

19. RESEARCH AND DEVELOPMENT

The President is committed to making investments in research and development (R&D) that will grow our economy, sustain our competitive advantage in the global economy, and enable America to remain the world leader in innovation. The Nation depends on science, technology, and innovation to promote sustainable economic growth and job creation, maintain a safe and sufficient food supply, improve the health of all Americans, move us toward a clean energy future, address global climate change, manage competing demands on environmental resources, and ensure the security of the Nation. Investing in science and technology-based innovation will let us do things like produce vaccines that stay ahead of drug-resistant bacteria, find new answers in the fight against Alzheimer's and other diseases, devise new clean energy technologies, and promote new advanced manufacturing opportunities in areas such as new materials.

The President's 2016 Budget provides \$146 billion for Federal research and development (R&D), including the

conduct of R&D and investments in R&D facilities and equipment. Detailed definitions and discussion of the reporting process are available in Section II below. The Administration continues to champion R&D, providing a 5.5 percent funding increase over 2015 enacted levels¹ for R&D. In conjunction with this investment, the 2016 Budget proposes to expand, simplify, and make permanent the Research and Experimentation tax credit, providing certainty and spurring private investment in R&D.

Finally, the 2016 Budget continues to strengthen U.S. international leadership by investing in the high-tech knowledge-based economy and innovation-fueled growth industries. The Budget will help ensure that the U.S. continues its long-standing and robust leadership in public and private sector R&D and maintains the high quality of our R&D institutions and the entrepreneurial nature of our R&D enterprise.

¹ R&D spending figures for FY 2015 are preliminary and may change as agency operating plans are finalized.

I. PRIORITIES FOR FEDERAL RESEARCH AND DEVELOPMENT

The Budget provides support for a broad spectrum of research and development, including multidisciplinary research and exploratory, potentially transformative, high-risk research proposals that could fundamentally improve our understanding of nature, revolutionize fields of science, and lead to the development of radically new technologies. Federal government funding for R&D is essential to address societal needs in areas in which the private sector does not have sufficient economic incentive to make the required investments. Key among these is the fundamental, curiosity-driven inquiry that has been a hallmark of the American research enterprise and a powerful driver of unexpected, new technology. The Budget provides \$67 billion for basic and applied research because such research is a reliable source of new knowledge, which in turn drives job creation and lasting economic growth.

The 2016 Budget continues to increase total Federal investment in the combined budgets of three key basic research agencies: the National Science Foundation (NSF), the Department of Energy (DOE) Office of Science, and the laboratories of the Department of Commerce (DOC) National Institute of Standards and Technology (NIST). The Budget proposes \$13.8 billion in 2016 for these three agencies, an increase of \$0.7 billion over the 2015 enacted level.

Promoting Advanced Manufacturing and Industries of the Future

The Administration is committed to revitalizing America's manufacturing sector, which will require in-

novation in the products that are manufactured and the manufacturing systems themselves. The Budget continues to support the "National Strategic Plan for Advanced Manufacturing," a blueprint for Federal efforts in partnership with industry and universities to develop and commercialize the emerging technologies that will create high-quality manufacturing jobs and sustain a renaissance in American manufacturing. The 2016 Budget provides \$2.4 billion for Federal R&D directly supporting advanced manufacturing at NSF, the Department of Defense (DOD), DOE, DOC, and other agencies, consistent with the goals and recommendations of the Strategic Plan. The Budget funds a national network of 45 manufacturing innovation institutes that will position the United States as a global leader in advanced manufacturing technology. Specifically, the Budget builds on the nine institutes already funded through 2015 with more than \$350 million in additional discretionary funds to support seven new manufacturing innovation institutes in DOC, DOD, DOE, and the Department of Agriculture (USDA) which will solicit proposals on a wide-range of focus areas across the manufacturing sector. The Budget also includes a mandatory spending proposal of \$1.9 billion to fund the remaining 29 institutes in the network.

In addition, as part of the broader effort, the Budget continues to invest in the National Robotics Initiative to develop robots that work with or beside people to extend or augment human capabilities. In addition to having applications in space, biology, and security, robots have the potential to increase the productivity of workers in the manufacturing sector. Another important compo-

nent of the advanced manufacturing R&D strategy is the Materials Genome Initiative. By leveraging advances in computer simulations and the overall material knowledge-base, this initiative aims to increase the rate by which we understand and characterize new materials, providing a wealth of practical information that entrepreneurs and innovators will be able to use to develop new products and processes for U.S. firms.

Moving Toward Cleaner American Energy

The Administration is committed to a future where the United States leads the world in research, development, demonstration, and deployment of clean-energy technologies to reduce air pollution, greenhouse-gas emissions, and dependence on oil, while creating high-wage, highly-skilled clean energy jobs and new businesses. The Budget advances the Administration's all-of-the-above energy strategy by investing in programs to drive innovation in the energy sector. These investments include: basic and applied research to address some of the fundamental unknowns to advancing clean energy technologies; research and development to create and dramatically improve clean energy products, such as solar panels and wind turbines, advanced nuclear reactors, electric and other alternative-fuel vehicles, and energy efficient systems for homes and businesses; and appropriate assistance to American entrepreneurs and businesses to commercialize the technologies that will lead the world in new clean energy industries.

The Budget requests approximately \$7.4 billion for clean energy technology programs government-wide to accelerate the transition to a clean energy economy and position the United States as the world leader in the energy industries of the 21st Century. DOE, DOD, USDA, and NSF are the largest investors in clean energy technology programs, with DOE providing about 75 percent of the total government-wide funding.

In DOE, the 2016 Budget provides about \$5.6 billion in discretionary funding for clean energy technology programs. Specifically, it provides \$2.7 billion for the Office of Energy Efficiency and Renewable Energy (EERE) to accelerate research and development, build on ongoing successes, increase the use of critical clean energy technologies, and further reduce costs. Within EERE, the Budget increases funding by 32 percent above 2015 enacted levels for sustainable vehicle and fuel technologies, by 60 percent for energy efficiency and advanced manufacturing activities, and by 41 percent for innovative renewable power projects. The USDA pursues complementary biofuel efforts to support development of next-generation biofuels. The Budget supports clean energy R&D through the Office of Nuclear Energy and Office of Fossil Energy, including funding for advanced reactors R&D, quantification and mitigation of methane emissions from natural gas infrastructure, and activities primarily dedicated to further lowering the costs of carbon capture and storage. The Budget includes \$325 million for the Advanced Research Projects Agency–Energy (ARPA-E), a program that seeks to fund transformative energy research, and

over \$900 million for basic clean energy research in the Office of Science.

Observing our Planet

Earth-observation data are necessary for government services that protect human life, property, the economy, and national security, as well as advancing fundamental understanding of the Earth. The Budget supports investments in Earth observations, such as Earth-observing satellites and monitoring of water, air, wildlife, invasive species, and ecosystems, consistent with the 2014 National Plan for Civil Earth Observations. Within the National Aeronautics and Space Administration (NASA), the Budget provides \$1.9 billion to sustain progress toward satellite missions and research that will improve our understanding of Earth, its atmosphere, and oceans. The Budget provides \$2.2 billion for the National Oceanic and Atmospheric Administration's satellite programs, including the next generation of polar-orbiting and geostationary satellite systems that are critical to weather forecasting. Satellite observations contribute directly to the National Weather Service's ability to issue public warnings to protect life and property. The Budget also proposes funding for the Sustainable Land Imaging program, jointly managed by NASA and the Department of Interior's U.S. Geological Survey, to continue the 42-year unbroken record of global land-imaging measurements made by the Landsat series of satellites. Consistent with the Administration's open data initiative, the Budget continues investments across multiple agencies in improving the accessibility and usability of Earth-observing data.

Understanding and Responding to Global Climate Change and Its Impacts

The President's Climate Action Plan provides a blueprint for responsible national and international action to slow the effects of climate change. The year 2014 ranks as Earth's warmest since 1880, and 14 of the 15 warmest years on record have all fallen in the first 15 years of this century. One of the key activities supported in the Climate Action Plan is actionable climate science, which is critical in helping government officials, communities, and businesses better understand and manage the risks associated with climate change. In support of this goal, the Administration has continued, through the U.S. Global Change Research Program (USGCRP), to advance actionable climate science to improve our understanding of climate change and its impacts, requesting approximately \$2.7 billion for these programs. The USGCRP coordinates and integrates Federal research and applications to assist the Nation and the world in understanding, assessing, predicting, and responding to the human-induced and natural processes of climate change and their related impacts and effects. Within coordinated USGCRP inter-agency investments, the 2016 Budget supports the goals set forth in the program's 2012-2021 strategic plan, which include: advancing scientific knowledge of the integrated natural and human components of the Earth; providing the scientific basis to inform and enable timely decisions on adaptation and mitigation; building sustained

assessment capacity that improves the United States' ability to document changes on the regional, landscape, and local level to understand, anticipate, and respond to climate change impacts and vulnerabilities; and advancing communications and education to broaden public understanding of climate change. The 2016 Budget also supports an integrated suite of climate change observations, process-based research, modeling and assessment and adaptation science activities that serve as a foundation for providing timely and responsive information, including but not limited to technical reports, impact and vulnerability assessments, and adaptation response strategies to a broad array of stakeholders. The Budget also invests in science to understand our national and global carbon stocks and sinks in order to implement carbon mitigation strategies. In addition, the Budget makes significant investments in technology and tools to support the climate resilience and preparedness of the Federal government and its State, tribal, and local partners. This includes \$20 million to continue expanding and improving the recently-released online Climate Resilience Toolkit, which provides scientific tools and information to help tribes, communities, citizens, businesses, planners, and others manage their climate-related risks and opportunities, and improve their resilience to extreme events. Through this website, interested parties can access a variety of tools and data streams to help them understand how certain changes in environmental conditions—such as sea level rise and flooding, or droughts and wildfires—may impact their communities.

Informing Better Stewardship of Natural Resources and Our Environment

Sustainable stewardship of natural resources requires strong investments in research and development in the natural sciences to strengthen the scientific basis for decision-making. The 2016 Budget provides robust R&D funding to support resource decision making and environmental stewardship at the Department of the Interior, Environmental Protection Agency, National Oceanic and Atmospheric Administration, and USDA, particularly through user-driven information and tools. The Budget provides strong support for science to inform ocean and coastal stewardship, with investments in ocean observations and exploration, coastal mapping and assessment, coastal ecosystem research, and coastal habitat restoration. The Budget strengthens investments in the safety and security of the Nation through research and development related to hazards such as earthquakes, floods, and extreme weather. Responding to the President's Council of Advisors on Science and Technology report, "Agricultural Preparedness & the United States Agricultural Research Enterprise," the 2016 Budget invests \$450 million in USDA's Agriculture and Food Research Initiative, which will be distributed through competitively awarded extramural research grants to support breakthrough research in national priorities including water quantity and quality, sustainable agricultural production, and climate change, as well as bioenergy, food safety, and human nutrition.

Improving Americans' Health through Innovation in Life Sciences, Biology, and Neuroscience

The Administration is committed to funding Federal R&D investments in fundamental biological discovery research that could generate unexpected, high-impact scientific and technological advances in health. The 2016 Budget strongly supports research that has the potential to foster innovations in health and to accelerate the pace of discovery in the life sciences, especially combating antibiotic-resistant bacteria, neuroscience, and Precision Medicine – an innovative field that provides healthcare professionals with tools, knowledge, and treatments to tailor care to a person's unique characteristics such as their genetic makeup. These discoveries will help improve the prevention and treatment of diseases and support the bioeconomy of the future.

The 2016 Budget proposes \$31.3 billion for the National Institutes of Health (NIH) to support high-quality, innovative biomedical research both on-campus and at research institutions across the country. The Budget supports basic and translational research to increase understanding of the causes of disease and spur development of diagnostic tests, treatments, and cures. The Budget increases NIH investments in Alzheimer's disease research, and the multi-agency BRAIN initiative. The Budget includes \$200 million for NIH's contribution to a Precision Medicine Initiative that will launch a study of a million or more Americans, expand research to define cancer subtypes and identify new therapeutic targets. The Budget also includes over \$450 million for research at NIH on antibiotic-resistant bacteria. The NIH investment is part of a \$1.2 billion effort from many bureaus of the Department of Health and Human Services, as well as the Departments of Veterans Affairs, DOD and USDA, to combat antibiotic-resistant bacteria. These resources will be used to prevent, detect, and control illness and death related to infections caused by antibiotic-resistant bacteria and will also help support the advancement of therapeutics for the treatment of bacterial infections.

The Budget includes over \$506 million in mandatory R&D funding for the independent Patient-Centered Outcomes Research Institute to conduct clinical comparative effectiveness research, as authorized by the Affordable Care Act.

The Budget also proposes \$1.1 billion for medical and prosthetic research across the Department of Veterans Affairs.

Strengthening Our Security through Science and Technology

Federal R&D investments in security aim to meet the threats of the future and to develop new innovative security capabilities. DOD R&D investments in the 2016 Budget focus on areas deemed to have the greatest impact on our nation and future military requirements. To this end, the 2016 Budget provides \$71.3 billion for DOD R&D, an increase of 9% percent from the 2015 enacted level.

The 2016 Budget proposes \$12.3 billion for DOD's Science & Technology program, a subset of DOD R&D which consists of basic research, applied research and advanced technology development.

The 2016 Budget also maintains DOD's critical role in fostering breakthrough approaches for discovering promising technologies with \$3.0 billion for the Defense Advanced Research Projects Agency (DARPA), which promotes advanced research to create breakthrough technologies for tomorrow's military systems. This funding level represents an increase of \$101 million from the 2015 enacted level. Investing in DARPA's high-risk and high-reward science is an Administration priority and critical to maintaining the technological superiority of the U.S. military.

For DOE, the Budget proposes \$4.8 billion for investments in R&D for the Nation's nuclear stockpile, naval nuclear propulsion, and nonproliferation goals.

The Budget supports investments in state-of-the-art technologies and solutions for Federal, State, and local homeland security operators, including \$559 million in funding for the Department of Homeland Security R&D programs that protect the Nation's people and critical infrastructure from chemical, biological, radiological, nuclear, and cyber attacks.

Preparing Our Students with Skills through Science, Technology, Engineering, and Mathematics (STEM) Education

Our Nation's competitiveness depends on our ability to improve and expand STEM learning in the United States. Over the past two years, the Administration has made considerable progress towards creating a more cohesive framework for delivering STEM education. Guided

by the Federal STEM Education Five-Year Strategic Plan and a significant reorganization of programs, agencies are increasing coordination, strengthening partnerships, and identifying ways to leverage existing resources to improve the reach of agency assets. The 2016 Budget builds on these efforts and continues to reduce fragmentation, ensuring that investments are aligned with the Strategic Plan and support effective programs with strategic approaches to evaluation. The Budget invests \$3.1 billion in STEM education programs, \$103 million above 2015 enacted, including \$202 million for K-12 education in the Department of Education's Math and Science Partnerships, and \$338 million for graduate fellowships, \$62 million for graduate traineeships, and \$135 million for improving undergraduate education at the NSF.

Expanding Our Capabilities in Space

The Budget provides \$18.5 billion for NASA to support the President's vision for innovation and scientific discovery on Earth and beyond. NASA drives innovation in the aerospace sector and enhances the Nation's capabilities in space in areas such as communications, space-based observations, space transportation, scientific discovery, and national defense. The Budget provides \$1.2 billion for the Commercial Crew program, which will develop lower-cost means to transport astronauts to orbit and eliminate our reliance on Russia for crew transport to the International Space Station. The Budget also provides \$725 million for Space Technology and \$230 million for Advanced Exploration Systems to develop technologies that will reduce the cost and increase the capabilities of NASA, other government, and commercial space activities.

II. FEDERAL R&D DATA

R&D is defined as the collection of efforts directed toward gaining greater knowledge or understanding and applying knowledge toward the production of useful materials, devices, and methods. R&D investments can be characterized as basic research, applied research, development, R&D equipment, or R&D facilities. The Office of Management and Budget has used those or similar categories in its collection of R&D data since 1949.

Background on Federal R&D Funding

More than 20 Federal agencies fund R&D in the United States. The character of the R&D that these agencies fund depends on the mission of each agency and on the role of R&D in accomplishing it. Table 19-1 shows agency-by-agency spending on basic research, applied research, development, and R&D equipment and facilities.

Basic research is systematic study directed toward a 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 is systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development is 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.

Research and development equipment includes acquisition or design and production of movable equipment, such as spectrometers, research satellites, detectors, and other instruments. At a minimum, this category includes programs devoted to the purchase or construction of R&D equipment.

Research and development facilities include 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. This category includes such fixed facilities as reactors, wind tunnels, and particle accelerators.

While the definitions for R&D activities have been stable for decades, interpretations of which programs are conducting R&D can vary with time. Government-wide efforts are underway to increase the accuracy and consistency of R&D budget. In the 2016 Budget, additional accounts within DOD have begun reporting \$1.5 to \$1.9

billion in R&D activities for the years covered in Table 19-1. At the Federal Aviation Administration, the application of the R&D definitions has been reanalyzed at the program level, leading to an increase in R&D reporting for this year versus previous Budgets.

III. OTHER MULTI-AGENCY R&D ACTIVITIES

Many research investments into the most promising areas for future industry, scientific discovery, and job creation are being addressed through multi-agency research activities coordinated through the National Science and Technology Council (NSTC) and other interagency forums. Most of these challenges simply cannot be addressed effectively by a single agency. Moreover, innovation often arises from combining the tools, techniques, and insights from multiple agencies. Details of two such interagency efforts – networking and information technology R&D and nanotechnology R&D – are described below.

Networking and Information Technology R&D: Federal IT R&D, which launched and fueled the digital revolution, continues to drive innovation in scientific research, national security, communication, and commerce to sustain U.S. technological leadership. The multi-agency Networking and Information Technology Research and Development (NITRD) Program provides strategic planning for and coordination of agency research efforts in big data, cyber-physical systems, cybersecurity, health IT high-confidence systems, high-end computing systems, human computer interaction, IT workforce development, large-scale networking, software design, wireless spectrum sharing, and other research relevant to advanced information technologies.

The 2016 Budget includes a focus on research to address the challenges and opportunities afforded by big data while providing appropriate privacy protections for personal data. The Budget continues to prioritize cybersecurity research to develop novel approaches and technologies that can protect U.S. systems from cyberattacks, to emphasize research that advances cyber-physical systems and the efficient use of wireless spectrum, and to promote high-end computing. The 2016 Budget also provides \$242 million to support the National Strategic

Computing Initiative within the DOE to promote innovation in high-performance computing to support national security, scientific discovery, and economic competitiveness. Budget information for NITRD is available at www.nitrd.gov.

Nanotechnology R&D: Working cooperatively through the National Nanotechnology Initiative (NNI), Federal agencies continue to support R&D aimed at creating a future in which the ability to understand and control matter at the nanoscale leads to a revolution in technology and industry that benefits society. Agencies participating in the NNI conduct R&D on materials, devices, and systems that exploit the unique physical, chemical, and biological properties that emerge in materials at the nanoscale (approximately 1 to 100 nanometers). Participating agencies continue to support fundamental research for nanotechnology-based innovation, technology transfer, and nanomanufacturing through individual investigator awards; multidisciplinary centers of excellence; education and training; and infrastructure and standards development, including openly-accessible user facilities and networks. NNI agencies will also continue their strong support for R&D on the environmental, health, and safety aspects of nanotechnology needed to ensure responsible development. NNI agencies and the National Nanotechnology Coordination Office (NNCO) will work with the business community, state and local governments, and the private sector to explore new approaches and leverage existing programs to foster broader commercialization of nanotechnology-enabled products. In addition, NNI agencies and the NNCO will continue to expand stakeholder engagement to advance nanotechnology-based STEM education, training, and outreach. Budget information is available at www.nano.gov.

IV. R&D IS AN INVESTMENT IN AMERICA'S FUTURE

America's long-term economic competitiveness and growth -- including sustaining efforts to grow domestic manufacturing -- also depend on robust investments in research and development (R&D), which provide the foundation needed to further grow the economy. Federal funding for R&D has helped lead to new products, new capabilities, and new industries, resulting in sustainable economic growth and highly-skilled, high-wage jobs,

as well as the creation of an astounding array of products and services that benefit every American. Today, we look to engineering and science to address our biggest challenges: creating jobs; improving the health of all Americans; enhancing access to clean energy, water, and food; addressing global climate change; managing competing demands on environmental resources; and ensuring the security of the Nation.

Table 19-1. FEDERAL RESEARCH AND DEVELOPMENT SPENDING

(Budget authority, dollar amounts in millions)

	2014 Actual	2015 Enacted	2016 Proposed	Dollar Change: 2015 to 2016	Percent Change: 2015 to 2016
By Agency¹					
Defense ²	66,018	67,451	72,121	4,670	7%
Health and Human Services	30,685	30,475	31,040	565	2%
Energy	11,996	11,736	12,597	861	7%
NASA	11,906	12,145	12,238	93	1%
National Science Foundation	5,827	5,999	6,309	310	5%
Agriculture	2,380	2,446	2,884	438	18%
Commerce	1,556	1,526	2,127	601	39%
Veterans Affairs	1,101	1,090	1,147	57	5%
Transportation ³	853	900	1,115	215	24%
Interior	840	904	985	81	9%
Patient-Centered Outcomes Research Trust Fund	297	506	578	72	14%
Homeland Security ⁴	1,032	1,032	569	-463	-45%
Environmental Protection Agency	539	523	559	36	7%
Education	315	333	279	-54	-16%
Smithsonian Institution	227	245	261	16	7%
Other	763	758	885	127	17%
TOTAL	136,335	138,069	145,694	7,625	6%
Basic Research					
Defense	2,112	2,292	2,101	-191	-8%
Health and Human Services	15,862	15,482	15,966	484	3%
Energy	4,095	4,120	4,245	125	3%
NASA	3,371	3,198	3,198	0	0%
National Science Foundation	4,752	4,834	5,062	228	5%
Agriculture	992	1,004	1,114	110	11%
Commerce	205	210	239	29	14%
Veterans Affairs	451	429	450	21	5%
Transportation .....	.....	.....	.....	.....	.....
Interior	52	53	61	8	15%
Patient-Centered Outcomes Research Trust Fund .....	.....	.....	.....	.....	.....
Homeland Security ⁴	41	41	41	0	0%
Environmental Protection Agency .....	.....	.....	.....	.....	.....
Education	27	6	7	1	17%
Smithsonian Institution	200	209	225	16	8%
Other	27	19	19	0	0%
SUBTOTAL	32,187	31,897	32,728	831	3%
Applied Research					
Defense	4,664	4,775	4,819	44	1%
Health and Human Services	14,621	14,791	14,864	73	0%
Energy	4,550	4,363	4,683	320	7%
NASA	2,358	2,402	2,480	78	3%
National Science Foundation	678	728	802	74	10%
Agriculture	1,090	1,105	1,251	146	13%
Commerce	1,053	919	1,086	167	18%
Veterans Affairs	583	564	597	33	6%
Transportation	635	673	766	93	14%
Interior	665	701	785	84	12%
Patient-Centered Outcomes Research Trust Fund	297	506	578	72	14%
Homeland Security ⁴	210	210	176	-34	-16%
Environmental Protection Agency	456	442	474	32	7%
Education	179	199	159	-40	-20%
Smithsonian Institution .....	.....	.....	.....	.....	.....
Other	507	533	626	93	17%
SUBTOTAL	32,546	32,911	34,146	1,235	4%

Table 19-1. FEDERAL RESEARCH AND DEVELOPMENT SPENDING—Continued
(Budget authority, dollar amounts in millions)

	2014 Actual	2015 Enacted	2016 Proposed	Dollar Change: 2015 to 2016	Percent Change: 2015 to 2016
Development					
Defense ²	58,986	60,366	65,036	4,670	8%
Health and Human Services	30	30	30	0	0%
Energy	2,559	2,322	2,621	299	13%
NASA	6,004	6,481	6,423	-58	-1%
National Science Foundation .....	.....	.....	.....	.....	.....
Agriculture	179	177	181	4	2%
Commerce	85	164	400	236	144%
Veterans Affairs	67	66	67	1	2%
Transportation	198	199	304	105	53%
Interior	107	110	113	3	3%
Patient-Centered Outcomes Research Trust Fund .....	.....	.....	.....	.....	.....
Homeland Security ⁴	348	348	344	-4	-1%
Environmental Protection Agency	78	76	80	4	5%
Education	109	128	113	-15	-12%
Smithsonian Institution .....	.....	.....	.....	.....	.....
Other	235	215	264	49	23%
SUBTOTAL	68,985	70,682	75,976	5,294	7%
Facilities and Equipment					
Defense	256	18	165	147	817%
Health and Human Services	172	172	180	8	5%
Energy	792	931	1,048	117	13%
NASA	173	64	137	73	114%
National Science Foundation	397	437	445	8	2%
Agriculture	119	160	338	178	111%
Commerce	213	233	402	169	73%
Veterans Affairs .....	.....	31	33	2	6%
Transportation	20	28	45	17	61%
Interior	13	39	2	-37	-95%
Patient-Centered Outcomes Research Trust Fund .....	.....	.....	.....	.....	.....
Homeland Security ⁴	433	433	8	-425	-98%
Environmental Protection Agency	5	5	5	0	0%
Education .....	.....	.....	.....	.....	.....
Smithsonian Institution	27	36	36	0	0%
Other	-3	-8	.....	.....	.....
SUBTOTAL	2,617	2,579	2,844	265	10%

¹ Some numbers in the chapter text include non-R&D activities and thus will be different from the R&D numbers in this table.

² In this Budget, Department of Defense began reporting development activities from three additional accounts, adding \$1.9 billion in FY 2014, \$1.8 billion in FY 2015, and \$1.5 billion in FY 2016.

³ Classification of R&D activities at the Federal Aviation Administration have been recently updated.

⁴ As of the date the 2016 Budget was released, final 2015 appropriations for the Department of Homeland Security were not yet enacted. Therefore, the 2015 column of this table reflects amounts requested for the Department of Homeland Security in the 2015 Budget.