rejected the increase, largely because of its effect on NIH, estimating that it would have taken an extra $147 million from NIH. (See S.Rept. 113-71 on S. 1284, p. 41 and p. 83.) The Consolidated Appropriations Act, 2014 (P.L. 113-76), set the assessment at 2.5%.

[57] For further information on the PHS Evaluation Set-Aside, see CRS Report R43304, *Public Health Service Agencies: Overview and Funding*, coordinated by C. Stephen Redhead.

brain injury. Continued support in FY2015 of the Big Data to Knowledge (BD2K) initiative will improve the handling, sharing, analysis, and protection of large complex biomedical datasets of information, such as high-resolution medical images and DNA sequencing data from many individuals.

Precision Medicine. In the FY2012 appropriations act, Congress approved an NIH reorganization that consolidated various programs into NCATS. The center focuses on improved methods to test possible new therapies and encourage their commercialization and dissemination into clinical practice. Part of this focus is what NIH calls precision medicine, tailoring therapy to the individual characteristics of the patient but also avoiding needless treatment and costs for those who will not benefit. Within NCATS, the Cures Acceleration Network (CAN) would receive $30 million under the President's FY2015 request, a $20 million increase over FY2014, to speed the development of "high need cures" by removing barriers between research discovery and clinical testing. NIH will continue to carry out a new collaboration—the Accelerating Medicines Partnership (AMP)—with biopharmaceutical firms and non-profit organizations aimed at promising biological targets in three disease areas: Alzheimer's; type 2 diabetes; and the autoimmune disorders, rheumatoid arthritis and lupus.

Research Training and Research Workforce. NIH estimates it will require $767 million to support 15,715 individuals in its major research training program, the Ruth L. Kirschstein National Research Service Awards, with a 2% stipend increase in FY2015 for predoctoral and postdoctoral trainees. The request is $14 million (2%) above the FY2014 level. NIH plans to continue with a special focus on promoting diversity and understanding barriers to career advancement of people traditionally underrepresented in the research workforce. It is building a consortium of under-resourced institutions and creating a mentoring network to assist students interested in pursuing a biomedical research career.

The following are selected other program changes and areas of emphasis in NIH accounts.

Alzheimer's Disease Research. To continue implementing the research components of the National Plan to Address Alzheimer's Disease (AD), NIH estimates it will spend $566 million on AD research in FY2015. NIH has recently set up the AD Genetics Warehouse to identify both genetic risk and protective factors. The Neuroimaging Initiative is analyzing brain scans, genetic profiles, and biomarkers in an effort to detect early stage AD. Over 35 NIH-supported clinical trials are being conducted to test more than 40 compounds as possible prevention or treatment agents against AD and other forms of cognitive decline.

HIV/AIDS. NIH estimates it will spend about $3 billion on HIV/AIDS research in FY2015.

Science, Technology, Engineering, and Mathematics (STEM) education. For FY2015, the Administration proposes a modified version of its government-wide reorganization of STEM education, which, among other things, would reform undergraduate education and consolidate the administration of fellowships "to better meet national STEM goals." For HHS, the proposal would eliminate two programs for a total savings of $2 million in FY2015.[58] For additional information on the proposed STEM reorganization, see "Reorganization of STEM Education Programs."

[58] The Budget for FY2015, Discretionary Cuts, Consolidations and Savings, p. 157, http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/ccs.pdf.

Office of the Director/Common Fund. The FY2015 request for OD includes an increase in funding for the Common Fund. The Common Fund supports research in emerging areas of scientific opportunity, public health challenges, or knowledge gaps that might benefit from collaboration between two or more institutes or centers. The request for the Common Fund is $583 million, $50 million (9%) higher than the FY2014 level, including $30 million for projects modelled after the research flexibilities utilized by DARPA.

Research Project Grants. The main funding mechanism for supporting extramural research is research project grants (RPGs), which are competitive, peer-reviewed, and largely investigator-initiated. The FY2015 budget requests total funding for RPGs of $16.197 billion, representing about 53% of NIH's proposed budget. The amount is an increase of $120 million (0.7%) over the FY2014 level. The request would support an estimated 34,197 RPG awards, 16 less than in FY2014. Within that total, 9,326 would be competing RPGs, 329 (4%) more than in FY2014. (Competing awards are new grants plus competing renewals of existing grants.) The average amount of a competing RPG in FY2014 is estimated to be about $456,000, up from about $421,000 in FY2012. Funding provided under the President's proposed Opportunity, Growth, and Security Initiative would be used to support 650 additional new grants in FY2015.

Table 10. National Institutes of Health Funding

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
National Cancer Institute (NCI)	$ 4,923	$ 4,931
National Heart, Lung, & Blood Institute (NHLBI)	2,983	2,988
Dental/Craniofacial Research (NIDCR)	397	397
Diabetes/Digestive/Kidney (NIDDK)[a]	1,742	1,743
Neurological Disorders/Stroke (NINDS)	1,586	1,608
Allergy/Infectious Diseases (NIAID)	4,393	4,423
General Medical Sciences (NIGMS)	2,362	2,369
Child Health/Human Development (NICHD)	1,281	1,283
National Eye Institute (NEI)	674	675
Environmental Health Sciences (NIEHS)	665	665
National Institute on Aging (NIA)	1,169	1,171
Arthritis/Musculoskeletal/Skin Diseases (NIAMS)	519	520
Deafness/Communication Disorders (NIDCD)	403	404
National Institute of Mental Health (NIMH)	1,417	1,440
National Institute on Drug Abuse (NIDA)	1,016	1,023
Alcohol Abuse/Alcoholism (NIAAA)	445	446
National Institute of Nursing Research (NINR)	140	140
Nat'l Human Genome Research Inst (NHGRI)	497	498
Biomedical Imaging/Bioengineering (NIBIB)	326	329
Minority Health/Health Disparities (NIMHD)	268	268

	FY2014 Enacted	FY2015 Request
Complementary/Alternative Medicine (NCCAM)	124	125
Advancing Translational Sciences (NCATS)	632	657
Fogarty International Center (FIC)	67	68
National Library of Medicine (NLM)	367	373
Office of Director (OD)	1,400	1,452
Buildings & Facilities (B&F)	129	129
Subtotal, Labor/HHS Appropriation	**29,926**	**30,126**
Superfund (Interior appropriation to NIEHS)[b]	77	77
Total, NIH discretionary budget authority	**30,003**	**30,203**
Pre-appropriated type 1 diabetes funds[c]	139	150
PHS Evaluation Tap funding[d]	8	8
Total, NIH program level	**30,151**	**30,362**

Source: NIH, *FY2015 Justification of Estimates for Appropriations Committees, Vol. I, Overview*, table on "Budget Request by Institute/Center," p. ST-2, at http://officeofbudget.od.nih.gov/pdfs/FY15/FY2015_Overview.pdf.

Notes: Totals may differ from the sum of the components due to rounding.

a. Amounts for the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) do not include mandatory funding for type 1 diabetes research (see note c).

b. This is a separate account in the Interior/Environment appropriations for National Institute of Environmental Health Sciences (NIEHS) research activities related to Superfund.

c. Mandatory funds available to NIDDK for type 1 diabetes research under PHS Act §330B (provided by P.L. 111-309 and P.L. 112-240). Funds have been appropriated through FY2014 and are proposed for reauthorization in FY2015. The FY2013 amount was reduced by $7.65 million (5%) due to the March 1, 2013 sequestration. The FY2014 amount was reduced by $11 million (7.2%) due to the FY2014 sequestration.

d. Additional funds for NLM from PHS Evaluation Set-Aside (§241 of PHS Act).

Department of Energy[59]

The Department of Energy (DOE) was established in 1977 by the Department of Energy Organization Act (P.L. 95-91), which combined energy-related programs from a variety of other agencies with defense-related nuclear programs that dated back to the Manhattan Project. Today, DOE conducts basic scientific research in areas ranging from nuclear physics to the biological and environmental sciences, basic and applied R&D relating to energy production and use, and R&D on nuclear weapons, nuclear nonproliferation, and defense nuclear reactors. The department has a system of 17 national laboratories around the country, mostly operated by contractors, that together account for about 40% of all DOE expenditures.

[59] This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

The Administration has requested $13.129 billion in FY2015 for Department of Energy R&D and related activities, including programs in three major categories: science, national security, and energy. This request is 5.6% more than the FY2014 appropriation of $12.436 billion. (See **Table 11** for details.)

The request for the DOE Office of Science is $5.111 billion, an increase of 0.9% from the FY2014 appropriation of $5.066 billion. There is no authorized funding level for the Office of Science in FY2015; the most recent authorization act (the America COMPETES Reauthorization Act of 2010, P.L. 111-358) authorized appropriations through FY2013. The FY2015 budget does not mention the Obama Administration's previous goal of doubling the combined funding of the Office of Science and two other agencies. (For more information on the double goal and how it has evolved, see "Efforts to Double Certain R&D Accounts.") The original target, announced by the Bush Administration in 2006, was to achieve the doubling in the decade from FY2006 to FY2016. The FY2015 request for the Office of Science is 41% more than its FY2006 baseline.

The Office of Science includes six major research programs. The request for the largest program, Basic Energy Sciences (BES), is $1.807 billion, an increase of 5.5%. Major proposed changes in the BES program include the initiation of a new activity in computational materials science ($24 million); an increase of $18 million for Nanoscale Science Research Centers; an increase of $63 million, as previously planned, for continued construction of the Linac Coherent Light Source II (LCLS-II); and a shift from construction funding to research funding for the National Synchrotron Light Source II (NSLS-II) as the new facility begins operations.

The request for High Energy Physics is $744 million, a decrease of 6.6%. Major proposed changes include a reduction of $24 million for experiments at the intensity frontier, especially NOvA, which will complete fabrication in FY2014; a decrease of $10 million, as previously planned, for continued construction of the Muon to Electron Conversion Experiment (Mu2e); and the elimination of construction funding ($16 million in FY2014) for the Long Baseline Neutrino Experiment (LBNE).

The request for Advanced Scientific Computing Research is $541 million, an increase of 13.2%. The proposed increase includes an additional $10 million for mathematical, computational, and computer sciences research; an additional $25 million for operations and upgrades at the Leadership Computing Facilities; and an additional $20 million for computing technology research, system design, and prototype evaluation.

The request for Fusion Energy Sciences is $416 million, a decrease of 17.6%. The request includes $18 million for operations and research at the Alcator C-Mod tokamak, as a transition plan is developed for the facility. In the FY2013 and FY2014 budget cycles, DOE plans to close this facility encountered congressional opposition. Construction funding for the International Thermonuclear Experimental Reactor (ITER) would decrease from $200 million to $150 million, while total funding for research and operations at domestic facilities would decrease from $305 million to $266 million. In 2008, the cost for the U.S. share of ITER, a multi-year international construction project, was estimated to be between $1.45 billion and $2.2 billion. Schedule delays, design and scope changes, and other factors have delayed formal approval of a revised cost estimate. According to DOE, the current best estimate of the total U.S. cost for ITER construction (which is 9.09% of the total international cost) is between $4 billion and $6.5 billion.

The request for DOE national security R&D is $4.220 billion, a 9.2% increase from $3.864 billion in FY2014. Most of the requested increase is in the Naval Reactors program. Naval

Reactors construction funding would increase from $24 million to $210 million as construction begins on the Spent Fuel Handling Recapitalization project. Congress declined to fund this project in FY2014, and DOE is developing a new schedule and funding profile. In the Weapons Activities account, the Administration request would increase funding for nuclear weapons science and advanced simulation and computing and would slightly reduce funding (by 0.2%) for research on inertial confinement fusion. In the Defense Nuclear Nonproliferation account, the requested 23.0% decrease in R&D funding is largely the consequence of a DOE reprogramming of funds from other activities in FY2014. Relative to the amount originally enacted by Congress for FY2014, the request for nonproliferation R&D is a decrease of 9.5%. Both proliferation detection R&D and nuclear detonation detection R&D would decrease, with reductions and delays in multiple topic areas.

The request for DOE energy R&D is $3.797 billion, up 8.3% from $3.506 billion in FY2014. The request would increase funding for R&D in the Office of Energy Efficiency and Renewable Energy (EERE) by 20.5%, with increases requested for most EERE programs. Within EERE, Advanced Manufacturing would receive $305 million, an increase of $125 million. The Advanced Manufacturing request includes an increase of $109 million for R&D facilities, which would support the establishment of an additional Clean Energy Manufacturing Innovation Institutes (consistent with the previously discussed "National Network for Manufacturing Innovation"). Also in EERE, R&D on vehicle technologies would increase by $69 million. The Energy Efficient Buildings Hub, which the Senate Committee on Appropriations directed DOE to terminate in its FY2014 report, has been renamed the Pennsylvania State University Consortium for Building Energy Innovation and would receive flat funding under the request. In Fossil Energy R&D, the proposed elimination of R&D on oil technologies ($15 million in FY2014) and the proposed reduction of $115 million for coal R&D (including carbon capture and storage) would be partly offset by $25 million for a new demonstration activity in natural gas carbon capture and storage and an increase of $14 million for natural gas technologies. In the Advanced Research Projects Agency–Energy (ARPA-E), R&D on transportation systems would increase by $47 million.

Table 11. Department of Energy R&D and Related Activities

(budget authority in millions of dollars)

	FY2014 Enacted	FY2015 Request
Science	**$5,066**	**$5,111**
Basic Energy Sciences	1,712	1,807
High Energy Physics	797	744
Biological and Environmental Research	610	628
Nuclear Physics	569	594
Advanced Scientific Computing Research	478	541
Fusion Energy Sciences	505	416
Other	396	382
National Security	**3,864**	**4,220**
Weapons Activities[a]	2,278	2,467
Naval Reactors	1,095	1,377

	FY2014 Enacted	FY2015 Request
Defense Nuclear Nonproliferation R&D	469	361
Defense Environmental Cleanup Tech. Dev.	22	16
Energy	**3,506**	**3,797**
Energy Efficiency and Renewable Energy[b]	1,670	2,012
Electricity Delivery & Energy Reliability R&D	562	476
Fossil Energy R&D	888	863
Nuclear Energy	106	121
Advanced Research Projects Agency–Energy	280	325
DOE, Total	**12,436**	**13,129**

Source: FY2014 enacted and FY2015 request from DOE's FY2015 congressional budget justification, http://energy.gov/cfo/downloads/fy-2015-budget-justification.

Notes: FY2014 enacted amounts reflect DOE's allocation of a $7 million reduction for contractor foreign travel expenses, as directed by P.L. 113-76, Section 317. Totals may differ from the sum of the components due to rounding.

a. Including Stockpile Services R&D Support, Stockpile Services R&D Certification and Safety, Science, Engineering except Enhanced Surety and Enhanced Surveillance, Ignition and High Yield, Advanced Simulation and Computing, and a prorated share of Readiness in Technical Base and Facilities. Additional R&D activities may take place in the subprograms of Directed Stockpile Work that are devoted to specific weapon systems, but these funds are not included in the table because detailed funding schedules for those subprograms are classified.

b. Excluding Weatherization and Intergovernmental Activities.

National Science Foundation[60]

The National Science Foundation (NSF) supports basic research and education in the non-medical sciences and engineering. Congress established the Foundation as an independent federal agency in 1950 and directed it to "promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes."[61] The NSF is a primary source of federal support for U.S. university research, especially in certain fields such as mathematics and computer science. It is also responsible for significant shares of the federal science, technology, engineering, and mathematics (STEM) education program portfolio and federal STEM student aid and support.

For FY2015 the Administration seeks $7.255 billion in funding for the NSF. This amount is $83 million (1.1%) more than the FY2014 estimate. The increase is split more or less evenly between the Agency Operations and Award Management (AOAM) account and the Education and Human Resources (EHR) account. The Research and Related Activities (RRA) account, which constitutes

[60] This section was written by Heather B. Gonzalez, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[61] The National Science Foundation Act of 1950 (P.L. 81-507).

a majority of NSF's funding, would remain essentially constant. (See **Table 12**.) Congress had not enacted specific FY2015 appropriations authorizations for NSF when the administration released its FY2015 budget request.[62]

In its budget documents, NSF indicates that its FY2015 priorities include four programs that were also foundation priorities in FY2013 and FY2014: Cyber-enabled Materials, Manufacturing, and Smart Systems (CEMMSS, $213 million); Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education (CIF21, $125 million); Science, Engineering, and Education for Sustainability (SEES, $139 million); and Secure and Trustworthy Cyberspace (SaTC, $100 million). The Administration has added Cognitive Science and Neuroscience ($29 million) to this list for FY2015.[63] Of these five programs, the Administration seeks an increase over FY2014 estimated levels only for Cognitive Science and Neuroscience.

Other priorities and highlights in the FY2015 budget request include advanced manufacturing; clean energy; Innovation Corps (I-Corps); National Robotics Initiative (NRI); Research at the Interface of Biological, Mathematical, and Physical Sciences (BioMaPS); U.S. activities in the Antarctic; Graduate Research Fellowships (GRF), NSF Research Traineeships (NRT), Improving Undergraduate STEM Education (IUSE); and Research Experiences for Undergraduates (REU).

Between FY2006 and FY2013, overall increases in the NSF budget were at least partially driven by the "doubling path" policy for physical sciences and engineering research. (See "Efforts to Double Certain R&D Accounts" above.) However, actual funding of these accounts did not generally reach authorized levels. It is unclear if the President or Congress will seek to continue this policy in FY2015.

Congress typically appropriates to NSF at the major account level. NSF's major accounts are Research and Related Activities; Education and Human Resources (EHR); Major Research Equipment and Facilities Construction (MREFC); Agency Operations and Awards Management (AOAM); National Science Board (NSB); and the Office of Inspector General (IG).[64]

RRA is the largest NSF account and the primary source of research funding at the NSF. The Administration seeks $5.807 billion in funding for RRA in FY2015, or about $1 million less than the FY2014 estimate. Six of eight RRA subaccounts would shift (up or down) by less than 2%. Two accounts, Social, Behavioral and Economic Sciences (SBE) and the U.S. Arctic Research Commission (USARC) would increase by more substantial amounts: 6.0% and 8.1%, respectively. SBE would receive the largest increase in dollar terms. The Administration seeks a $15 million increase over FY2014 estimated levels for SBE in FY2015. Most of the additional funding ($11 million) would support the work of the National Center for Science and Engineering Statistics (NCSES), which among other things, publishes the widely cited, bi-annual sourcebook for science and engineering statistics, *Science and Engineering Indicators*.[65] FY2015 funding for

[62] NSF relies on its organic act for budget authority in FY2015.

[63] The FY2012 CJS conference report encouraged NSF to establish neuroscience as a crosscutting theme. See, H.Rept. 112-284.

[64] Funds from major NSF accounts may be merged at the program level and in many cases NSF's education, facilities, and research activities are deeply integrated as a matter of practice.

[65] For example, see National Science Board, *Science and Engineering Indicators 2014*, NSB 14-01, 2014, http://www.nsf.gov/statistics/seind14/.

SBE's Political Science program, which has been the subject of debate and controversy in the 113th Congress, would be around $9 million.[66] This funding level is equal to the FY2014 estimate.

The FY2015 NSF budget includes few major changes in spending by RRA sub-account. However, the Directorates for Biological Sciences (BIO) and Geosciences (GEO) each seek to adjust funding within their divisions (relative to FY2014) to accommodate operations costs for certain MREFC projects. BIO seeks to reduce research funding within its Division of Emerging Frontiers in order to offset operations and maintenance support for the National Ecological Observatory Network (NEON). Similarly, GEO's Division of Integrative and Collaborative Education and Research (ICER) seeks to provide temporary operations and management support through FY2017 for the Ocean Observatories Initiative (OOI). ICER research funding would decrease, in part, to off-set the cost of OOI support.

Within RRA, the FY2015 Administration request for the Experimental Program to Stimulate Competitive Research (EPSCoR) program is $160 million, $2 million (1%) more than the FY2014 estimate of $158 million.

In FY2015 the Administration proposes what it calls a "fresh" reorganization and consolidation of the federal STEM education effort. (See "Reorganization of STEM Education Programs" above.) Consistent with this plan, the NSF FY2015 budget justification states that NSF would continue to collaborate with the Department of Education and Smithsonian Institution as "lead agencies" in the implementation of the National Science and Technology Council's strategic plan for STEM education, while partnering with federal science mission agencies.[67] The FY2015 NSF budget request also consolidates three NSF undergraduate education programs into the Improving Undergraduate STEM Education program.[68] In FY2014, NSF proposed reorganizing this same set of programs into the Catalyzing and Advancing Undergraduate STEM Education (CAUSE) program. H.Rept. 113-47, which accompanied H.R. 2787 (Commerce, Justice, Science, and Related Agencies Appropriations Act, 2014) when it was reported by the House Committee on Appropriations, directed NSF not to establish the CAUSE program.

The FY2015 request for EHR continues that directorate's focus on funding for R&D activities. Between FY2008 and FY2013, the portion of the EHR account that supported research and development in STEM education and learning increased from 11% to 35%. Since then, that percentage has held steady at about 35% (FY2014 estimate and FY2015 request). The character of EHR's R&D funding has also shifted, moving from about 90% basic research to about 40%. Many EHR grants, even those mainly focused on education and training, require a research component. Some advocates assert that this approach aligns the EHR directorate with NSF's other primary mission (research) while others may assert that more education R&D could improve our understanding of what works in STEM education. On the other hand, the shift implicitly gives greater priority to R&D activities than to the scholarships, museums, and other non-R&D activities that this account also supports. This could have implications for the federal STEM

[66] In FY2013, Congress prohibited NSF from providing funds for political science research unless the foundation certified that each grant promoted the national security or economic interests of the United States. See Section 543 of P.L. 113-6 (Consolidated and Further Continuing Appropriations Act, 2013).

[67] EOP, NSTC, Committee on STEM Education, *Federal Science, Technology, Engineering, and Mathematics (STEM) Education: 5-Year Strategic Plan*, May 2013, http://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf.

[68] These programs are the STEM Talent Expansion Program (STEP), Widening Implementation and Demonstration of Evidence-based Reforms (WIDER), and Transforming Undergraduate Education in STEM (TUES).

education portfolio, of which NSF is a key agency, and for the various constituencies that seek such funding.

Widely tracked EHRsub-accounts include the Graduate Research Fellowship (GRF) and the Integrative Graduate Education and Research Traineeship or IGERT (now called the NSF Research Traineeship or NRT). The FY2015 request for the GRF is $333 million, about 11% over the FY2014 estimate. NSF seeks to increase the GRF stipend from $32,000 to $34,000 in FY2015. The NSF budget request includes $58 million for the NRT in FY2015, an increase of 6% over the FY2014 estimate. NSF proposes a new track within NRT, to provide funding for research in graduate student training and professional development.

Other accounts that fund R&D at the NSF include the MREFC account, which supports large construction projects and scientific instruments. The FY2015 MREFC request is for $200 million. This amount is about equal to the FY2014 estimated level. NSF indicates that FY2015 funding would provide the second-to-last year of support for NEON and would provide ongoing support for the Large Synoptic Survey Telescope (LSST) and Daniel K. Inouye Solar Telescope (DKIST).[69] Historically, the MREFC account typically supported between four and six projects at a time. The FY2015 request for three projects is lower than the historical trend, which could indicate that some potentially scientifically valuable projects are being delayed or overlooked. On the other hand, as can be seen in the FY2015 BIO and GEO requests, when these large projects come online their operations costs must be shouldered by research accounts. In a constrained budget environment, this dynamic can precipitate difficult choices between funding for research and funding research facilities and equipment.

The Administration seeks $338 million, $4 million, and $14 million, respectively, for AOAM, NSB, and OIG in FY2015. These amounts are 14%, 2%, and 2% more, respectively, than the FY2014 estimates for these accounts. The AOAM increase is part of a multi-year plan to relocate NSF headquarters.

The FY2015 NSF budget request includes funding for three multi-agency initiatives: National Nanotechnology Initiative (NNI, $410 million), Networking and Information Technology Research and Development (NITRD, $1.158 billion), and U.S. Global Change Research Program (USGCRP, $318 million). The request for NNI is about the same as the FY2014 estimate; the NITRD request is similarly equivalent; and the request for USGCRP is about $4 million (1%) more than the FY2014 estimate.

The Administration also seeks $552 million in FY2015 funding for the NSF as part of the Opportunity Growth and Security Initiative. Without specifying program funding levels, the NSF FY2015 congressional budget justification notes that (among other things) OGSI funding would support an estimated 1,000 additional standard awards and would provide additional traineeship opportunities to approximately 3,000 graduate students over the next five years through the NRT program. (For more information on the OGSI, see earlier discussion at “Opportunity, Growth, and Security Initiative.”)

[69] The Advanced Technology Solar Telescope was renamed the Daniel K. Inouye Solar Telescope in December, 2013.

Table 12. NSF Funding by Major Account

(budget authority in millions of dollars)

Account	FY2014 Estimate	FY2015 Request
Research and Related Activities	**5,808.9**	**5,807.5**
Biological Sciences	$ 721.3	$ 708.5
Computer and Information Science and Engineering	894.0	893.4
Engineering	851.1	858.2
Geosciences	1,303.0	1,304.4
Mathematical and Physical Sciences	1,299.8	1,295.6
Social, Behavioral, and Economic Sciences	256.9	272.2
International and Integrative Activities	481.6	473.9
U.S. Arctic Research Commission	1.3	1.4
Education and Human Resources	**846.5**	**889.8**
Major Research Equipment and Facilities Construction	**200.0**	**200.8**
Agency Operations and Award Management	**298.0**	**338.2**
National Science Board	**4.3**	**4.4**
Office of the Inspector General	**14.2**	**14.4**
NSF, Total	**7,171.9**	**7,255.0**

Source: FY2015 *NSF Budget Request to Congress*.

Notes: Totals may differ from the sum of the components due to rounding.

National Aeronautics and Space Administration[70]

The National Aeronautics and Space Administration (NASA) was created in 1958 by the National Aeronautics and Space Act (P.L. 85-568) to conduct civilian space and aeronautics activities. NASA has research programs in planetary science, Earth science, heliophysics, astrophysics, and aeronautics, as well as development programs for future human spacecraft and for multipurpose space technology such as advanced propulsion systems. In addition, NASA operates the International Space Station as a facility for R&D and other purposes.

The Administration has requested $16.258 billion for NASA R&D in FY2015. This amount is 1.1% less than the $16.455 billion NASA received for R&D in FY2014. In addition, the proposed Opportunity, Growth, and Security Initiative includes $874 million for NASA R&D. For a breakdown of these amounts, see **Table 13**. (For more information on the OGSI, see earlier discussion at "Opportunity, Growth, and Security Initiative.") There is no authorized level for

[70] This section was written by Daniel Morgan, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

NASA funding in FY2015. The most recent authorization act (the NASA Authorization Act of 2010, P.L. 111-267) authorized appropriations through FY2013. Bills that would authorize FY2015 appropriations for NASA include H.R. 2687, H.R. 2616, and S. 1317.[71]

The FY2015 request for Science is $4.972 billion, a decrease of 3.5%. In Planetary Science, the request includes $15 million for continued study of a potential future mission to Jupiter's moon Europa. Congress provided $69.7 million in FY2013 and $80 million in FY2014 for formulation of a Europa mission, which was a high priority of the 2011 National Research Council (NRC) decadal survey of planetary science.[72] The NRC expressed reservations, however, at the mission's estimated a cost of $4.7 billion, and NASA is now reportedly targeting a modified mission with a cost of about $1 billion.[73] In Astrophysics, the request includes $12.3 million for the Stratospheric Observatory for Infrared Astronomy (SOFIA). SOFIA reached full operating capability in February 2014, and previous budgets envisioned 20 years of operations at a cost of about $85 million per year. According to NASA's congressional budget justification, however, "because SOFIA development has taken much longer than originally envisioned ... the observatory will no longer provide the kind of scientific impact and synergies with other missions as once planned." NASA intends to place the SOFIA aircraft in storage unless international partners can support the U.S. share of its operating costs. The OGSI proposal includes an additional $187.3 million for Science, including $29.3 million for the Orbiting Carbon Observatory 3 (OCO-3) in the Earth Science program, but not including any funding for SOFIA.

The FY2015 request for Aeronautics is $551 million, a decrease of 2.6%. NASA aeronautics research would be reorganized to align with a new strategic vision announced in August 2013.[74] Following this realignment, most individual projects would continue, but funding for rotorcraft research would decrease by $7.9 million. The OGSI proposal includes an additional $43.9 million for Aeronautics and would restore the proposed reduction in rotorcraft funding.

The FY2015 request for Space Technology is $706 million, an increase of 22.5%. Support for the proposed Asteroid Redirect Mission, including the accelerated development of high-power solar electric propulsion technology for future spacecraft, would increase from $38 million to $93 million. Congressional reactions to the Asteroid Redirect Mission, which would also receive $30 million in the Exploration account, remain mixed. The FY2014 joint explanatory statement stated that "NASA has not provided Congress with satisfactory justification materials" and that additional groundwork "is needed ... prior to NASA and Congress making a long-term commitment to this mission concept." The OGSI proposal includes an additional $100.0 million for Space Technology.

The FY2015 request for Exploration is $3.976 billion, a decrease of 3.3%. This account funds development of the Orion Multipurpose Crew Vehicle (MPCV) and the Space Launch System (SLS) heavy-lift rocket, which were mandated by the 2010 authorization act for human exploration beyond Earth orbit. The account also funds development of a commercial crew

[71] Another NASA authorization bill, H.R. 4412, does not include language authorizing FY2015 appropriations.

[72] National Research Council, *Vision and Voyages for Planetary Science in the Decade 2013-2022* (National Academies Press, 2011). Available online at http://www.nap.edu/catalog.php?record_id=13117.

[73] See Marcia S. Smith, "Funding for Europa Mission Ephemeral in NASA Budget," March 11, 2014, online at http://www.spacepolicyonline.com/news/funding-for-europa-mission-ephemeral-in-nasa-budget.

[74] See National Aeronautics and Space Administration, "NASA Introduces New Blueprint for Transforming Global Aviation," August 14, 2013, http://www.nasa.gov/aero/strategic_vision/.

transportation capability for future U.S. astronaut access to the International Space Station. The request of $2.784 billion for Orion, the SLS, and related ground systems (known collectively as Exploration Systems Development) is a decrease of 10.6%, while the request of $848 million for commercial crew is an increase of 21.8%. In past years, this apparent difference in human spaceflight priorities between Congress and the Administration was controversial. The OGSI proposal includes an additional $100 million for SLS and Orion and an additional $250 million for commercial crew.

The Administration's request of $3.051 billion for the International Space Station (ISS) is a 3.2% increase. The ISS account includes the cost of commercial cargo flights for ISS resupply. The request would eliminate one previously planned ISS cargo flight in FY2015. The OGSI proposal includes an additional $101 million for the ISS and would restore the eliminated flight.

Table 13. NASA R&D

(budget authority in millions of dollars)

	FY2014 Enacted	FY2015 Request	FY2015 OGSI
Science	**$5,151.2**	**$4,972.0**	**$187.3**
Earth Science	1,826.0	1,770.0	—
Planetary Science	1,345.0	1,280.0	—
Astrophysics	668.0	607.0	—
James Webb Space Telescope	658.2	645.0	—
Heliophysics	654.0	669.0	—
Aeronautics	**566.0**	**551.1**	**43.9**
Space Technology	**576.0**	**705.5**	**100.0**
Exploration	**4,113.2**	**3,976.0**	**350.0**
Exploration Systems Development	3,115.2	2,784.0	100.0
Commercial Spaceflight	696.0	848.0	250.0
Exploration R&D	302.0	343.0	0.0
International Space Station	**2,964.1**[a]	**3,050.8**	**100.6**
Subtotal R&D	**13,370.5**	**13,255.4**	**781.8**
Non-R&D Programs[b]	968.0	980.5	10.0
Cross-Agency Support	2,793.0	2,778.6	0.0
Associated with R&D[c]	*2,604.4*	*2,587.2*	*0.0*
Construction & Environmental C&R	515.0	446.1	93.7
Associated with R&D[c]	*480.2*	*415.4*	*92.5*
NASA, Total (R&D)	**16,455.2**	**16,258.0**	**874.3**
NASA, Total	**17,646.5**	**17,460.6**	**885.5**

Sources: FY2014 enacted from P.L. 113-76 and joint explanatory statement, *Congressional Record*, January 15, 2014, Book II, at pp. H515-H517. FY2015 request and OGSI from NASA's FY2015 congressional budget justification, http://www.nasa.gov/news/budget/, and other NASA budget documents.

Notes: Totals may differ from the sum of the components due to rounding.

a. From NASA's operating plan. Not specified in P.L. 113-76 or the joint explanatory statement.

b. Space and Flight Support, Education, and Inspector General.

c. Allocation between R&D and non-R&D is estimated by CRS in proportion to the underlying program amounts in order to allow calculation of a total for R&D. The Cross-Agency Support and Construction and Environmental Compliance and Remediation accounts consist mostly of indirect costs for other programs, assessed in proportion to their direct costs.

Department of Commerce

National Institute of Standards and Technology[75]

The National Institute of Standards and Technology (NIST) is an agency of the Department of Commerce with a mandate to increase the competitiveness of U.S. companies through appropriate support for industrial development of precompetitive, generic technologies and the diffusion of government-developed technological advances to users in all segments of the American economy. NIST research also provides the measurement, calibration, and quality assurance methods and techniques that underpin U.S. commerce, technological progress, product reliability, manufacturing processes, and public safety. NIST is also responsible for developing, maintaining, and retaining custody of the national standards of measurement; providing the means and methods for making measurements consistent with those standards; and for ensuring the compatibility of U.S. national measurement standards with those of other nations.

The President's FY2015 budget requests $900.0 million for NIST, an increase of $50.0 million (5.9%) over the FY2014 enacted appropriation. (See **Table 14**.) Included in this figure is $680 million for R&D in the Scientific and Technical Research and Services (STRS) account, $29 million (4.5%) above FY2014 funding. According to NIST, priority areas targeted for budget increases within STRS include R&D investments in forensic science ($3.5 million), cyber-physical systems ($7.5 million),[76] advanced materials ($5.0 million), synthetic biology ($7.0 million), and a lab-to-market initiative ($6.0 million).[77]

The FY2015 budget requests $161 million for the Industrial Technology Services (ITS) account, including $141.0 million for the Manufacturing Extension Partnership (MEP) program (up $13.0 million, 10.2% from FY2014). Also included in ITS is $15.0 million for the Advanced Manufacturing Technology Consortia (AMTech) program, which was funded at the same level in FY2014, and $5.0 million for coordination of manufacturing innovation institutes, include the nine launched or committed to launching by the Department of Defense, Department of Energy, and Department of Agriculture, as well as those envisioned as part of the President's proposed National Network for Manufacturing Innovation (discussed further below).[78]

[75] This section was written by John F. Sargent, Jr., Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[76] In this context, cyber-physical systems refers to interconnected machines and devices designed to create adaptive and predictive systems that respond in real time to improve performance.

[77] Department of Commerce, National Institute of Standards and Technology, "National Institute of Standards and Technology/National Technical Information Service, Fiscal Year 2-15 Budget Submission to Congress," March 2014, http://www.osec.doc.gov/bmi/budget/FY15CJ/NISTandNTISFY2015CJFinal508Compliant.pdf.

[78] Ibid.

The President's budget also includes $59.0 million for the NIST Construction of Research Facilities account, up $3 million (5.4%) over FY2014.[79]

As well as the appropriations included in the base budget proposal, the President has proposed additional NIST funding as part of his Opportunity, Growth, and Security Initiative. In particular, the OGSI includes $2.4 billion for the establishment of the National Network for Manufacturing Innovation, a network of up to 45 institutes with unique foci that

> will support manufacturing technology commercialization by allowing new manufacturing processes and technologies to progress more smoothly from basic research to implementation in manufacturing, in addition to providing a much-needed environment and support for work-force development in advanced manufacturing.[80]

The OGSI also includes $115 million that would: fully fund NIST's requested FY 2014 initiatives in advanced manufacturing, cybersecurity, forensic science, and disaster resilience; accelerate renovation of scientific facilities at the NIST laboratories in Boulder, Colorado; expand research and testing capabilities in advanced communications, including spectrum sharing and next-generation communication technologies; enhance research programs in quantum science; support robust cryptography capabilities for NIST's cybersecurity programs; support a data science and information program for the development of standards and validation tools for accessing, processing, distilling, storing, and protecting data; and strengthen forensics science research and collaborative efforts with stakeholders.[81] (For more information on the OGSI, see the earlier discussion at "Opportunity, Growth, and Security Initiative.")

NIST's extramural programs (currently the Manufacturing Extension Partnership and AMTech), which are directed toward increased private-sector commercialization, have been a source of contention. Some Members of Congress have expressed skepticism about a technology policy based on providing federal funds to industry for the development of what are termed "pre-competitive generic technologies." This skepticism, coupled with pressures to balance the federal budget, has led to proposals for the elimination of NIST extramural activities. In 2007, similar concerns led to the Advanced Technology Program being terminated and replaced by the Technology Innovation Program, which operated until Congress withdrew its funding in FY2012.

Increases in spending for NIST laboratories that perform research focused on the mission responsibilities of the agency have tended to remain small. As part of the American Competitiveness Initiative, announced in 2006, the Bush Administration stated its intention to double funding over 10 years for "innovation-enabling research" done, in part, at NIST through its "core" programs (defined as the STRS account and the construction budget). In April 2009, President Obama indicated his decision to double the budget of key science agencies, including NIST, over the next 10 years. In President Obama's FY2011 budget the timeframe for doubling slipped to 11 years; his FY2012 budget was silent on a timeframe for doubling. There is no mention of doubling or a timeframe in the FY2015 budget request. For more information on the doubling effort, see "Efforts to Double Certain R&D Accounts" above.

[79] Ibid.

[80] Ibid.

[81] Ibid.

Table 14. NIST

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
Base Budget		
Scientific and Technical Research and Services	**$ 651.0**	**$ 680.0**
Industrial Technology Services	**143.0**	**161.0**
Manufacturing Extension Partnership	128.0	141.0
Advanced Manufacturing Technology Consortia	15.0	15.0
Manufacturing Innovation Institutes Coordination	—	5.0
Construction	**56.0**	**59.0**
NIST, Total (Base Budget)	**850.0**	**900.0**
Opportunity, Growth, and Security Initiative		
National Network for Manufacturing Innovation	—	2,400.0
Other NIST Research Activities	—	115.0
NIST, Total (OGSI)	—	**2,515.0**

Sources: NIST website (http://www.nist.gov/public_affairs/releases/approps-summary2015.cfm), P.L. 113-76 and Explanatory Statement; and Administration's FY2015 Budget Request.

Note: Totals may differ from the sum of the components due to rounding.

National Oceanic and Atmospheric Administration[82]

The Commerce Department's National Oceanic and Atmospheric Administration conducts scientific research in areas such as ecosystems, climate, global climate change, weather, and oceans; supplies information on the oceans and atmosphere; and manages coastal and marine organisms and environments. NOAA was created in 1970 by Reorganization Plan No. 4.[83] The reorganization was intended to unify elements of the nation's environmental activities and to provide a systematic approach for monitoring, analyzing, and protecting the environment.

NOAA's R&D efforts support the four long-term goals of NOAA's Next Generation Strategic Plan: (1) climate adaptation and mitigation, (2) a weather-ready nation,[84] (3) healthy oceans, and (4) resilient coastal communities and economies.[85] The focus of NOAA's R&D efforts include climate; weather and air quality; and ocean, coastal, and Great Lakes resources. NOAA's R&D funding supports intramural activities of the agency and extramural activities of private

[82] This section was written by Harold F. Upton, Analyst in Natural Resources Policy, CRS Resources, Science, and Industry Division.

[83] "Reorganization Plan No. 4 of 1970," 35 *Federal Register* 15627-15630, October 6, 1970; see also http://www.lib.noaa.gov/noaainfo/heritage/ReorganizationPlan4.html.

[84] According to NOAA a weather-ready nation is envisioned as a society that is prepared for and responds to weather-related events.

[85] National Oceanic and Atmospheric Administration, *National Oceanic and Atmospheric Administration FY2014 Budget Summary*, National Oceanic and Atmospheric Administration, Washington, DC, April 2013, http://www.corporateservices.noaa.gov/nbo/fy14_bluebook/FINALnoaaBlueBook_2014_Web_Full.pdf.

individuals and organizations under grants, contracts, or cooperative agreements. NOAA has developed a research and development plan to guide NOAA's R&D activities for the next five years.[86] NOAA describes the plan as a framework under which NOAA and the public can monitor and evaluate the agency's progress and learn from past experience.

For FY2015, President Obama has requested $688.7 million in R&D funding for NOAA, a 3.4% increase in funding from the FY2014 enacted level of $666.0 million. R&D accounts for 12.5% of NOAA's total FY2015 discretionary budget request of $5.491 billion. The R&D request consists of $468.1 million for research (68.0%), $65.8 million for development (9.5%), and $154.8 million for R&D equipment (22.5%).[87]

NOAA's administrative structure has five line offices that reflect its diverse mission: the National Ocean Service (NOS); National Marine Fisheries Service (NMFS); National Environmental Satellite, Data, and Information Service (NESDIS); National Weather Service (NWS); and Office of Oceanic and Atmospheric Research (OAR). In addition to NOAA's five line offices, Program Support (PS), a cross-cutting budget activity, includes the Office of Marine and Aviation Operations (OMAO).

The Office of Oceanic and Atmospheric Research is the primary center for R&D within NOAA. In FY2014, OAR accounted for 58.2% of NOAA's R&D funding. The President's FY2015 request would provide OAR with $424.8 million in R&D funding, which is 61.7% of total R&D funding requested by NOAA and 91.9% of OAR's total budget request of $462.2 million. **Table 15** provides R&D funding levels by line office for FY2013, FY2014, and the FY15 request.[88]

The President's Opportunity, Growth, and Security Initiative includes $1 billion for a Climate Resilience Fund that would support activities across multiple agencies. NOAA would receive $180 million from the OGSI for expanded weather, climate, and oceans observations and research. NOAA would also receive $25 million from the Climate Resilience Fund for oceanic and atmospheric research grants to improve understanding of the effects of climate change on various sectors, and $50 million to improve coastal resilience by awarding competitive grants to state, local, and tribal governments and nonprofit organizations.[89] A significant portion of these efforts would likely support or supplement ongoing R&D activities.

[86] NOAA, *Research and Development at NOAA*, Five-Year Research and Development Plan 2013-2017, Washington, DC, 2014, http://nrc.noaa.gov/CouncilProducts/ResearchPlans/5YearRDPlan/NOAA5YRPHome/Preface/Purpose.aspx.

[87] Courtney Barry, NOAA Budget Office, e-mail, March 31, 2014.

[88] Ibid.

[89] NOAA , *Budget Estimates Fiscal Year 2015*, Congressional Submission, Washington, DC, March 2014, p. x, http://www.corporateservices.noaa.gov/nbo/docs/NOAA_FY15_CJ_508%20compliant.pdf.

Table 15. NOAA R&D

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
National Ocean Service	$ 73.1	$ 75.0
National Marine Fisheries Service	67.0	61.4
National Weather Service	33.0	19.0
National Environmental Satellite, Data, and Information Service	26.0	26.0
Office of Marine and Aviation Operations[b]	79.1	82.4
Office of Oceanic and Atmospheric Research	387.8	424.8
NOAA, Total (R&D)	**666.0**	**688.6**
OAR, Total (R&D and Non-R&D)	**426.8**	**462.2**
NOAA, Total (R&D and Non-R&D)	**5,314.6**	**5,491.3**

Source: Courtney Barry, NOAA Budget Office, e-mail to CRS concerning NOAA R&D, March 31, 2014

Notes:

a. From the NOAA Spend Plan for FY2013 after rescissions and sequestration were applied.

b. R&D for the Office of Marine and Aviation Operations is for equipment in support of R&D activities.

Department of Agriculture[90]

The U.S. Department of Agriculture (USDA) was created in 1862 in part to conduct and support agricultural research. USDA houses intramural research programs at federal facilities with government-employed scientists. It also supports external research at universities and other research facilities through competitive grants and formula-based funding. USDA conducts or supports a broad array of research: from traditional agricultural production techniques, to organic and sustainable agriculture, bioenergy, nutrition needs and composition, food safety, animal and plant health, pest and disease management, economic decision making, and other social sciences affecting consumers, farmers, and rural communities.

Four agencies carry out USDA's research and education activities. The department groups these agencies into the Research, Education, and Economics (REE) mission area. The agencies are the Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA), National Agricultural Statistics Service (NASS), and Economic Research Service (ERS).

The Administration's FY2015 budget request for the USDA REE mission area is $2.702 billion, up $64 million (2.4%) from FY2014. (See **Table 16.**) In addition to this base request, the Administration is requesting an additional $277 million for a subset of REE activities under the Opportunity, Growth, and Security Initiative.

The Agricultural Research Service is USDA's in-house basic and applied research agency. It operates approximately 90 laboratories nationwide with about 7,400 employees. ARS also operates the National Agricultural Library, one of the Department's primary information repositories for food, agriculture, and natural resource sciences. ARS laboratories focus on efficient food and fiber production, development of new products and uses for agricultural commodities, development of effective controls for pest management, and support of USDA regulatory and technical assistance programs.

The President has requested $1.104 billion for ARS in FY2015, a decrease of $18 million (1.6%) from the FY2014 enacted appropriation. This request would increase funding for crop production and human nutrition research, while reducing funding for crop protection, value-added, livestock, food safety, and environmental stewardship research programs. Within each area of research, ARS proposes to reduce funding for several existing programs and redirect funding to higher-priority programs. The agency also proposes to consolidate resources from six laboratories to other existing ARS facilities; this part of the request is similar to a FY2014 proposal that was rejected by Congress.

In addition to the base request of $1.104 billion for ARS, the Administration proposes an additional $197 million for ARS through the OGSI. Most of this extra amount would be for buildings and facilities to construct a new bio-containment facility to replace the Poultry Research Facility in Athens, GA ($155 million). The FY2014 request also included $155 million for the new poultry research facility, but Congress did not fund it in the enacted appropriation.

[90] This section was written by Jim Monke, Specialist in Agricultural Policy, CRS Resources, Science, and Industry Division.

The rest of the OGSI funding for ARS would provide increased support for five high-priority research areas across the agency ($42 million).

The National Institute of Food and Agriculture (formerly the Cooperative State Research, Education, and Extension Service)[91] provides federal funding for research, education, and extension projects conducted in partnership with the State Agricultural Experiment Stations, the State Cooperative Extension System, land grant universities, colleges, and other research and education institutions, as well as individual researchers. These partnerships include the 1862 land-grant institutions, 1890 historically black colleges and universities, 1994 tribal land-grant colleges, and Hispanic-serving institutions.[92] Federal funds are distributed to enhance capacity at universities and institutions by statutory formula funding, competitive awards, and grants.

The President has requested $1.336 billion for NIFA in FY2015, an increase of $59 million (4.6%) from the enacted FY2014 appropriation. Within this amount, the request would increase research and education programs by $65 million, keep Extension programs constant, and reduce Integrated Activities by $6 million.

Within the increase for Research and Education programs, the Administration proposes to establish three new "Innovation Institutes" that would focus on emerging agricultural research challenges. The Administration would provide $75 million per year ($25 million for each institute) for five years. The public-private institutes would engage industry, leverage funding, and facilitate technology transfer. Proposed research areas include pollinator health, bio-manufacturing and bioproducts development, and anti-microbial resistance.

The Department's flagship competitive research grants program, the Agriculture and Food Research Initiative (AFRI) would receive $325 million (up 2.7% from FY2014), about one-fourth of NIFA's budget.

As part of the Administration's proposal for a government-wide reorganization of STEM programs, NIFA would defund its Higher Education Challenge Grants, Graduate and Postgraduate Fellowship Grants, the Higher Education Multicultural Scholars Program, Women and Minorities in STEM Program, Agriculture in the Classroom, and Secondary and Postsecondary Challenge Grants. (For more information on the proposed reorganization, see "Reorganization of STEM Education Programs" above.)

In addition to the base request of $1.336 billion for NIFA, the Administration proposes an additional $80 million for NIFA through the OGSI. Most of this extra amount would provide increased support for additional AFRI competitive research grants ($60 million). The rest would establish a new competitive research grant program to complement formula-funded NIFA grants.

The National Agricultural Statistics Service conducts the Census of Agriculture and provides the official statistics on agricultural production and indicators of the economic and environmental status of the farm sector. The President's proposed funding for NASS is $179 million for FY2015, an increase of $18 million (11%) from the enacted FY2014 appropriation. The Agricultural Estimates portion of NASS would receive $131 million, up $14 million from FY2014, to restore

[91] The 2008 farm bill restructured and renamed this agricultural research agency.

[92] The numbers 1862, 1890, and 1994 in this context refer to the years that laws were enacted creating these classifications of colleges and universities, not to the number of institutions.

selected surveys that were reduced or eliminated in recent years for budgetary reasons. These include a variety of fruit and vegetable surveys and a chemical use survey. NASS would expand the use of geospatial information and conduct surveys related to pollinator health. The request also includes $48 million for the Census of Agriculture, up $3 million from FY2014, to begin planning for the 2017 Census of Agriculture.

The Economic Research Service supports economic and social science information analysis on agriculture, rural development, food, commodity markets, and the environment. It collects and disseminates data concerning USDA programs and policies to various stakeholders. The FY2015 budget request proposes $83 million for ERS, an increase of $5 million (6.9%) over the enacted FY2014 appropriation. The request includes $3.5 million (an increase of $1 million) to expand the use of behavioral economics and administrative statistics to study the effectiveness of government polices based on risk management decisions by farmers or nutrition choices by consumers.

Table 16. U.S. Department of Agriculture R&D

(budget authority in millions of dollars)

Agency or Major Program	FY2014 Enacted P.L. 113-76	FY2015 Request Base Budget	FY2015 Request OGSI
Agricultural Research Service	**$ 1,122.5**	**$ 1,104.4**	**$ 197.2**
National Institute of Food and Agriculture	**1,277.1**	**1,335.5**	**80.0**
Research and Education	772.6	837.7	80.0
AFRI	316.4	325.0	60.0
Hatch Act	243.7	243.7	15.0
Evans-Allen	52.5	52.5	5.0
McIntire-Stennis	34.0	34.0	—
Innovation Institutes	0.0	75.0	—
Other	126.0	107.6	—
Extension	469.2	469.0	—
Smith-Lever (b) & (c)	300.0	300.0	—
Smith-Lever (d)	85.5	85.7	—
Other	83.7	83.2	—
Integrated Activities	35.3	28.8	—
National Agricultural Statistics Service	**161.2**	**179.0**	—
Economic Research Service	**78.1**	**83.4**	—
USDA, Total	**2,638.8**	**2,702.4**	**277.2**

Source: OMB, *FY2015 Budget Appendix*; and U.S. Department of Agriculture, *FY2015 Budget Explanatory Notes,* March 2014, at http://www.obpa.usda.gov/FY15explan_notes.html.

Department of the Interior[93]

The Department of the Interior (DOI) seeks to protect and manage the Nation's natural resources and cultural heritage, and provides scientific and other information about those resources. DOI's responsibilities include, among other things: mapping, geological, hydrological, and biological science; migratory bird and wildlife conservation; endangered species preservation; surface-mined lands protection and restoration; and historic preservation.[94]

The Administration has requested $888.7 million in DOI R&D funding for FY2015, $60.4 million (7.3%) above its FY2014 enacted level of $828.4 million. (See **Table 17**.) According to DOI,

> Activities supported by this [R&D] funding range from scientific observations of the earth, streams, and wildlife populations, to applied research in the field to better address the impacts of a changing climate on Interior's lands and address species specific problems such as white nose syndrome in bats.[95]

The U.S. Geological Survey (USGS) accounts for most of DOI's R&D ($649.5 million in FY2014, 78.4% of total DOI R&D). USGS is also the most R&D-intensive agency in DOI, with approximately two-thirds of its FY2015 request devoted to R&D activities.

In the President's FY2015 budget, 6.2% of the requested R&D would be for basic research, 81% for applied research, and 12.7% for development. The USGS is the only DOI agency that conducts basic research.[96]

Funding for DOI R&D is generally included in line items that also include non-R&D funding. Therefore it is not possible to know precisely how much of the funding provided for in appropriations bills will be allocated to R&D unless funding is provided at the precise level of the request. In general, R&D funding levels are known only after DOI agencies allocate their appropriations to specific activities. In March 2014, DOI provided detailed information to CRS on R&D funding levels proposed by the President for each of its agencies and for broad program areas; these data were used for much of the analysis in this section.[97]

U.S. Geological Survey

All USGS funding is provided through a single account, Surveys, Investigations, and Research (SIR). USGS R&D is conducted under seven SIR activity/program areas: Ecosystems; Climate

[93] This section was written by John F. Sargent, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[94] Department of the Interior, *Strategic Plan for Fiscal Years 2014-2018*, http://www.doi.gov/pmb/ppp/upload/DOI-Strategic-Plan-for-FY-2014-2018-POSTED-ON-WEBSITE.pdf.

[95] Department of the Interior, *Fiscal Year 2015: The Interior Budget in Brief*, March 2014, p. DH-35, http://www.doi.gov/budget/appropriations/2015/highlights/upload/2015_Highlights_Book.pdf.

[96] CRS analysis of unpublished information provided by the DOI budget office via email communication with CRS, March 7, 2014.

[97] Email correspondence between the DOI budget office and CRS, March 7, 2014.

and Land Use Change; Energy, Minerals, and Environmental Health; Natural Hazards; Water Resources; Core Science Systems; and Science Support.

The President's total FY2015 budget request for USGS is $1.074 billion. It includes $685.1 million for R&D, an increase of $35.6 million (5.5%) over the FY2014 level of $649.5 million. The largest R&D increase in the FY2015 USGS budget is for Climate Variability (up $18.4 million, 34.3%),which is a part of the Climate Change and Land Use activity area (up $17.8 million, 18.6%). Other activity/program areas receiving additional funding in the request include Ecosystems (up $9.2 million, 6.0%) and Energy, Minerals, and Environmental Health (up $7.6 million, 8.3%). Water Resources and Core Science Systems would receive smaller increases. Natural Hazards and Science Support funding would be reduced.

Other DOI Agencies

With respect to other DOI agencies, under the President's FY2015 budget request:[98]

- The Bureau of Ocean Energy Management would receive $50.2 million in FY2015 for applied research, an increase of $2.4 million (5.0%).
- The Fish and Wildlife Service would receive $49.9 million in FY2015 for applied research, an increase of $19.5 million (63.8%).
- The Bureau of Safety and Environmental Enforcement would receive $27.1 million in FY2015 for applied research, essentially unchanged.
- The National Park Service would receive $27.0 million in FY2015 for applied research and development, an increase of $0.2 million (0.7%).
- The Bureau of Land Management would receive $22.4 million in FY2015 for applied research and development, an increase of $3.2 million (16.4%).
- The Bureau of Reclamation would receive $12.7 million in FY2015 for applied research and development, a decrease of $3.9 million (23.5%).
- Wildland Fire Management would receive $6.0 million in FY2015 for applied research, the same as in FY2014.
- The Bureau of Indian Affairs would receive $5.0 million in FY2015 for applied research, the same as in FY2014.
- The Office of Surface Mining would receive $3.4 million in FY2015 for applied research; this office received no R&D funding in FY2014.

[98] Ibid.

Table 17. Department of the Interior R&D

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
U.S. Geological Survey	$ 649.5	$ 685.1
Bureau of Ocean Energy Management	47.8	50.2
Fish and Wildlife Service	30.5	49.9
Bureau of Safety and Environmental Enforcement	27.1	27.1
National Park Service	26.8	27.0
Bureau of Land Management	19.2	22.4
Bureau of Reclamation	16.6	12.7
Wildland Fire Management	6.0	6.0
Bureau of Indian Affairs	5.0	5.0
Office of Surface Mining	—	3.4
DOI, Total	**828.4**	**888.7**

Source: Unpublished data provided to CRS by the DOI Budget Office.

Note: Totals may differ from the sum of the components due to rounding.

Environmental Protection Agency[99]

The U.S. Environmental Protection Agency (EPA), the federal regulatory agency responsible for carrying out a number of environmental pollution control laws, funds a broad range of R&D activities to provide scientific tools and knowledge to support decisions relating to preventing, regulating, and abating environmental pollution. Beginning in FY2006, EPA has been funded through the Interior, Environment, and Related Agencies appropriations bill. Funding for EPA R&D is generally included in line items that also include non-R&D activities; therefore, it is not possible to identify precisely how much of the funding provided for in appropriations bills will be allocated to EPA R&D specifically (see discussion later in this section). The agency's Science and Technology (S&T) account funds much of EPA's scientific research activities, including R&D and other related scientific evaluations conducted by universities, foundations, and other non-federal entities that receive EPA grants, as well as R&D conducted by the agency at its own laboratories and facilities. The S&T account is funded by a "base" appropriation and a transfer from the Hazardous Substance Superfund (Superfund) account. The transferred funds are dedicated to research on more effective methods to clean up contaminated sites.

The President's FY2015 budget request of $782.6 million for EPA's S&T account, including transfers from the Hazardous Substance Superfund account ($18.9 million), is $4.3 million (0.6%) above the $778.4 million included for FY2014 in the Consolidated Appropriations Act, 2014 (P.L. 113-76, Title II of Division G) enacted January 17, 2014. The request for the S&T

[99] This section was written by Robert Esworthy, Specialist in Environmental Policy, CRS Resources, Science, and Industry Division.

account (including transfers) represents roughly 10% of the agency's total $7.89 billion request for FY2015.

In testimony before Congress, the EPA Administrator reported that the proposed Opportunity, Growth, and Security Initiative (see "Opportunity, Growth, and Security Initiative") would include $1.0 billion for a Climate Resilience Fund for research and data collection across multiple federal departments and agencies to "better understand and prepare for the impacts of a changing climate."[100] For EPA efforts addressing impacts of climate change, the fund would provide $10.0 million for protecting and enhancing coastal wetlands and $5.0 million to support urban forest enhancement and protection. This funding is separate from the base request for the S&T account and other EPA appropriations accounts.

As indicated in **Table 18**, the FY2015 requested total base (prior to transfers) for the S&T account is $763.8 million, $4.6 million (0.6%) above the FY2014 level of $759.2 million. The $18.9 million FY2015 requested transfer from the Superfund account is less than the $19.2 million transferred in FY2014. As indicated in EPA's FY2015 Congressional budget justification[101] and reflected in the table, the requested base amount for the S&T account includes both increases and decreases for individual EPA research program and activity line items.

The FY2014 appropriation included $4.2 million for "Research: National Priorities," the same as in FY2013, for competitively awarded research grants to fund "high-priority water quality and availability research by not-for-profit organizations."[102] As in previous requests, the President's FY2015 budget request does not include funding for these "national priorities."

The FY2015 request proposes eliminating $0.2 million within the S&T account appropriated in FY2014 to support radon testing. Proposed elimination of this funding was also included in the FY2014 budget request.[103] Also as in the FY2014 request, the FY2015 budget proposes eliminating the indoor radon (categorical) state grants ($8.1 million) in the State and Tribal Assistance Grants (STAG) account.[104] The FY2015 request proposes increased funding within the Environmental Program and Management (EPM) account to support continuance of the EPA's Federal Radon Action plan to reduce radon risks and improve the public's understanding related to the risks associated with radon.[105] In the Explanatory Statement for the Consolidated Appropriations Act, 2014 (P.L. 113-76, H.R. 3547), Congress rejected the similar proposed FY2014 eliminations and reductions for the radon program.

[100] See Administrator McCarthy testimony during Compressional hearings on EPA's Fiscal Year 2015 Budget: April 2, 2014, before the Committee on Energy and Commerce, Subcommittee on Energy and Power and Subcommittee on Environment and Economy, http://energycommerce.house.gov/hearing/fiscal-year-2015-epa-budget; and March 26, 2014, before the Senate Committee on Environment and Public Works, http://www.epw.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_id=bffc28f9-f780-7d6d-66c5-1b8d66ce2ce8&CFID=121355238&CFTOKEN=49508863.

[101] U.S. EPA, *Fiscal Year 2015 Justification of Appropriation Estimates for the Committee on Appropriations: Science and Technology*, pp. 77-188, http://www2.epa.gov/sites/production/files/2014-03/documents/fy_15_congressional_justification.pdf.

[102] Ibid.

[103] See EPA's FY2015 Congressional Justification (footnote 101), pp.101-102.

[104] See EPA's FY2015 Congressional Justification (footnote 101), pp. ix, 769-770.

[105] See EPA's FY2015 Congressional Justification (footnote 101), pp. 531-532.

The largest proposed decrease in dollar terms in the S&T account is for "Research: Sustainable and Healthy Communities." The $144.1 million requested is $10.8 million (7.0 %) less than the $155.0 million FY2014 appropriation.[106] There are several proposed increases and decreases for individual activities within this research program area, but a significant proportion of the overall decrease can be attributed to the proposed $11.1 million reduction for EPA's Science to Achieve Results (STAR) and Greater Research Opportunities (GRO) fellowship programs as part of the Administration's proposal for reorganization and consolidation of STEM education programs.[107] (For additional information, see "Reorganization of STEM Education Programs" above.)

One of the largest percentage increases requested in the S&T account is for the Computational Toxicology activity in the "Research: Chemical Safety and Sustainability" program area. The $28.6 million requested for Computational Toxicology in FY2015 is $7.2 million (33.7%) more than the FY2014 enacted level of $21.4 million. Within the S&T account, the FY2015 request includes $101.9 million for Air, Climate, and Energy (ACE) Research, a $7.0 million (7.3%) increase above FY2014, and $114.2 million for Safe and Sustainable Water (SSW) Research, a $3.2 million (2.8%) increase. Contributing to these two requested increases are proposed $3.8 million and $4.3 million increases under ACE and SWW, respectively, as part of EPA's overall research efforts to address additional questions regarding the safety of hydraulic fracturing.[108] Concerns regarding potential drinking water impacts associated with hydraulic fracturing continue to be an area of considerable interest during the 113th Congress.[109]

The EPA S&T account incorporates elements of the former EPA Research and Development account, as well as portions of the former Salaries and Expenses and Program Operations accounts, which were in place until FY1996.[110] Although the Office of Management and Budget (OMB) reports historical and projected budget authority (BA) for R&D at EPA (and other federal agencies),[111] OMB documents do not describe how these amounts explicitly relate to the requested and appropriated funding amounts for the many specific EPA program activities. Typically, the R&D BA amounts reported by OMB have been considerably less than amounts requested and appropriated for the S&T account as a whole. This may be an indication that not all of the EPA S&T account funding is allocated to R&D. (The amounts reported by OMB are included in **Table 18** for purposes of comparison.)

R&D at EPA headquarters and laboratories around the country, as well as external R&D, is managed primarily by EPA's Office of Research and Development (ORD). A large portion of the S&T account funds EPA R&D activities managed by ORD, including the agency's research laboratories and research grants. The account also provides funding for the agency's applied

[106] See EPA's FY2015 Congressional Justification (footnote 101), pp. 162-168.

[107] See EPA's FY2015 Congressional Justification (footnote 101), pp. 167.

[108] See EPA's FY2015 Congressional Justification (footnote 101), pp. 39, 148-153, and 155-161.

[109] For more information, see CRS Report R41760, *Hydraulic Fracturing and Safe Drinking Water Act Regulatory Issues*, by Mary Tiemann and Adam Vann.

[110] In recent years, EPA's annual appropriations have been requested, considered, and enacted according to eight statutory appropriations accounts established by Congress during the FY1996 appropriations process. Because of the differences in the scope of the activities included in these accounts, apt comparisons before and after FY1996 are difficult.

[111] The Office of Management and Budget (OMB) reports R&D budget authority (BA) amounts in its Analytical Perspectives accompanying the annual President's budget request. See OMB, *Fiscal Year 2015 Budget of the United States: Analytical Perspectives—Special Topics/Research and Development, pp. 309-315,* http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/topics.pdf.

science and technology activities conducted through its program offices (e.g., the Office of Water). Many of the programs implemented by other offices within EPA have a research component, but the research component is not often the primary focus of the program.

Table 18. Environmental Protection Agency S&T Account

(budget authority, in millions of dollars)

	FY2014 Enacted (P.L. 113-76)	FY2015 Request
Science and Technology Appropriations Account		
Clean Air and Climate	$ 120.4	$ 118.5
Clean Air Allowance Trading Program	8.6	8.4
Climate Protection Program	8.3	8.0
Federal Support for Air Quality Management	7.0	7.0
Federal Vehicle & Fuel Standards & Certification	96.5	95.0
Enforcement	14.1	14.1
Homeland Security	38.4	39.4
Indoor Air and Radiation	6.4	6.1
Indoor Air: Radon	0.2	0.0
Radiation: Protection	2.1	2.0
Radiation: Response Preparedness	3.8	3.7
Reduce Risks from Indoor Air	0.3	0.4
IT/Data Management/Security	3.5	3.1
Operations & Administration	70.4	75.8
Pesticide Licensing	6.2	6.2
Research: Air, Climate, and Energy	95.0	101.9
Research: Chemical Safety and Sustainability	130.8	136.5
Human Health Risk Assessment	40.0	37.9
Research: Computational toxicology	21.4	28.6
Research: Endocrine disruptor	16.3	15.7
Research: Other Activities	53.2	54.3
Research: Safe and Sustainable Water	111.0	114.2
Research: Sustainable and Healthy Communities	155.0	144.1
Water: Human Health Protection (Drinking Water Programs)	3.6	3.7
Research: National [Congressional] Priorities (Water Quality and Availability)	4.2	0.0
Subtotal S&T Account Base Appropriations	**759.2**	**763.8**
Transfer in from Hazardous Substance Superfund Account	**19.2**	**18.9**
EPA, Total (Science and Technology)	**778.4**	**782.6**
EPA, R&D Budget Authority Reported by OMB	**560.0**	**560.0**

Source: Prepared by CRS. FY2015 requested amounts are based on the *Fiscal Year 2015 Justification of Appropriation Estimates for the Committee on Appropriations*, http://www2.epa.gov/sites/production/files/2014-03/documents/fy_15_congressional_justification.pdf. FY2014 enacted amounts are as presented in the table in the Joint Explanatory Statement for the Consolidated Appropriations Act, 2014 (P.L. 113-76, , H.R. 3547) as printed in the January 15, 2014 Congressional Record, Book II, pp. H1010-H1011, http://www.congress.gov/crtext/113-datesection.shtml. In those instances where comparable FY2014 enacted amounts were not specified for certain program activities below the program area level in the Explanatory Statement, CRS relied on the EPA FY2015 budget justification. OMB amounts of R&D budget authority are as reported in OMB, *Fiscal Year 2015 Budget of the United States: Analytical Perspectives—Special Topics/Research and Development, pp. 309-315,* http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/topics.pdf. Totals may differ from the sum of the components due to rounding.

Department of Transportation[112]

The Department of Transportation (DOT) seeks to ensure a fast, safe, efficient, accessible, and convenient transportation system. DOT's goals include improving public health and safety by reducing transportation-related fatalities and injuries; ensuring the U.S. maintains critical transportation infrastructure in a state of good repair; promoting transportation policies and investments that bring lasting and equitable economic benefits; fosters livable communities by integrating transportation policies, plans, and investments with housing and economic development policies; and advances environmentally sustainable policies and investments that reduce carbon and other harmful emissions from transportation sources.

President Obama has requested $896.3 million for Department of Transportation R&D in FY2015, an increase of $21.9 million (2.5%) from the FY2014 enacted level. (See **Table 19**.) Two DOT agencies—the Federal Highway Administration (FHWA) and the Federal Aviation Administration (FAA)—account for more than three-fourths of the department's R&D funding (76.9% in the FY2015 request).

The FHWA would receive $406.8 million in R&D funding in FY2015 under the President's request, an increase of $38.0 million (10.3%) from the FY2014 enacted level.[113] Of these funds, $130.0 million would support highway R&D, up $20.9 million (19.1%); $94.5 million would support Intelligent Transportation Systems R&D, up $15.1 million (19.0%); $165.9 would be for State Planning and Research, up $2.0 million (1.2%); and $16.4 million would be for administrative expenses.

The FAA is requesting $282.1 million for R&D and R&D facilities in FY2015, a decrease of $38.3 million (11.9%) from the FY2014 enacted level. The FY2015 request includes $256.9 million for research and development, a decrease of $46.5 million (15.3%), and $25.2 million for R&D facilities, an increase of $8.2 million (48.5%). Of these funds, $156.8 million would come from FAA's Research, Engineering, and Development (RE&D) account (down $2.0 million, 1.3%) which supports research in NextGen-specific areas such as wake turbulence, human factors, and clean aircraft technologies, as well as in fire safety, propulsion systems, advanced materials, aircraft icing, and continued airworthiness. The request includes $94.5 million for safety research, up $7.2 million (8.3%); $22.3 million for research in support of economic

[112] This section was written by John F. Sargent, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[113] FHWA, *Budget Estimates Fiscal Year 2015: Federal Highway Administration*, http://www.dot.gov/sites/dot.gov/files/docs/FHWA-FY2015-Budget-Estimates.pdf.

competitiveness, down $2.0 million (8.4%); $34.4 million for research supporting environmental sustainability, down $7.1 million (17.2%); and $5.5 million for mission support, down $0.1 million (1.7%). The RE&D request for FY2015 includes $47.5 million in funding for NextGen RE&D for fuels, wake turbulence, human factors, and weather technology in the cockpit, and environmental research, down $10.8 million (18.5%) from the FY2014 enacted level. [114]

Among the changes in other DOT agencies' R&D budgets:

- Funding for Federal Railroad Administration R&D would grow by 54.7% in FY2015 to $61.9 million, up from $40.0 million in FY2014.
- The Pipeline and Hazardous Materials Safety Administration would receive $21.1 million in R&D funding, up $4.8 million (29.3%) from FY2014.
- National Highway Traffic Safety Administration R&D funding would rise $9.9 million (15.2%) in FY2015 to $75.1 million.
- Funding for Federal Transit Administration R&D would fall by a third in FY2015 to $28.2 million, down from $42.2 million in FY2014.
- Federal Motor Carrier Safety Administration R&D would fall by $1.5 million (19.4%) to $6.1 million in FY2015, down from $7.5 million in FY2014.[115]

In addition, R&D funding in the Office of the Secretary would increase to $15.0 million in FY2015, up $1.0 million (7.2%) from FY2014.[116] As requested by DOT in its FY2014 request, Congress eliminated the Research and Innovative Technology Administration (RITA), and moved its programs and related funding to the Office of the Assistant Secretary for Research and Technology in the Office of the Secretary under the provisions of the Consolidated Appropriations Act, 2014 (P.L. 113-76).

[114] FAA, *Budget Estimates Fiscal Year 2015: Federal Aviation Administration*, http://www.dot.gov/sites/dot.gov/files/docs/FAA-FY2015-Budget-Estimates.pdf.

[115] Email communication between CRS and the Department of Transportation, March 27, 2014.

[116] Ibid.

Table 19. Department of Transportation R&D

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
Federal Highway Administration	$ 368.8	$ 406.8
Federal Aviation Administration	320.4	282.1
National Highway Traffic Safety Administration	65.1	75.1
Federal Railroad Administration	40.0	61.9
Federal Transit Administration	42.2	28.2
Pipeline & Hazardous Materials Safety Administration	16.3	21.1
Office of the Secretary	14.0	15.0
Federal Motor Carrier Safety Administration	7.5	6.1
DOT, Total	**874.4**	**896.3**

Source: DOT FY2015 department and agency budget justification; email communication between CRS and the Department of Transportation, March 27, 2014.

Notes: Figures include R&D and R&D facilities. Totals may differ from the sum of the components due to rounding.

Department of Veterans Affairs[117]

The Department of Veterans Affairs (VA) operates programs to provide America's veterans with medical care, benefits, social support, and memorials.[118] VA provides a broad range of primary care, specialized care, and related medical and social support services. VA seeks to advance medical R&D in areas that most directly address the diseases and conditions that affect veterans and eligible beneficiaries.

For FY2015, the President has proposed $1.178 billion for VA R&D, up 0.3% from FY2014. VA research focuses on biomedical topics of special relevance to wounded soldiers, including clinical and translational research.[119] The VA has requested $589.0 million for its Medical and Prosthetic Research account and an equal amount for VA research as part of its Medical Care appropriation. The Medical and Prosthetic Research account supports medical, rehabilitative, and health services research. VA medical research includes basic and clinical studies that advance knowledge leading to improvements in the prevention, diagnosis, and treatment of diseases and disabilities. Rehabilitation research focuses on rehabilitation engineering problems in the fields of prosthetics, orthotics, adaptive equipment for vehicles, sensory aids, and related areas. Health services

[117] This section was written by John F. Sargent, Specialist in Science and Technology Policy, CRS Resources, Science, and Industry Division.

[118] VA administers compensation benefits, pension benefits, fiduciary services, education benefits, vocational rehabilitation and employment services, transition services, and home loan and life insurance programs. VA also operates the largest national cemetery system for veterans, eligible beneficiaries, and their families.

[119] EOP, OSTP, "The FY 2015 Science and Technology R&D Budget: Science, Technology, and Innovation for Opportunity and Growth," press release, March 4, 2014, http://www.whitehouse.gov/sites/default/files/microsites/ostp/2015%20Budget%20Release.pdf.

research focuses on improving the effectiveness and economy of the delivery of health services.[120]

According to the VA, FY2015 research will emphasize addressing the critical needs of veterans of Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND), while continuing to address the health care needs of all veterans. A primary focus of FY2015 research will be the ability to extract knowledge from large, complex collections of digital data, including the storage, retrieval, and analysis of biological data. To store and manage the data, the VA Million Veteran Program (MVP) is building one of the world's largest medical databases, GenISIS, to support MVP and VA genomic-medicine studies.[121]

Table 20 summarizes R&D program funding requested for VA, in total, and for certain efforts, including OEF/OIF/OND-focused research, Prosthetics, Women's Health, Gulf War Veterans Illness programs, amyotrophic lateral sclerosis (ALS) and other neurodegenerative disorders, and Genomic Medicine.

Table 20. Department of Veterans Affairs R&D

(budget authority, in millions of dollars)

	FY2014 Enacted	FY2015 Request
VA, Total	**$1,174**	**$1,178**
Selected VA Research Efforts		
OEF/OIF/OND		
Pain	*18.9*	*19.2*
Post-deployment Mental Health	*55.4*	*56.3*
Sensory Loss	*17.7*	*17.9*
Spinal Cord Injury	*28.8*	*29.2*
Traumatic Brain Injury and Other Neurotrauma	*35.0*	*35.5*
Prosthetics	*12.7*	*12.9*
Women's Health	*16.6*	*16.8*
Gulf War Veterans Illness	*15.0*	*15.0*
ALS and Other Neurodegenerative Disorders	*37.2*	*37.8*
Genomic Medicine, including MVP	*51.5*	*52.2*

Source: Department of Veterans Affairs, *2015 Congressional Submission*, p. Highlights-33.

Notes: Italicized lines do not add to total.

[120] S.Rept. 113-174.

[121] VA describes MVP as, "a national, voluntary research program funded entirely by the Department of Veterans Affairs Office of Research & Development ... to study how genes affect health ... by safely collecting blood samples and health information from one million Veteran volunteers. Data collected from MVP will be stored anonymously for research on diseases like diabetes and cancer, and military-related illnesses, such as post-traumatic stress disorder." Department of Veterans Affairs, Office of Research and Development, website, http://www.research.va.gov/MVP.

Appendix. Acronyms and Abbreviations

ACE	Air, Climate, and Energy
ACI	American Competitiveness Initiative
AD	Alzheimer's Disease
AFRI	Agriculture and Food Research Initiative
AMP	Advanced Manufacturing Partnership
AMTech	Advanced Manufacturing Technology Consortia
AOAM	Agency Operations and Award Management
ARPA-E	Advanced Research Projects Agency–Energy
ARS	Agricultural Research Service
B&F	Buildings & Facilities
BD2K	Big Data to Knowledge
BES	Basic Energy Sciences
BIO	Directorate for Biological Sciences
BioMaPS	Research at the Interface of Biological, Mathematical, and Physical Sciences
BRAIN	Brain Research through Advancing Innovative Neurotechnologies
CAN	Cures Acceleration Network
CAUSE	Catalyzing and Advancing Undergraduate STEM Education
CEMMSS	Cyber-enabled Materials, Manufacturing, and Smart Systems
CIF21	Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education
CRF	Construction of Research Facilities
DARPA	Defense Advanced Projects Research Agency
DHS	Department of Homeland Security
DKIST	Daniel K. Inouye Solar Telescope
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOT	Department of Transportation
EERE	Office of Energy Efficiency and Renewable Energy
EHR	Education and Human Resources
EPA	Environmental Protection Agency
EPM	Environmental Program and Management
EPSCoR	Experimental Program to Stimulate Competitive Research
ERS	Economic Research Service
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FHWA	Federal Highway Administration
FIC	Fogarty International Center
GAO	Government Accountability Office
GDP	Gross Domestic Product
GEO	Directorate for Geosciences
GRF	Graduate Research Fellowship
GRO	Greater Research Opportunities
GWOT	Global War on Terror
HHS	Department of Health and Human Services
ICER	Integrative and Collaborative Education and Research

ICs	Institutes and Centers
IFF	Iraqi Freedom Fund
IG	Inspector General
IGERT	Integrative Graduate Education and Research Traineeship
ISS	International Space Station
ITER	International Thermonuclear Experimental Reactor
ITS	Industrial Technology Services
IUSE	Improving Undergraduate STEM Education
JIEDDF	Joint Improvised Explosive Device Defeat Fund
LBNE	Long Baseline Neutrino Experiment
LCLS-II	Linac Coherent Light Source II
LSST	Large Synoptic Survey Telescope
MEP	Manufacturing Extension Partnership
MGI	Materials Genome Initiative
MPCV	Multipurpose Crew Vehicle
MREFC	Major Research Equipment and Facilities Construction
Mu2e	Muon to Electron Conversion Experiment
MRAPVF	Mine Resistant and Ambush Protected Vehicle Fund
NASA	National Aeronautics and Space Administration
NASS	National Agricultural Statistics Service
NBAF	National Bio and Agro-Defense Facility
NCATS	National Center for Advancing Translational Sciences
NCCAM	National Center for Complementary and Alternative Medicine
NCI	National Cancer Institute
NCSES	National Center for Science and Engineering Statistics
NEI	National Eye Institute
NEON	National Ecological Observatory Network
NESDIS	National Environmental Satellite, Data, and Information Service
NHGRI	National Human Genome Research Institute
NHLBI	National Heart, Lung, and Blood Institute
NIA	National Institute on Aging
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NIAID	National Institute of Allergy and Infectious Diseases
NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases
NIBIB	National Institute of Biomedical Imaging and Bioengineering
NICHD	National Institute of Child Health and Human Development
NIDA	National Institute on Drug Abuse
NIDCD	National Institute on Deafness and Other Communication Disorders
NIDCR	National Institute of Dental and Craniofacial Research
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIEHS	National Institute of Environmental Health Sciences
NIFA	National Institute of Food and Agriculture
NIGMS	National Institute of General Medical Sciences
NIH	National Institutes of Health
NIMH	National Institute of Mental Health
NIMHD	National Institute on Minority Health and Health Disparities
NINDS	National Institute of Neurological Disorders and Stroke
NINR	National Institute of Nursing Research
NIST	National Institute of Standards and Technology
NITRD	Networking and Information Technology Research and Development

NLM	National Library of Medicine
NMFS	National Marine Fisheries Service
NNI	National Nanotechnology Initiative
NNMI	National Network for Manufacturing Innovation
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRC	National Research Council
NRI	National Robotics Initiative
NRT	NSF Research Traineeships
NSB	National Science Board
NSLS-II	National Synchrotron Light Source II
NSTC	National Science and Technology Council
NWS	National Weather Service
OAR	Oceanic and Atmospheric Research
OCO	Overseas Contingency Operations
OCO-3	Orbiting Carbon Observatory 3
OGSI	Opportunity, Growth, and Security Initiative
OMAO	Office of Marine and Aviation Operations
OMB	Office of Management and Budget
OOI	Ocean Observatories Initiative
ORD	Office of Research and Development
OSTP	Office of Science and Technology Policy
PHS	Public Health Service
R&D	Research and Development
R&E	Research and Experimentation
RDT&E	Research, Development, Test, and Evaluation
RE&D	Research, Engineering, and Development
REE	Research, Education, and Economics
REU	Research Experiences for Undergraduates
RIID	Radioisotope Identification Device
RITA	Research and Innovative Technology Administration
RPG	Research Project Grant
RRA	Research and Related Activities
S&T	Science and Technology
SaTC	Secure and Trustworthy Cyberspace
SBE	Social, Behavioral and Economic Sciences
SEES	Science, Engineering, and Education for Sustainability
SIR	Surveys, Investigations, and Research
SLS	Space Launch System
SOFIA	Stratospheric Observatory for Infrared Astronomy
SSW	Safe and Sustainable Water
STAG	State and Tribal Assistance Grants
STAR	Science to Achieve Results
STEM	Science, Technology, Engineering, and Mathematics
STRS	Scientific and Technical Research and Services
USARC	U.S. Arctic Research Commission
USDA	Department of Agriculture
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VA	Veterans Administration

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