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If there is any good news for federal R&D programs next fiscal year, it's that there almost certainly will be an R&D budget. That's because last December's Bipartisan Budget Act established caps on discretionary spending for fiscal year 2015 as well as for the current year. For the first time in three years, lawmakers are following the regular order for the appropriations process, in which House and Senate bills are drafted, approved, reconciled, and sent to the president. Gone, at least temporarily, are the partisan budget squabbles that resulted in last fall's government shutdown, a succession of stopgap spending bills, and finally, a massive catch-all spending bill in January. In FY 2013 funding had simply been extended throughout the year at the FY 2012 level.

The bad news for science is that the budget agreements leave virtually no room for increases, for R&D or anything else: Overall federal discretionary spending can rise by only a minuscule 0.2% in FY 2015. The president's request of $135 billion for R&D represents an increase of 1.2% from FY 2014, about 0.5% below the rate of inflation. Basic research would decline 1%, to $32.1 billion. "All of us would have preferred more," admitted White House science adviser John Holdren when he presented the R&D budget to reporters on 4 March. Defense-related R&D, which includes the Department of Defense and the nuclear weapons programs at the Department of Energy, would total $69.4 billion next year, compared with the proposed $65.9 billion for nondefense programs.

In a bid to supplement his budget request, Obama proposed to create the $56 billion Opportunity, Growth, and Security Initiative (OGSI). That expenditure, which would include $5.3 billion for R&D, would be offset with new revenues provided by a combination of tax increases on wealthy individuals and savings from reforms to crop insurance and other federal programs.

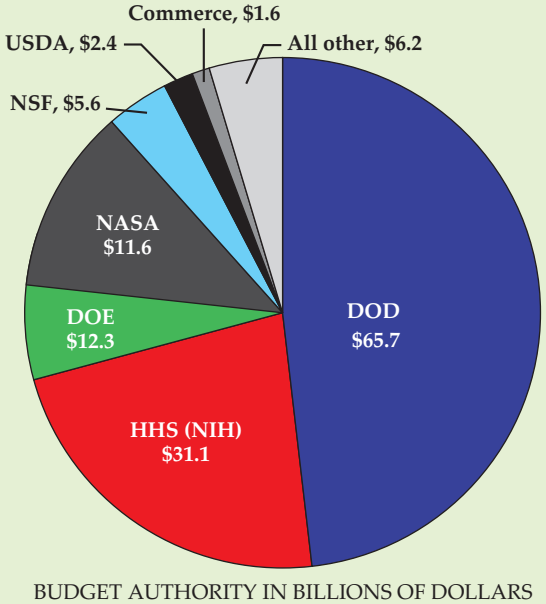
Appearing before the House Committee on Science, Space, and Technology on 26 March, Holdren repeatedly urged lawmakers to approve the OGSI while admitting that the base budget isn't enough to cover all the administration's R&D priorities. The proposal, however, was immediately dismissed by House speaker John Boehner (R-OH) as "irresponsible," and it is unlikely to be approved by Congress. Science committee chairman Lamar Smith (R-TX) told Holdren that the George W. Bush administration's R&D budgets had been larger than Obama's. Holdren countered that Bush did not have to deal with mandatory spending caps imposed by the budget agreement.

Gone from this year's request is any mention of the Obama administration's repeatedly stated goal of doubling the budgets of three agencies that together supply most of the support for basic research in the physical sciences: NSF, DOE's Office of Science, and NIST's laboratory programs. Budget documents note that the proposal includes a combined $200 million increase for the three agencies, to a level of $13 billion. The doubling had been a goal of the George W. Bush administration as well, though neither president provided nearly the amount of annual increases that would be required to accomplish that mark over a 10-year period.

The Obama administration proposes to spend $2.9 billion on federal science, technology, engineering, and mathematics (STEM) education programs in FY 2015, an increase of 3.7% over FY 2014. Holdren said the administration has dropped its FY 2014 plan to transfer various STEM education programs across agencies. It now proposes instead to reorganize and consolidate those programs within agencies to minimize duplication.

Funding for advanced manufacturing R&D, conducted at multiple agencies including DOE and NIST, would rise 12%, to $2.2 billion. DOE's advanced manufacturing office would

Total R&D by agency, FY 2015



BUDGET AUTHORITY IN BILLIONS OF DOLLARS

Total R&D = $136.5 billion

Source: American Association for the Advancement of Science

Federal funding for R&D would increase by 1.2% under President Obama's fiscal year 2015 budget request. The request includes $32.1 billion for basic research, a 1% decrease from its FY 2014 level, and applied research would increase 1.8%, to $32.6 billion. Defense-related R&D would increase 1.7%, and nondefense would rise 0.7%. Advanced manufacturing R&D would leap by 12%, to $2.2 billion. Note: AAAS figures differ slightly from Office of Science and Technology Policy R&D totals. Opportunity, Growth and Security funding not included in chart.

receive $305 million to develop and commercialize emerging energy-efficient and crosscutting manufacturing technologies. Among other multiagency R&D programs, the US Global Change Research Program would receive $2.5 billion, a 0.5% increase from the current-year level. Support for the National Nanotechnology Initiative would remain even with the current year at $1.5 billion, and networking and information technology R&D would decline 2.9%, to $3.8 billion.

The FY 2015 budget continues a multiyear trend of slowing R&D growth in the US, where industry funds roughly two-thirds of R&D. Figures from *Science and Engineering Indicators* published by the National Science Board in February show that US public and private R&D in 2011, after adjustment for inflation, was slightly below that of 2008. In current-dollar terms, US total R&D increased at an annual rate of 4.4% in the 10 years ending in 2011. By contrast, China's total R&D expenditures grew at a rate of 20.7%, although China's spending of $208 billion in 2011 was less than half of the US total of $429 billion. The year 2011 is the latest for which figures are available, but former acting NSF director Cora Marrett told lawmakers that the trends are continuing. In their annual R&D outlook released last December, the Battelle organization and *R&D Magazine* predicted that China will surpass the US in R&D expenditures by 2022.

Following are highlights from the agencies that support most of the federal government's R&D in the physical sciences.

Department of Energy

While DOE would receive the biggest increase among the R&D agencies, the growth would be largely confined to the energy efficiency and renewable energy office, which is set to jump 22%. The weapons programs of the semiautonomous National Nuclear Security Administration (NNSA) would increase 10%.

The Office of Science, which supports most of the basic science programs at DOE, would increase just 0.9%. Fusion research would decline sharply, and the US contribution to ITER, the international fusion test reactor being built in Cadarache, France, would decline to $150 million, from $199 million this year. That is well below the administration's self-imposed $225 million cap on the US annual contribution (see PHYSICS TODAY, February 2014, page 20). Testifying before the House Appropria-

Department of Energy R&D programs

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
Total DOE	27 225	27 940	2.6
DOE R&D	12 205	12 968	6.2
Office of Science	5 066	5 111	0.9
Total high-energy physics (HEP)	797	744	−6.6
Energy frontier experimental physics	155	154	−0.7
Research	96	81	−15.6
Facilities	59	58	−1.8
Projects	—	15	—
Intensity frontier experimental physics	275	251	−8.6
Research	52	51	−2.1
Facility operations and experimental support	185	175	−5.7
Projects	37	25	−32.5
Cosmic frontier experimental physics	99	101	2.2
Research	62	49	−22.1
Facility operations and experimental support	12	12	−2.7
Projects	25	41	66.0
Theoretical and computational physics	63	59	−6.4
Research	60	58	−3.0
Theory	51	50	−3.0
Computational HEP	8	8	−3.0
Projects	3	1	−69.0
Advanced technology R&D (accelerators and detectors)	122	114	−6.6
Research	105	97	−7.9
HEP general accelerator R&D	58	48	−17.5
HEP directed accelerator R&D	23	26	10.6
Detector R&D	24	23	−3.0
Facility operations and experimental support	17	17	1.4
Accelerator stewardship	10	19	93.2
Construction	51	25	−51.0
Long Baseline Neutrino Experiment	16	—	−100.0
Muon to Electron Conversion Experiment	35	25	−28.6
SBIR/STTR	22	21	−4.7
Total nuclear physics	569	594	4.3
Medium-energy nuclear physics	149	150	0.8
Research	37	36	−2.3
Operations	94	96	1.6
SBIR/STTR and other	17	18	2.9
Heavy-ion nuclear physics	200	199	−0.4
Research	35	34	−2.1
Operations (primarily RHIC)	165	165	—
Low-energy nuclear physics	76	75	−0.6
Research	49	48	−1.5
Operations (primarily ATLAS)	27	27	1.1
Nuclear theory	45	43	−4.5
Isotope development and production	19	20	2.3
Construction	80	106	32.3
CEBAF upgrade	25	16	−35.3
Facility for Rare Isotope Beams	55	90	63.6
Total fusion energy sciences	505	416	−17.6
Science	177	154	−12.7
Facility operations	104	90	−13.9
Enabling R&D	24	22	−9.6
ITER	199	150	−24.8
Total basic energy sciences	1 712	1 806	5.5
Materials sciences	363	387	6.6
Chemical sciences, geosciences, and energy biosciences	316	316	—
Energy frontier research centers†	100	100	—
Energy innovation hubs†	48	48	—
Total scientific user facility operations	931	965	3.6
Advanced Light Source, LBNL	60	63	5.5
Advanced Photon Source, ANL	123	130	5.6
National Synchrotron Light Source, BNL	30	5	−81.7
National Synchrotron Light Source II, BNL	56	115	105.0
Center for Nanophase Materials Sciences, ORNL	20	24	19.6
Center for Integrated Nanotechnologies, SNL/LANL	21	22	5.0
Molecular Foundry, LBNL	20	28	37.0
Center for Nanoscale Materials, ANL	20	24	21.4
Center for Functional Nanomaterials, BNL	20	21	5.6
Stanford Synchrotron Radiation Laboratory, SLAC	38	39	1.0
High Flux Isotope Reactor, ORNL	58	60	3.5
Manuel Lujan Jr Neutron Scattering Center, LANL	9	2	−77.5
Spallation Neutron Source, ORNL	179	186	4.2
Linac Coherent Light Source, SLAC	124	132	5.7
Other project costs, major equipment, research, SBIR	152	113	−25.5

Department of Energy R&D programs (continued)

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
Construction	102	139	36.2
National Synchrotron Light Source II, BNL	26	—	–100.0
Linac Coherent Light Source II, SLAC	76	139	83.2
Advanced scientific computing research	478	541	13.2
Biological and environmental research	610	628	3.0
Science laboratories and infrastructure	98	79	–19.0
Program direction	185	189	2.4
Workforce development for teachers and scientists	26	19	–26.4
Safeguards and security	87	94	8.0
Advanced Research Projects Agency–Energy	280	325	16.1
Fossil energy R&D	562	475	–15.4
Nuclear energy R&D	888	863	–2.8
Energy efficiency and renewable energy	1 901	2 317	21.9
Electricity delivery and energy reliability	147	180	22.2
Total National Nuclear Security Administration R&D	3 343	3 684	10.2
Total weapons science, technology, and engineering	1 779	1 946	9.4
Science campaigns	370	456	23.4
Engineering campaigns	150	136	–9.3
Advanced simulation and computing	569	610	7.2
Inertial confinement fusion	514	513	–0.2
Directed stockpile work R&D‡	176	231	31.3
Nonproliferation and verification R&D	469	361	–23.0
Naval reactors	1 095	1 377	25.8
Environmental management R&D	18	13	–27.7

*Figures are rounded to the nearest million. Changes are calculated from unrounded figures.
†Funding for the energy frontier research centers and energy innovation hubs is provided equally by the material sciences and chemical sciences, geosciences and biosciences programs.
‡Includes the R&D support and R&D certification and safety items of the directed stockpile work program.
ANL, Argonne National Laboratory. ATLAS, Argonne Tandem Linac Accelerator System. BNL, Brookhaven National Laboratory. CEBAF, Continuous Electron Beam Accelerator Facility. LANL, Los Alamos National Laboratory. LBNL, Lawrence Berkeley National Laboratory. ORNL, Oak Ridge National Laboratory. RHIC, Relativistic Heavy Ion Collider. SBIR, Small Business Innovation Research. SNL, Sandia National Laboratories. STTR, Small Business Technology Transfer.

NSF R&D programs

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
Total NSF	7 172	7 255	1.2
Research and related activities (R&RA)			
Mathematical and physical sciences (MPS)			
Mathematical sciences	226	224	–0.5
Astronomical sciences	239	236	–1.2
Physics	266	264	–1.0
Chemistry	236	237	0.6
Materials research	298	299	0.3
Multidisciplinary activities	35	35	—
Total MPS	1 300	1 296	–0.3
Geosciences (GEO)			
Atmospheric and geospace sciences	250	251	0.1
Earth sciences	178	178	0.1
Ocean sciences	356	357	0.1
Integrative and collaborative education and research	84	84	0.1
Polar programs	435	435	0.1
Total GEO	1 303	1 304	0.1
Engineering	851	858	0.8
Biological sciences	721	709	–1.8
Computer & Information Science & Engineering (CISE)			
Advanced cyberinfrastructure	212	212	—
Computer and network systems	220	220	—
Computing and communication foundations	185	185	—
Information and intelligent systems	185	185	—
Information technology research	90	90	–0.7
Total CISE	894	893	–0.1
Arctic research commission	1	1	8.1
Social, behavioral, and economic sciences	257	272	6.0
International and integrative activities	482	474	–1.6
Total R&RA	5 809	5 807	—
Major research equipment and facilities construction	200	201	0.4
Education and human resources	846	890	5.1
Agency operations and award management	298	338	13.5
National Science Board	4	4	1.6
Inspector general	14	14	1.6

*Figures are rounded to the nearest million. Changes are calculated from unrounded figures.

tions Committee on 25 March, Patricia Dehmer, acting director of the Office of Science, said the reduction in the ITER contribution was "in response to what's happening in the ITER organization"—the central office in Cadarache. Major management changes are under way there in response to a hard-hitting US review performed last year. Dehmer said the ITER organization has committed to providing a baseline cost estimate for the project by the summer of 2015. The administration "absolutely maintains its commitment" to the ITER agreement, Dehmer said, adding, "realistically we believe that our [budget] request will provide the ITER project what it needs for this year." But the US has never come close to meeting the schedule of its annual contributions that would be needed to complete ITER construction in the early 2020s.

The budget request also lops $40 million off the current year's appropriation for the domestic fusion program. In recent years Congress has supplemented the request for the domestic program and has twice refused the administration's request to shut down the Alcator C-Mod tokamak at MIT. This year's request would postpone that closure until late FY 2016.

A reduction to the high-energy physics program reflects the ramping down of some construction projects and a decision to delay construction of the Long-Baseline Neutrino Experiment until after the High Energy Physics Advisory Panel provides priority recommendations in May, Dehmer said. (See PHYSICS TODAY, October 2013, page 18.)

The FY 2015 request includes a 13.2% increase for the advanced scientific computing research program. Dehmer said the Office of Science's highest priority is to build an exascale computer by the early 2020s that is 500 to 1000 times more powerful than today's machines. The computer will be programmable and usable by the scientific community, will have reasonable power requirements, and will be built from commercial components. During the intervening years, she said, two to three generations of high-performance computers will be installed at Oak Ridge National Laboratory. The science office will collaborate with the NNSA on the exascale initiative.

The nuclear physics budget includes $90 million for construction of the Facility for Rare Isotope Beams at Michigan State University, an increase of $35 million from the FY 2014 appropriation. The $730 million facility is due for completion in 2022.

Within the $416 million increase requested for the energy efficiency and

renewable energy programs, support for sustainable vehicle and fuel technologies would increase 15%; energy efficiency and advanced manufacturing programs, 39%; and projects aimed at reducing the cost of solar power, 16%. In recent years Congress has significantly scaled back increases for those programs.

The budget proposes a 10-year, $2 billion energy security trust for developing cost-effective clean-vehicle technologies, which is to be financed outside the appropriations process with royalties from federal gas and oil leases.

The budget would increase spending for the NNSA's nuclear weapons R&D by 9.4%, but funding would be flat for the National Ignition Facility and other inertial confinement fusion activities. Support for nuclear nonproliferation R&D would plunge $105 million, or 23%, although the FY 2014 amount was inflated by a one-time $70 million congressional reprogramming of appropriations. The decrease reflects the conclusion this year of field experiments on proliferation detection technologies and a reduction in nuclear forensics research, according to budget documents (see related story, page 18).

Of the $1.6 billion that the OGSI would provide to DOE, about $1 billion would be spent on clean energy, energy efficiency, and climate resilience activities, and $600 million would be added to the agency's national security programs.

NSF

The FY 2015 budget would provide an $83 million increase, or 1.2%, for NSF, to $7.3 billion. The proposal includes $5.8 billion for research and related activities, enough for the awarding of around 11 400 research grants, about 100 more than in the current year. Funding for graduate research fellowships would increase 11.1%, to $333 million, accommodating an increase in stipends from $32 000 to $34 000. As in the current year, 2000 three-year fellowships are expected to be awarded in FY 2015. The NSF request for education and human resources is $890 million, an increase of $43 million, or 5%. Major research equipment and facilities construction would hold constant at $201 million.

The budget includes $362 million for fundamental research that will lead to future clean energy and energy-efficient technologies. Specific pursuits include research on energy conversion, storage, and distribution and on the science and engineering of energy-related materials, energy use, and energy efficiency. Marrett assured lawmakers that NSF works closely with DOE to ensure that the foundation's energy program does not duplicate the efforts of the Advanced Research Projects Agency–Energy.

Among cross-foundation initiatives, the budget proposal includes $213 million, or 7.3% less than FY 2014, for the cyber-enabled materials, manufacturing, and smart systems program, which combines simulations, advanced manufacturing, robotics, and other science and engineering activities to develop and produce new materials. The $125 million requested for a separate cyberinfrastructure framework for the 21st century science, engineering, and education program is down 14.2% from the current year. Funding for a third cyber program, secure and trustworthy cyberspace, would decline 20%, to $100 million. And the science, engineering, and education for sustainability program would decline 14.1%, to $139 million. Marrett said the decreases reflect the maturation of those fields.

The OGSI would allot NSF an additional $552 million, which would support an extra 1000 research grants next

NASA R&D programs

	FY 2013 actual	FY 2014 enacted*	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)†			
Total NASA	16 865	17 646	17 461	–1.0
NASA R&D				
Total Science	4 782	5 151	4 972	–3.5
Planetary science				
Planetary science research	196	—	256	—
Discovery	215	285	231	–19.0
Lunar quest	64	—	—	—
New Frontiers	159	258	281	9.1
Mars exploration	369	288	279	–3.0
Outer planets	148	159	96	–39.8
Technology	123	146	137	–6.0
Total planetary science	1 275	1 345	1 280	–4.8
Astrophysics				
Astrophysics research	156	—	191	—
Cosmic Origins	219	—	120	—
Physics of the Cosmos	124	—	109	—
Exoplanet Exploration	53	—	47	—
Astrophysics Explorer	65	—	140	—
Total astrophysics research	617	668	607	–9.1
James Webb Space Telescope	628	658	645	–2.0
Heliophysics				
Heliophysics research	165	—	217	—
Living with a star	175	—	266	—
Solar terrestrial probes	204	—	61	—
Heliophysics explorer program	59	95	124	29.8
Total heliophysics	603	654	669	2.3
Earth science				
Earth science research	423	—	450	—
Earth systematic missions	816	—	786	—
Earth system science pathfinder	177	—	266	—
Multimission operations	162	—	176	—
Technology	49	—	56	—
Applied sciences	32	—	36	—
Total Earth science	1 659	1 826	1 770	–3.0
Exploration				
Exploration systems development	2 884	3 115	2 784	–10.6
Exploration R&D	297	302	343	13.7
Commercial spaceflight	525	696	848	21.9
Total exploration	3 705	4 113	3 976	–3.3
Aeronautics research	529	566	551	–2.6
Space technology	614	576	705	22.5
Space operations				
Space shuttle	39	—	—	—
International Space Station	2 776	—	3 051	—
Space and flight support	910	—	855	—
Total space operations	3 725	3 778	3 905	3.4
Cross-agency support	2 711	2 793	2 779	–0.5

*NASA's budget tables provide FY 2014 amounts only where appropriations were specified in the FY 2014 Omnibus Appropriations Act enacted in January. Therefore, many individual program figures are not available.
†Figures are rounded to the nearest million. Changes are calculated from unrounded figures.

Department of Defense R&D programs

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
Research, development, test, and evaluation (RDT&E)			
Total basic research (6.1)	2 167	2 018	7.0
US Army			
In-house independent research	22	13	−38.2
Defense research sciences	222	238	7.4
University research initiatives	79	70	−12.0
University and industry research centers	114	103	−9.6
Total US Army	436	424	−2.8
US Navy			
University research initiatives	113	114	1.1
In-house independent research	18	19	2.8
Defense research sciences	488	444	−9.1
Total US Navy	619	576	−6.9
US Air Force			
Defense research sciences	373	315	−15.7
University research initiatives	138	127	−8.1
High-energy laser research	13	13	−2.7
Total US Air Force	525	454	−13.4
Defense-wide basic research programs†			
DTRA basic research initiative	46	38	−17.6
Defense research sciences‡	315	312	−0.9
Basic operational medical research science‡	49	50	0.7
National defense education program	77	45	−41.1
Chemical and biological defense research	51	48	−6.1
Basic research initiatives	11	45	299.0
Historically black colleges & universities/minority institutions	36	24	−32.0
Total defense-wide basic research programs	586	562	−4.0
Applied research (6.2)	4 641	4 457	−4.0
Advanced technology development (6.3)	5 201	5 040	−3.1
Total science and technology (6.1–6.3)	12 008	11 515	−4.1
Other RDT&E§	51 091	52 019	1.8
Total RDT&E‖	63 100	63 534	0.7

*Figures are rounded to the nearest million. Changes are calculated from unrounded figures.
†Includes the basic research budgets of DOD agencies such as DARPA, the Defense Advanced Research Projects Agency; DTRA, the Defense Threat Reduction Agency; the Missile Defense Agency; and the Office of the Secretary of Defense.
‡The two categories that make up DARPA's basic research budget. The bulk of DARPA's budget is provided from the applied research (6.2) and advanced technology development (6.3) categories. DARPA's overall FY 2015 request is $2.9 billion, up 4.9% from the FY 2014 appropriation of $2.8 billion.
§Includes RDT&E categories 6.4 through 6.7.
‖Excludes a total of $1.2 billion requested in FY 2015 for medical research and R&D in support of chemical and munitions destruction.

year. According to budget documents, it would also increase by 3000 the number of graduate research traineeships over the next five years.

NASA

The budget request for NASA of $17.5 billion is $186 million below the FY 2014 level. The agency's science portfolio would be funded at $5 billion, which is $180 million, or 3.5%, less than the current year. Within the science total, funding would decline by 3.1% for Earth science, 4.8% for planetary science, 9.1% for astrophysics, and 2% for the *James Webb Space Telescope*. Heliophysics funding would rise by 2.3%. NASA administrator Charles Bolden told the House Science, Space, and Technology Committee on 27 March that the *JWST*, estimated to cost $6.2 billion, remains on track for launch in 2018. Aeronautics research at NASA would decline $15 million, or 2.6%, to $551 million. Space technology would jump 22.6%, or $130 million, to $705 million.

Funding for commercial spaceflight would rise 21.9%. Bolden stressed that full funding for the program is required if the US is to develop its own capability to fly astronauts to the International Space Station by 2017. He dismissed concerns expressed by some lawmakers that Russia could terminate its agreement to shuttle US astronauts because of the current tensions between the two nations, noting that Russia is codependent on the US to operate the power system and other major space station components.

The administration proposes grounding the Stratospheric Observatory for Infrared Astronomy (SOFIA), a flying telescope mounted to a Boeing 747, jointly operated with the German Aerospace Center. Bolden said external reviewers had ranked SOFIA a low priority among NASA's astrophysics missions, but he added that officials from the agency and the German center are trying to attract other partners to keep the observatory in operation. Science committee member Zoe Lofgren (D-CA) predicted that Congress would not allow the shutdown. The product of a $1.1 billion, 10-year development program, SOFIA had become fully operational just days before the termination announcement.

The NASA request includes $133 million for a proposed expedition to capture and redirect an asteroid into an Earth orbit for study. Bolden described the mission as a "stepping stone" on the path to an eventual manned mission to Mars, but many lawmakers have been skeptical. The asteroid mission would try out technologies, such as solar–electric propulsion, that will be needed for the eight-month-long trip to Mars, Bolden said, and the mission would make use of the heavy-load rocket and deep-space crew vehicles that are already under development at NASA.

Bolden said NASA has reached agreement with DOE to produce plutonium-238 to fuel planetary missions. But the two agencies are still negotiating over which will pay for required improvements to DOE's ^{238}Pu facilities. Production will reach 1.5 kg to 2 kg per year by 2019—sufficient to meet NASA's projected needs.

The OGSI would provide $886 million in additional funding for NASA.

Department of Defense

Of the $63.5 billion requested for Pentagon R&D, $52 billion would pay for development of specific weapons systems. The remaining $11.5 billion would be devoted to basic research, applied research, and advanced technology development, which are known as 6.1, 6.2, and 6.3, respectively. Collectively those accounts would decline 5.7% from their FY 2014 levels. The $2 billion requested for basic research is down 4.7% from the current year. The 6.1 account supplies about one-third of all federal support for research in computer science and engineering and an even greater share of funding for specific fields of electrical and materials engineering. The Defense Advanced Research Projects Agency would receive a 4.9% increase, to $2.9 billion. About $80 million of that is for the interagency BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative (see PHYSICS TODAY, December 2013, page 20).

None of the $26.4 billion included in the OGSI for DOD would go for R&D.

Department of Homeland Security R&D programs

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
Total DHS R&D	1 445	1 289	−10.8
Domestic Nuclear Detection Office (DNDO)	205	199	−3.1
Science and technology			
Acquisition and operations support	42	42	—
Research, development, and innovation	462	434	−6.1
APEX R&D†	15	15	—
Border security R&D	44	51	16.5
Chemical, biological, and explosive defense R&D	142	125	−11.6
Counterterrorism R&D	77	65	−15.6
Cybersecurity/information analytics R&D	80	77	−4.0
First responder/disaster resilience R&D	104	101	−3.6
University programs	40	31	−22.0
Laboratory facilities	548	435	−20.5
Management and administration	129	130	0.9
Total science and technology	1 220	1 072	−12.1
Coast Guard	19	18	−6.5

*Figures are rounded to the nearest million. Changes are calculated from unrounded figures.
†APEX R&D projects are described as crosscutting, multidisciplinary projects that have been requested by DHS's numerous operating units and are said to be "high-priority, high-value, and short turnaround in nature."

Department of Commerce (NOAA and NIST) R&D programs

	FY 2014 actual	FY 2015 request	FY 2014–15 percent change
	(millions of dollars)*		
National Oceanic and Atmospheric Administration R&D			
Total	661	688	4.1
NIST R&D			
Total	850	900	5.9
Scientific and Technical Research Services (STRS)†	651	680	4.4
Construction of research facilities	56	59	5.3

*Figures are rounded to the nearest million. Changes are calculated from unrounded figures.
†STRS includes NIST's laboratories.

Department of Homeland Security

Funding for the Department of Homeland Security's science and technology directorate would decline 12.1%, to $1.1 billion. The office develops systems for protecting critical infrastructure from chemical, biological, explosive, and cyber attacks; for guarding borders; and for addressing crosscutting issues such as standards and interoperability. The request includes $300 million for construction of the National Bio and Agro-Defense Facility in Kansas for studying foreign animal and emerging zoonotic diseases. The $199 million request for the DHS's Domestic Nuclear Detection Office is 3.1% below the current year level.

NOAA and NIST

The R&D programs of the National Oceanic and Atmospheric Administration would increase 4.1%, to $688 million. NOAA's Office of Oceanic and Atmospheric Research operates a network of laboratories and supports external research and science partners. Increases are requested for R&D related to drought, sea-level rise, extreme heat, and climate impacts on living marine resources. NOAA would receive $180 million in additional resources from the OGSI.

The laboratory programs at NIST, known as scientific and technical research and services, would increase by 4.4%, or $29 million. Increases are requested for R&D on improved measurement science and standards for forensic science, cyber-physical systems, advanced materials, and synthetic biology and for strengthening technology transfer activities. The OGSI would include $115 million for NIST.

Other agencies

The R&D budget at the US Geological Survey (USGS) would grow 5.5%, to $686 million. The Environmental Protection Agency's R&D budget would be unchanged at $560 million. The EPA request includes $14 million for the agency's research collaboration with the USGS and DOE to reduce the potential health and environmental impacts of natural gas development from hydraulic fracturing. The Department of Transportation would get $865 million, a 1.4% increase over FY 2014. The DOT funding includes R&D in support of the Federal Aviation Administration's next-generation air transportation system, known as NextGen.

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