The Obama administration on 2 February presented its budget request to Congress for the 2016 fiscal year, which begins in October. ScienceInsider tracked the numbers on rollout day and provided analysis. Click here to see all of our Budget 2016 coverage.

8:05 p.m.: That's all for today, folks! Come back tomorrow for more coverage of science policy, politics, and money on ScienceInsider.
8 p.m.: The top Republican and Democrat on the House of Representatives science committee react to today's budget request.

Representative Lamar Smith (R–TX), chair of the House science committee:

“Under this president, our nation's debt has grown by more than $7 trillion. And the president's latest budget proposal is more of the same. The American people do not want increased taxes and the government spending what it doesn’t have.

“Investments in science and technology have the potential to create jobs and yield future economic growth. Rather than focus on areas that have clear benefits for Americans, the president instead chose to push a partisan agenda. His budget includes new spending for costly ineffective energy subsidies and a new $500 million United Nations program to promote 'climate change resiliency' in other countries. I’m disappointed the president chose to play politics with taxpayers’ dollars instead of offering real solutions.

“I am disappointed that the budget request does not adequately support the programs that will take us farther into space to destinations like Mars. In fact, his budget cuts human space exploration and planetary science. The Obama administration continues to include costly distractions, such as climate funding better suited for other agencies, and an asteroid retrieval mission that the space community does not support.

“It is clear that the president is out of touch with how Americans want their government to be run. House Republicans will continue to promote policies to make the federal government and our nation's scientific enterprise more efficient, effective and accountable.”

Representative Eddie Bernice Johnson (D–TX), ranking member of the House science committee:

“The President’s Budget would help ensure that the U.S. can compete in a 21st Century global economy and solidify America's place as a scientific and technological leader. The commitment to STEM education, advanced manufacturing, and energy efficiency and the development of clean energy alternatives is encouraging. I am most pleased by the 6 percent increase for research and development. Robust investments in R&D and education are essential if we want to create jobs, stimulate economic growth, and unlock untold societal benefits.

“I am also pleased that the budget would undo the sequester. The full impact of sequestration on non-defense discretionary spending would be very
detrimental to our research, education, and innovation enterprise. The scientists, engineers, and innovators of today make discoveries and develop technologies that improve the quality of life and security of our citizens, generate whole new industries and jobs, and keep our nation thriving in a competitive world economy. They also help to give our children the inspiration and grounding they will need to become the next innovators, or just to be prepared for the high-skilled jobs of the future. The only responsible course of action is to invest in our research agencies like the President has proposed, not hamstring them with arbitrary sequestration cuts.

“I look forward to reviewing the specific budget requests of the agencies under the jurisdiction of the Committee in more detail in the weeks ahead and I look forward to working with the President and my colleagues on both sides of the aisle to ensure that America remains a leader in science and technology in the decades to come.”

7:55 p.m.: CDC close to flat, but with new antimicrobial mandate

The U.S. Centers for Disease Control and Prevention (CDC) would see a small increase under the president’s budget request. The agency would get nearly $7.1 billion—up almost 2% from 2015 levels, not counting the emergency $1.7 billion it got this year to support domestic and international Ebola response.

The most notable increase would go to “emerging and zoonotic infectious disease” programs, allotted $699 million in the 2016 budget—a nearly $300 million increase. Most of that comes with the president’s initiative to combat antibiotic resistance, a $1.7 billion initiative announced last week, of which CDC would take a $280 million slice. That funding would support efforts to educate hospitals about antibiotic stewardship and to monitor emerging threats. The agency plans to double the number of sites in the Emerging Infections Program—a research and surveillance network of labs, clinics, and state health departments—from 10 to 20.

CDC’s budget for injury prevention and control would also spike under the plan, from $150 million to $257 million, as CDC is folded into a broader effort by the administration to reduce rates of prescription drug abuse. —Kelly Servick

7:50 p.m.: A food-focused bump for FDA

Obama’s budget request includes $4.9 billion for the Food and Drug Administration (FDA)—a 9% increase over 2015. Federal appropriations alone—not counting user fees collected from companies seeking FDA review—amount to $2.76 billion, or a 6% increase, according to a preliminary analysis by the Alliance for a Stronger FDA.
The agency’s food safety efforts would see the biggest boost—$109 million, or 4%—as part of an ongoing overhaul meant to cut down on foodborne illness, mandated by 2011’s Food Safety Modernization Act. Meanwhile, its oversight of medical products would see just a 1% increase in funding.

That’s problematic, given that both the agency’s workload and the complexity of the science involved in the review process continue to increase, says Steven Grossman, the alliance’s deputy executive director. “It’s clear that the medical products stuff is growing much faster than the budget is,” he says. –Kelly Servick

7:48 p.m.: At NOAA, a 6.3% increase and an emphasis on climate and weather

The National Oceanic and Atmospheric Administration’s (NOAA’s) budget request reveals a strong focus on planning for and mitigating the impacts of climate change and extreme weather events, with money set aside for new weather satellites, climate mitigation planning, and additional grants for coastal resilience studies. The budget also calls for expanding NOAA’s existing efforts to study ocean acidification and for upgrading the National Weather Service’s infrastructure.

The total NOAA request is $3.333 billion, 6.3% above 2015. For the Office of Oceanic and Atmospheric Research, the agency’s main research arm, the request is $485 million, an increase of 12%. Within the office, climate research would get a big boost, a 9% increase to $189 million. There’s also a 33% hike for ocean acidification research, to $30 million.

The budget asks for $2 billion to push forward with the next generation of weather satellites, including $380 million to begin to develop a Polar Follow-On satellite program, designed to fill the data gap between the current Suomi National Polar-orbiting Partnership satellite with NASA and the planned Joint Polar Satellite System (JPSS), of which the first satellite is scheduled to launch in early 2017. Funding for the follow-on satellites may come at the expense of the budgets for the Geostationary Operational Environmental Satellite-R Series (GOES-R) and JPSS, however, both of which stand to decrease by about $100 million for 2016.

Overall, NOAA research did well—it’s the best budget for NOAA research in a long time, says Scott Rayder, a former chief of staff at NOAA and now a senior adviser at the University Corporation for Atmospheric Research in Boulder, Colorado. “There’s something there for everyone.” In particular, he notes the administration’s apparent emphasis on climate “news you can use,” such as regional forecasts, rather than global forecasts. There’s also a focus on developing forecasts with a seasonal to interannual timeframe—about 3 months to a year—which are in high demand in industry, Rayder says. “The marketplace—agriculture, transportation, energy, water managers—they all want this information. So in this space, the administration and Congress can agree that it’s a good thing.”
NOAA is also requesting $147 million to begin construction of a new ocean survey vessel with a variety of capabilities, from surveying marine mammal populations to servicing National Weather Service buoys. To save costs, NOAA is requesting that the ship be built to the same specifications as two already-planned ships for the federally funded academic research fleet, the Woods Hole Oceanographic Institution’s R/V Neil Armstrong and the Scripps Institution of Oceanography’s R/V Sally Ride. “It’s a smart acquisition decision,” Rayder says. With the federal fleet aging and likely to decline by 50% by 2026, “they really need this vessel.” —Carolyn Gramling

7:36 p.m.: UPDATED—USGS climate, natural hazards programs would gain under 13.7% budget boost

The U.S. Geological Survey (USGS) was among the winners in the White House’s budget request for 2016. The agency was allotted nearly $1.2 billion—an increase of 13.7% from 2015.

All seven of the agency’s so-called mission areas—Ecosystems, Climate and Land Use, Energy, Minerals and Health, Natural Hazards, Water Resources, Core Science Systems, Science Support—would see gains. The agency’s climate and land use research programs would get largest overall bump, 27%. Core Science Systems, which supports research, would get 14% raise to $187 million, while the agency’s natural hazards program would get a 13% increase to $155 million.

“It’s a very strong budget,” said Suzette Kimball, the agency’s acting director, at a briefing today. “We have very limited actual decreases in budget.” If approved by Congress—and that remains to be seen—the increase would help pay for studies of everything from insects that pollinate crops to sinkholes and space weather.

The proposed increases also reflect the Obama administration’s shift toward trying to take a more active role in mitigating the potential effects of climate change, said Lexi Shultz, public affairs director at the American Geophysical Union in Washington, D.C. “We’re facing a somewhat unprecedented threat because we, as a nation, don’t have a handle on everything we need to do to protect ourselves from the effects of climate change. So I don’t think it’s surprising that the administration would prioritize [USGS’s climate and land research programs] above all others.” The agency, administration officials have suggested, could play a key role in helping communities anticipate and prepare for climate-related catastrophes and long-term changes.

Although the agency’s water resources programs would see the smallest funding increases under the proposed budget—just 5% to $222 million—they would remain the agency’s single largest spending area. Some the new funds, the agency says, would go to studying how drought affects entire ecosystems.

Overall, USGS’s percentage increase is nearly double the White House’s overall 7%
proposed increase for discretionary spending. That favored status reflects White House's recognition of USGS's value, says Shultz, who adds: "Now what we'd really like to see is Congress share in this recognition." Whether the Republican-led Congress will be as enthusiastic, however, won't be known until later this year. –David Shultz

7:35 p.m.: UPDATED—NASA budget includes missions to fly past Europa and to redirect an asteroid

NASA's request of $18.5 billion represents a rise of 2.7% over 2015 enacted levels. That may not come close to the 5% rises requested by other research agencies, such as the National Science Foundation. But for NASA watchers, it's better than it has been a long time.

"This is the best starting point we've had in 4 years from the White House," says Casey Dreier, director of advocacy for the Planetary Society, based in Pasadena, California. "That shouldn't be dismissed."

For NASA's science office, perhaps the biggest surprise is an official embrace of a mission to Jupiter's moon Europa that would launch in the mid-2020s. The agency asks for $30 million for the Europa mission in 2016 and plans on developing the mission concept this spring. That request signals a detente between the administration, which had avoided requesting funding for Europa, and Congress, which always plumped for the mission—including the $100 million that it appropriated for Europa in 2015. "This is a big change in administration policy and we're very pleased," Dreier says.

At a briefing today, NASA chief financial officer David Radzanowski would not say what the overall price tag of the Europa mission would be, only that it would have to cost much less than $4 billion. That's why advocates have pushed for a "Europa Clipper" concept that would spin around the moon in multiple flybys, rather than calling for an orbiter—a more difficult and expensive mission that would subject the spacecraft to much greater doses of radiation from Jupiter. There has been growing evidence that Europa may be emitting plumes of water from its south pole, and many scientists want any mission to be able to sample those plumes for signs of life.

The budget also asks for $220 million for an Asteroid Initiative, which includes money for a controversial mission to send astronauts to an asteroid that had been redirected from its natural orbit to the vicinity of Earth. However, there is no line item for the asteroid redirect mission, and the agency has delayed making a decision on choosing an approach for the mission (whether to snatch a boulder from a larger asteroid, for instance, or to bag up an entire asteroid and bring it to Earth). Marcia Smith, a veteran space policy analyst and consultant based in Arlington, Virginia, says the longer NASA avoids committing to a particular mission, the easier it will be for a subsequent administration to kill the proposal. "It seems that time is running out for them to make that choice," she says. "It suggests that they're having some challenges at a fundamental level."
In the request, NASA's Science Mission Directorate gets far less of a boost than the agency does overall—a rise of just 0.8% to $5.289 billion. Within the four science divisions—earth science, astrophysics, planetary science, and heliophysics—earth science appears to be the big winner. That division gets $1.947 billion—a whopping 10% jump over 2015 levels.

This is no surprise coming from the Obama administration, which has consistently tried to raise earth science funding. But it also comes with increased responsibilities—the administration wants NASA to take over the management of all nonweather satellites from the National Oceanic and Atmospheric Administration. Nevertheless, Steven Running, chair of a NASA earth science advisory committee meeting, was pleased both with the funding request, as well as with a year that had seen the launch of three major missions: the Global Precipitation Measurement mission, joint with the Japanese Space Agency; the Orbiting Carbon Observatory-2 mission; and the Soil Moisture Active Passive mission, which just launched on 31 January. “NASA Earth science has had a tremendously good year,” says Running, of the University of Montana, Missoula. “We’re feeling our oats.”

NASA planetary science appears to be the biggest loser in the Science Mission Directorate, with a 5% cut from 2015 enacted levels. But that reflects the pattern of the last few years, where the administration underasks for planetary and Congress overdelivers to the division. “It’s a very familiar story,” Dreier says. Among now operating planetary missions, the agency expects to zero out the Mars Opportunity rover, the Mars Odyssey orbiter, and the Lunar Reconnaissance Orbiter. But Radzanowski says that the agency has been able to find money to continue operations for aging missions before. “We will look at ways to continuing operations—if they actually are operational by 2016 and the science value does make sense.”

The agency requests a 3.7% hike to $709 million for astrophysics, and an additional $620 million to continue building its chief astronomical priority, the $8.8 billion James Webb Space Telescope. “On the whole, it’s not a bad situation,” says Bradley Peterson, an astronomer at Ohio State University, Columbus, who heads a NASA astrophysics advisory committee.

One surprise is the administration request for the Stratospheric Observatory for Infrared Astronomy (SOFIA), a joint mission with the German space agency that consists of a converted 747 jet with a telescope riding in the rear. Last year, the administration tried to cancel the mission, which has been expensive and relatively unproductive scientifically. But Congress rushed to the mission’s aid with $70 million for 2015. This year the agency asked for $85 million. “Let bygones be bygones,” Dreier joked. “I was very surprised to see that, coming out as if nothing had happened.” According to Peterson, “that was recognition that they should not have made any unilateral decision on the future of SOFIA without discussions with our German partners.”

Within the human exploration program, which takes up roughly a quarter of NASA’s overall budget, the agency continues to take a two-pronged approach to developing rockets that would return astronauts to space after the retirement of the Space Shuttle. The
commercial crew program—which provides subsidies to companies such as SpaceX and Boeing to develop privately owned, human-rated rockets and capsules—would get $1.244 billion, a more than 50% jump over what Congress gave the program in 2015.

In addition, the agency would spend almost double that, $2.453 billion, on its own capsule, Orion, and a rocket, the Space Launch System (SLS), a lumbering, and delayed, heavy-lift vehicle that will not see its first launch until the end of 2018. Yet NASA’s request calls for 15% less than Congress spent on Orion and SLS for 2015. The requested levels are telling and anticipate familiar battles with Congress, which has taken a dim view of commercial crew while protecting SLS. Both the Europa mission and the asteroid redirect mission could take advantage of rides on a SLS rocket in the 2020s. –Eric Hand

7:33 p.m.: UPDATED—DOE's science office rises 5%, with advanced computing a big winner

The president’s budget doles out $5.3 billion for the Department of Energy’s (DOE’s) Office of Science, a 5% increase that beats out inflation. “It’s not a windfall by any means, but on the other hand, certainly we understand it’s a pretty constrained budget environment so being able to see any increase at all is a positive thing,” says Thom Mason, director of DOE’s Oak Ridge National Laboratory (http://www.ornl.gov) in Tennessee.

Five of the six major research programs within the Office of Science get a share of the good news.

The biggest winner is the Advanced Scientific Computing Research program, which would see an increase of 14.8%, to $621 million. This increase would support efforts by DOE’s National Nuclear Security Administration, which manages the nuclear weapons stockpile, and the Office of Science to develop fast, cutting-edge exascale computers, paving the way for advanced climate modeling and biomedical applications.

Nuclear physics receives a 5% increase, to $625 million. That’s consistent with the funding needed for construction of the new Facility for Rare Isotope Beams (http://www.frib.msu.edu) at Michigan State University.

High Energy Physics received a 2.9% increase to $788 million, which includes support for the planned Long Baseline Neutrino Facility.


“That’s an area where in the last couple of years we’ve seen budget increases requested but they’ve not made it through [Congress],” Mason says. “It would be good if we actually could realize those requested increases.”
DOE’s Biological and Environmental Research program would get a 3.4% bump to $612 million. (But the Obama administration’s efforts to increase funding for this program have often gotten a frosty reception from Republicans in Congress, who now control both the House and Senate.)

The lone outlier is DOE’s fusion program, which would get a 10.3% cut, to $420 million. The program saw an increase in 2015 partly as a result of Congress’s desire to maintain a domestic fusion research program at the Massachusetts Institute of Technology (MIT). The White House had proposed cutting that project in order to help pay for ITER (http://www.iter.org), the troubled international fusion project under construction in France. But a fierce lobbying campaign persuaded Congress saved the MIT project for 1 year. Now, however, DOE is struggling to figure out how to pay for both ITER and a few domestic projects—and the administration appears to be reinforcing the idea that there won’t be any new money in the short run.

For the DOE budget overall, “the emphasis is really in the energy technology areas,” rather than the Office of Science, says Michael Lubell of the American Physical Society in Washington, D.C. Programs supporting renewable energy and energy efficiency received major increases in the request, as they have in previous years. But if history is any judge, the increases are unlikely to be approved by Congress. –Emily Conover

**5:10 p.m.: AAU says Pentagon basic research cuts "inconceivable"**

The Association of American Universities, which represents many of the nation's largest research campuses, has issued this reaction to today's budget request (edited for brevity):

"The President's FY16 budget contains the kind of investments in scientific research and higher education that would help close the nation’s innovation deficit. By proposing to eliminate sequestration and raise the budget caps, it permits needed investments in the ideas, discoveries, and people that can provide the foundation for our nation’s future.

The budget's proposed increases for the National Institute of Health, National Science Foundation, the Department of Energy’s Office of Science and ARPA-E, NASA, and the Agriculture Food Research Initiative would help build our economy, improve health, and strengthen our national security …

On the other hand, we find it inconceivable that the Defense budget contains an 8.3-percent cut in basic research, given the significant overall increase provided for the Pentagon. Defense basic research is critical to our national security. For this nation’s fighting men and women to remain the world's best equipped, most technically advanced force, we need to sustain the investment in Defense basic research. Congress rejected a similar cut last year, and we hope that it will step in again."

BUDGET 2016 COVERAGE: A roundup of Obama's science spending ... http://news.sciencemag.org/funding/2015/02/budget-2016-coverage-rou...
5:08 p.m.: President’s 2016 budget offers 3.3% boost for NIH; modest increase includes more for precision medicine, antibiotic resistance, BRAIN Initiative

The National Institutes of Health (NIH) would rise $1 billion, bringing its total budget to $31.3 billion under President Barack Obama’s 2016 budget request released today. That 3.3% increase is good news for biomedical research advocates.

Within the $1 billion are two new cross-agency research efforts announced in Obama’s January State of the Union address and described in more detail by the White House last week. The Precision Medicine Initiative includes $130 million spread across NIH’s institutes to create a 1-million-volunteer study to explore links between genes and health; another $70 million would expand National Cancer Institute efforts to treat cancer by targeting genes that drive tumor growth. And $100 million (in addition to an existing $361 million) would go for diagnostic test development, genome sequencing, a clinical trial network, and other research as NIH’s contribution to a trans-agency National Strategy to Combat Antibiotic Resistance.

The request also includes $70 million in new money for the cross-agency BRAIN Initiative, more than doubling its NIH funding; $51 million more for Alzheimer’s disease research (a 9% increase over current spending); and $51 million more for vaccines against such diseases as HIV and influenza.

The 3.3% raise is “a nice increase for NIH. We’re very gratified by that number,” says Jennifer Zeitzer, deputy director of public affairs for the Federation of American Societies for Experimental Biology in Bethesda, Maryland. “We do wish for more, obviously. But we’re in a good spot. This lays out a vision for what we can do.” She adds, however, that the increase will depend on Congress following through on Obama’s request to scrap the 2011 mandatory budget cuts known as sequestration.

But the head of another biomedical research advocacy group, Research!America CEO Mary Woolley, said although her group, based in Alexandria, Virginia, is “pleased” by what it calls “a starting point,” her group feels the new initiatives at NIH “should supplement, not supplant, the imperative of making up for a decade’s worth of lost ground.” Her group is pinning its hopes on a bill introduced by House of Representatives Democrats called the Accelerating Biomedical Research Act that would allow NIH’s budget to gradually grow to the level it would have reached if it had risen with inflation since 2003. –Jocelyn Kaiser
4:08 p.m.: White House favors USGS with rock-solid 13.7% increase

The U.S. Geological Survey (USGS) was among the winners in the White House’s budget request for 2016. The agency was allotted nearly $1.2 billion—an increase of 13.7% from 2015. (That percentage is nearly double the White House’s overall 7% proposed increase for discretionary spending.) If Congress goes along—and that’s unlikely—the increase would dwarf the 1.4% budget increase USGS got this year. —David Shultz

3:51 p.m.: NIST shoots for 29% increase as White House backs advanced manufacturing

The president’s budget aims to boost the National Institute of Standards and Technology’s (NIST’s) numbers with a 29% increase to $1.12 billion, up from $864 million last year. This overall number includes a near 12% bump for the NIST labs, also known as the Scientific and Technical Research and Services, from $676 million to $755 million.

But the biggest winner appears to be NIST’s Industrial Technology Services. ITS includes a series of programs to support innovations in manufacturing. Within that bailiwick, the administration proposes to spend $144 million this year on the new National Network for Manufacturing Innovation, a collaborative effort between industry, academia, and government partners to speed manufacturing innovation. The heart of that effort would be the creation of two Institutes for Manufacturing Innovation, which are expected to cost $150 million over 5 years.

Also noteworthy in the ITS budget is the quiet phaseout of the Technology Innovation Program (TIP), the successor to the once highly controversial Advanced Technology Program, which shared R&D costs between government and industry. TIP funding for 2015 was down to a meager $5 million, and that number has been zeroed out for 2016.

—Robert F. Service

3:46 p.m.: Correction: DOD basic research gets an 8% cut, not a modest increase

Thanks to some sharp eyes at the Association of American Universities for noticing that our earlier item on DOD basic research contained an error. The request actually calls for an 8% cut to the Pentagon’s basic research account, to about $2.1 billion. This account has been under heavy pressure in recent years, with Congress stepping in at times to plus up the numbers. It provides major funding for several fields, including engineering research, computer science, and math. (To avoid confusion, we have removed the earlier item.)
3:15 p.m.: EPA requests 4.6% boost for science and technology, including computational toxicology research

Science and technology spending at the Environmental Protection Agency (EPA) would get a $34 million (or 4.6%) boost over what Congress approved last year, to $769 million, under the president's fiscal year 2016 budget proposal. Of note, the president's request includes a 58% hike in funding for computational toxicology research to $33.8 million, to help develop better and faster methods for screening chemicals for potential health concerns.

"One of the great challenges that EPA has faced for some time has been being able to increase the speed of their assessments — their risk assessments and their hazard assessments," says Paul Anastas, former EPA assistant administrator and now a chemist at Yale University. "And being able to use these high-throughput protocols that the computational toxicology allows is going to be essential going forward. So I think that that's really very important, and perhaps one of the biggest highlights in the investments in the science and technology budget."

The request also includes a 9% increase for climate, air, and energy research to $100.3 million. –Puneet Kolipara

1:55 p.m.: Lukewarm praise from Research!America for National Institutes of Health and health numbers …

This in from Research!America president and CEO Mary Woolley:

"We are pleased that the President's FY16 budget proposal calls for the elimination of sequestration and makes a down payment on the bipartisan goal of accelerating medical progress. We see this as a starting point. It is absolutely important to invest in initiatives that focus on precision medicine, Alzheimer's, antimicrobial resistance and other growing health threats, but these investments should supplement, not supplant, the imperative of making up for a decade's worth of lost ground. We believe that Congress and the White House can, and must, unify behind a moonshot as envisioned in the bipartisan Accelerating Biomedical Research Act (http://www.bizjournals.com/sanantonio/news/2015/01/27/new-bill-would-boost-nih-funding-and-medical.html). Medical progress is not just a health imperative, it is a strategic imperative, integral to national security, fiscal stability and economic progress. Leaders on both sides of the aisle clearly appreciate that the time is now to turn ideas into reality. It may be a truism, but where there's a will, there's a way."
1:32 p.m.: NASA's science office gets modest 0.8% boost, but agency embraces mission to Europa

NASA overall gets a request of $18.5 billion, which represents a rise of 2.7% over 2015 enacted levels. The agency continues to go with a two-pronged approach to developing rockets that would return astronauts to space after the retirement of the Space Shuttle. The commercial crew program—subsidies for companies like SpaceX to develop privately owned, human-rated rockets—would get $805 million, while the agency would spend $2.051 billion on its own rocket, the Space Launch System, a lumbering, and delayed, heavy-lift vehicle that will not see its first launch until the end of 2018.

The budget asks for $100 million to develop a mission formulation to Jupiter's moon Europa. That signals the end of a low-grade battle between the administration, which had avoided requesting funding to pursue the mission, and Congress, which always appropriated money toward the goal (http://news.sciencemag.org/funding/2015/01/money-chase-2016-new-head-key-house-science-spending-panel-likes-limited-government). The budget would also provide support for a controversial mission to send astronauts to an asteroid that had been redirected from its natural orbit to the vicinity of Earth. Both of those missions could conceivably ride on a Space Launch System rocket in the 2020s.

In the request, NASA's Science Mission Directorate gets far less of a boost—a rise of just 0.8% to $5.289 billion. Within the four science divisions—earth science, astrophysics, planetary science, and heliophysics—earth science appears to be the big winner. That division gets $1.9 billion—a whopping 7.3% jump over 2015 levels. This is no surprise from the administration, which has consistently tried to raise the earth science division above the others.

Steven Running, chair of a NASA earth science advisory committee meeting, was pleased both with the request, as well as with a year that had seen the launch of three major missions: the Global Precipitation Measurement mission, joint with the Japanese Space Agency; the Orbiting Carbon Observatory-2 mission; and the Soil Moisture Active Passive mission, which just launched on 31 January. “NASA earth science has had a tremendously good year,” says Running, of the University of Montana, Missoula. “We’re feeling our oats.”

But the other divisions still get to continue work on their babies. An agency fact sheet mentions support for a Mars rover planned to launch in 2020 and also for the James Webb Space Telescope—though its development costs have been capped at $8 billion.

–Eric Hand

1:15 p.m.: Remember those decade-old plans to double the budgets of NSF, DOE Science, and NIST? How's that going?
A trio of research agencies still waiting to reap the rewards of a promised doubling of their budgets fared well in the new request. In 2006, President George W. Bush proposed a 10-year doubling for the National Science Foundation (NSF), the Department of Energy’s Office of Science, and the National Institute of Standards and Technology (NIST). In 2007, Congress enacted the America COMPETES Act that set an even faster, 7-year doubling path, and once President Barack Obama was elected, he pledged to honor the doubling, although the details became fuzzier as the years passed. In fact, the three agencies have seen their budgets rise by a total of 33% from 2006 to 2015.

This year’s budget would mark the end of the original Bush pledge, and the Obama administration has clearly pushed to make the news as rosy as possible. The president’s 2016 request would boost the trio’s budget to 40% above their 2006 appropriations. For NSF, that would mean a jump from $5.65 billion to $7.72 billion, a rise of 37%. The Office of Science would grow from $3.63 billion to $5.34 billion, a boost of 48%. NIST, by far the smallest of the three agencies, would come closest to an actual doubling, soaring 91%, from $395 million to $755 million. —Jeffrey Mervis

1:10 p.m.: DOE's advanced computing program would get a big boost as science office grows 5.3%

Under the proposed budget, the Department of Energy’s (DOE’s) Office of Science would get a 5.3% increase overall, to $5.3 billion. The biggest bump within DOE goes to their Advanced Scientific Computing Research program, which would see an increase of 14.8%, to $621 million. Basic Energy Sciences would get a boost of 6.7%, to $1.8 billion. Nuclear Physics would increase by 5.0%, to $625 million. High Energy Physics would get $788 million, a 2.9% increase. Biological and Environmental Research would grow by 3.4% to $612 million. Fusion Energy Sciences, however, would shrink by 10% to $420 million. —Emily Conover

12:47 p.m.: NIST's research labs would get a boost of nearly 12%, to $755 million

12:35 p.m.: Early reaction to NIH numbers

A statement just in from Carrie Wolinetz, president, United for Medical Research, a coalition that works to boost biomedical research funding.

“We welcome President Obama’s FY16 budget proposal to increase National Institutes of Health (NIH) funding and eliminate harmful sequestration. NIH has fostered remarkable advancements in human health, but has suffered from inadequate funding for the past decade. Additional resources will help defeat
our nation's most harmful diseases — including cancer, heart disease and diabetes — and fuel job creation in the life sciences sector – a win-win."

12:21 p.m.: NSF gets 5.2% overall, education would jump 11%

The National Science Foundation (NSF) would receive a 5.2% increase, to $7.724 billion. The six research directorates would grow by 4.3%, to $6.19 billion, while the education directorate would jump by 11%, to $962 million. NSF would also receive a 9% boost in its management account to continue planning for its 2017 move to a new headquarters building in Alexandria, Virginia.

Noon: A first look at the numbers from the budget request (more to come):

- Would provide $146 billion for research and development, 5.5% above 2015 levels. R&D includes basic and applied research and technology development programs.
- $32.8 billion for basic research, a 3% increase.
- $34.1 billion for applied research, a 4% increase.
- $31.3 billion for the National Institutes of Health, a roughly 3% increase.
- 5.2% increase for the National Science Foundation, up $379 million to $7.724 billion.
- Repeats call to make the R&D tax credit permanent. (http://news.sciencemag.org/economics/2015/01/economists-offer-new-arguments-u-s-research-tax-break)
- Repeats last’s years request for $325 million for the Advanced Research Projects Agency-Energy; Congress gave just $275 million.
- Requests $450 million for the U.S. Department of Agriculture’s Agriculture and Food Research Initiative; current budget is $325 million.
- $71.3 billion for overall Pentagon R&D, a 9% increase.

10:40 a.m.: What are science advocates looking for in today's budget request?

Last week ScienceInsider asked a variety of folks who closely follow federal spending on
science what they would be looking for in today’s budget request. Here are some of their answers:

- **Pat White, president, Act for NIH, Washington, D.C.**

  My eye will obviously be on NIH. Here are the things I’ll be looking out for:

  **The NIH budget.** As you know, NIH’s budget has declined by nearly 25 percent since 2003, when adjusted for inflation. In the best of times, NIH could fund 1-in-3 research proposals. Today, that number has fallen to its lowest level ever, about 1-in-6. That means thousands of promising proposals that could lead to cures for disease are not pursued every year. Rumor is Administration will ignore sequestration and budget caps in FY16 proposal. What’s that mean for NIH?

  Areas for bipartisan achievement with Congress and the White House for medical research. Historically, NIH and medical research have been non-partisan issues. In the 1990s, the NIH budget was doubled and the Human Genome Project were completed by a Republican Congress and a Democratic White House. We have that same opportunity today.

- **David O. Conover, vice president for research, Stony Brook University, New York**

  We will be looking closely at the total requests for NSF, NIH, and DOE. Last year we were disappointed that the President’s budget did not set a higher mark for those funding agencies, but it was the 2nd year of the budget cap agreement so it was a zero sum game. Not so this year. Within the NSF budget, we will be looking at the agency request level for social sciences and geosciences since these directorates have been called out for reductions and/or criticism by Congress. Will the request demonstrate resolve to fight for these disciplines or bow to pressure?

- **Barry Toiv, vice president for public affairs, Association of American Universities (AAU), Washington, D.C.**

  Here are questions that will be on our minds at AAU:

  1. Does discretionary spending rise beyond the sequestration level and perhaps beyond the statutory cap, and is that accomplished in a way that has any chance of enactment?

  2. Do the basic research budgets in each of the major research agencies suggest significant progress toward closing the innovation deficit?

  3. Does the precision medicine proposal provide new resources or does it come from existing NIH funding?
4. Does the Defense Department budget show progress toward achievement of the 20/20 principle? The 20/20 principle is an investment benchmark level for Defense Science and Technology (S&T) and 6.1 basic research programs—investments in Defense S&T should constitute 20% of the total Defense RDT&E budget, and investments in 6.1 basic research should comprise 20% of the total DOD S&T budget (6.1, 6.2, and 6.3 programs). This investment principle is predicated on past DOD S&T investments that have yielded cutting edge technologies with both military and civilian applications. The 20/20 investment principle could be achieved over a three-year period by increasing the share of funding by approximately one percent in FY15, FY16, and FY17 for 6.1 basic research and by approximately one percent in total for DOD S&T during the same time frame.

- Jon Retzlaff, managing director, Office of Science Policy and Government Affairs, American Association for Cancer Research, Washington, D.C.

In addition to advocating for the President’s initiative on precision medicine, the AACR will be focused on making sure that Congress understands the importance of providing annual funding increases for NIH that takes into account inflation and provides for a healthy percentage of real growth. We also strongly believe that it’s important that NIH’s annual funding increases are predictable, consistent, and sustainable over the long-term. Therefore … we hope to see that the President’s FY 2016 budget proposal prioritizes NIH funding so that the agency is able to begin the process of ensuring that our country is able to consistently support the plethora of research opportunities to improve public health that currently exist.

- Scott Rayder, senior adviser for development and partnerships at the University Corporation for Atmospheric Research in Boulder, Colorado

I hope that the Administration does not flat fund R&RA (research and related activities) at NSF. Last year (FY15 Presidents Request) was the first time in NSF history that research was level funded. I hope FY 16 PresBud is better.

7:45 a.m.: Top line R&D number out; White House wants 6% bump for R&D, spending caps lifted

The Obama administration will ask for a 6% increase in federal spending on research and development, according to a White House fact sheet previewing today’s budget request to Congress for the 2016 fiscal year, which begins in October. (http://www.gpo.gov/newsroom-media/presspage/15presspage01.htm)

“Our long-term economic competitiveness depends upon continued robust investment in R&D,” according to the statement (http://content.govdelivery.com/attachments...
including significant investments in basic research and advanced manufacturing technology. The Budget invests in biomedical research—like the BRAIN initiative, which is developing tools and technologies to offer new insight into diseases like Alzheimer’s, and Precision Medicine, which can improve health outcomes and better treat diseases. It also emphasizes agricultural research, looking at climate resilience and sustainability.

The federal R&D budget includes spending on both basic and applied research. It will total roughly $140 billion this year, so a 6% increase would mean an additional $8 billion spread across the six or seven agencies that fund the bulk of the nation’s research activities. The exact distribution in the request won’t be known until later today.

The increases for research are part of the Obama administration’s arguments for lifting spending caps established by a 2011 budget deal with Congress. The fact sheet suggests the caps set for 2016 would starve research. “[A]ssuming roughly current funding patterns, research funding adjusted for inflation would reach its lowest levels since 2002,” the fact sheet notes, “other than when sequestration was in full effect in 2013.”

The White House fact sheet also hints at new investments in clean energy and efforts to combat climate change, but provides no details. “In order to secure America’s energy future and protect our children from the impacts of climate change, the Budget invests in clean energy, improving energy security, and enhancing preparedness and resilience to climate change,” the fact sheet states.

It also hints at spending on public health priorities. “The Budget provides resources to support the Global Health Security Agenda, increases funding to eradicate polio and other global health challenges, and creates a new Impact Fund for targeted global HIV/AIDS efforts,” the fact sheet states. “In addition, the Budget increases funding for domestic preparedness efforts to more effectively and efficiently respond to potential future outbreaks here at home. The Budget also makes investments to address the domestic HIV epidemic to help States develop HIV implementation plans to support the goals of the National HIV/AIDS Strategy.”

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In my opinion, any welfare system, although theoretically well studied, can never resist if the Medicine will not be based on the single Patient, i.e., Single Patient Based Medicine. In such a original National Health System, physicians must know all Constitutions of the patients, bedside recognized with a stethoscope, which can be removed by not expensive therapy.

Many social and political issues that are debated may also be of interest to scientists as social acceptance and political decision making can influence investment in science and technology as well as the direction of institutionalized science. When science is funded by the public, there is increasing pressure on the scientist to study problems important to the society, more than problems that arouse his curiosity.

Sadly, so many who will receive taxpayer funding, might have better served society had they just gone to a trade school or the military.

If the funding kept up with inflation that might not be true. Now we have 1,000s of talented Americans who wasted their 20s learning skills they will not be able to apply. A complete loss of American talent and tax payer money.

Many hold worthless degrees not suited to the actual job market. A report by McKinsey, a consultancy, found that 42% of recent graduates are in jobs that require less than a four-year college education. Some 41% of graduates from the nation’s top colleges could not find jobs in their chosen field; and half of all graduates said they would choose a different major or school.

There is a big difference between a 4 year liberal arts degree and a PhD in life sciences (which takes on average 7 years) where you need to have the ability to discover something that has never been known to mankind.