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Fact Sheet
Updated May 27, 2015

NASA'S FY2016 BUDGET REQUEST

Overview

For FY2016, President Obama is requesting $18.529 billion for NASA, an increase of $519 million (2.9 percent) above the FY2015 appropriated level.

This fact sheet has four tables:

- Table 1 compares what Congress appropriated for FY2015, the FY2016 President's request, and what is recommended in the FY2016 House Appropriations Commerce-Justice-Science (CJS) bill. Additional data will be added as the request works its way through Congress.
- Table 2 shows the funding levels in the House authorization bill for FY2016 and FY2017 that has been approved by the House Science, Space and Technology Committee, but not yet reported to the House (H.R. 2039). The bill authorizes funding under two different scenarios depending on whether the budget caps set by the 2011 Budget Control Act (BCA) are repealed or replaced. The first set of figures, designated by the committee as "aspirational," apply if the caps are repealed or replaced. The second set, designated as "constrained," apply if the caps are not repealed or replaced. The committee approved the bill on a party-line vote on April 30, 2015.
- Table 3 shows NASA's funding for its "Asteroid Initiative," which includes the Asteroid Redirect Mission (ARM). Those activities are not grouped together in NASA's budget documents and are spread across several NASA Headquarters organizations. This table brings it all together using data provided by NASA.
- Table 4 consolidates the funding for the Space Launch System (SLS), which is spread across three subaccounts.

Background on Key Issues and Budget Caps

The President's budget request is a substantial increase above the FY2015 appropriated level, but is in keeping with the increase that Congress provided for FY2015. For that year, the President requested $17.647 billion, while Congress appropriated $18.010 billion (see our fact sheet on the FY2015 NASA budget for details). Some see the request as a glass half full, a great improvement over what was projected for NASA at this time last year. Others see it as a glass half empty because the Obama Administration requested a 6 percent increase for research and development across the government and see NASA's 2.9 percent as too low.

The debate over NASA's budget, however, is taking place in a broader context that pits the White House and congressional Democrats against congressional Republicans over the total amount the government may spend in FY2016. Under the 2011 Budget Control Act (BCA), which is current law, limits – **"budget caps"** – are placed on how much the government may spend in each fiscal year from FY2011 to FY2021.

Neither party likes the BCA caps and in 2013 the two sides agreed to relax them for FY2014 and FY2015. Now that they are debating FY2016, however, the BCA caps are back in force. Republicans found a way around the cap for defense spending by adding tens of billions of dollars to an account (Overseas Contingency Operations—OCO) that is not included in the cap and changing the rules on how OCO money may be spent (for regular defense needs rather than only for executing the war in Afghanistan, for example).

For non-defense spending, like that in the CJS bill, Republicans are insisting on holding to the BCA caps. The White House and congressional Democrats want a relaxation of the caps for non-defense spending, too, and the President has vowed to veto any appropriations bill that does not treat non-defense spending the same as defense spending. Thus, reaching agreement on the FY2016 appropriations bills is expected to be a lengthy process.

As for NASA specifically, four key issues are emerging during the debate over the President's request: the increase in funding for earth science; the decrease in funding for planetary science; the request for the Asteroid Redirect Mission (ARM); and funding for human spaceflight – the Space Launch System (SLS), Orion spacecraft, and commercial crew.

Earth Science

The President is requesting a substantial increase for NASA's earth science budget: $1.947 billion, a $174.8 million increase over FY2015. The increase reflects two significant changes: a decision to begin funding for a "multi-decadal sustainable land imaging program" that includes building and launching the next Landsat satellite; and an administration decision to transfer to NASA from NOAA responsibility for all non-defense satellite earth observation programs other than weather satellites.

Land Imaging. Landsat has a long and tortuous history that is too complex to explain fully in this brief report, but here is its essence. NASA launched the first Landsat satellite (then called Earth Resources Technology Satellite – ERTS) in 1972, with a total of five NASA-built satellites launched by 1984. In the late 1970s, however, the Carter Administration (and the Reagan Administration thereafter) decided the program was sufficiently mature to leave NASA, which focuses on research and development, and transferred it to NOAA (which has operational responsibilities) with the goal of privatizing it. The privatization effort resulted in the construction of Landsat 6, but it was lost in a launch failure, which also ended the privatization effort. Data from Landsat are widely used and a decision was made to continue launching these satellites and the program ultimately was returned to NASA, but with the U.S. Geological Survey (USGS) assuming operational responsibilities for the satellites once they are in orbit. USGS already had been in charge of distributing Landsat data from the Earth Resources Observation and Science Center (EROS) in South Dakota for many years

NASA built Landsat 7 as well as Landsat 8, the newest in the series, which was launched in 2013. The Obama Administration proposed transferring the entire Landsat program to USGS, including responsibility for building Landsat 9 and subsequent satellites. Congress rejected the proposal and the program remained at NASA. NASA became determined to create a long-term "sustainable" program that would provide stability instead of Landsat perennially seeming to be a waif in search of a home. The FY2016 budget request has the first funding this sustainable program, which includes money to begin building Landsat 9 for launch in 2023; a separate "free flyer" for launch in 2019 to ensure continuity of thermal infrared (IR) data; and investments in new technology and system innovation to reduce the cost of future Landsats.

NASA's earth science program is viewed as a potential lightning rod for climate change skeptics on Capitol Hill, so a substantial increase may provoke intense debate. However, Sen. Barbara Mikulski (D-MD), the top Democrat on the Senate Appropriations Committee (and its Commerce-Justice-Science subcommittee that funds NASA) is a strong supporter of earth science at NASA. On the authorization side, Sen. John Thune (R-SD), chairs the Senate Commerce, Science and Transportation Committee that oversees NASA, and the EROS Center is in his state, so he may be more familiar than others with the utility of Landsat data. Thus, the Landsat portion of the increase may encounter smoother sailing at least in the Senate than other earth science activities, although some still argue that it should be funded by USGS even though Congress rejected that idea already.

Responsibilities of NASA Versus NOAA. The division of responsibilities between NASA and NOAA for weather and climate satellite research and observations also has a long and complex history. NOAA has been responsible for operational civilian weather satellites for decades, but its interest in climate observations from satellites has grown. Beginning in 1994, it became one of the two major agencies (DOD was the other) that tried to merge the defense and civil weather satellite programs in the National Polar-orbiting Operational Environmental Satellite System (NPOESS), to which a number of climate sensors were added over the years.

Cost increases and schedule delays in NPOESS led to its cancellation, and cost increases in NOAA's replacement program, the Joint Polar Satellite System (JPSS), prompted sharp rebukes even from supporters in Congress. Congress has made clear in recent years that it wants NOAA to focus on weather, not climate, and to reduce the percentage of NOAA's budget devoted to satellites versus its other responsibilities.

Under this proposal in the FY2016 budget, NOAA will retain responsibility for weather satellites (JPSS and GOES-R), radio occultation satellites (COSMIC-2), and space weather satellites (DSCOVR was launched in February 2015 and NOAA wants to begin planning for a successor). For more information on NOAA's satellite programs, see our fact sheet.

NOAA has been trying to determine how to launch three instruments that were intended to be flown on NPOESS. One of those, the Total and Spectral Solar Irradiance Sensor (TSIS), has been in limbo for several years, but in the FY2016 budget would be assigned to NASA instead of NOAA. NASA plans to place TSIS-1 on the International Space Station instead of launching it as a stand-alone satellite. NASA would also take on responsibility for any future ocean altimetry satellites in the Jason series (NOAA's Jason-3 is scheduled for launch this spring).

Past attempts to shift programs from NOAA to NASA have resulted in opposition from some NASA supporters in Congress who see it as a drain on NASA's budget. Others oppose climate science research more generally and may regard the increase in NASA's budget for earth science unjustified. NASA told SpacePolicyOnline.com via email on February 2, 2014 that approximately $54 million of the $174.8 million increase requested for the earth science program in FY2016 is attributable to the shift of activities from NOAA to NASA.

Planetary Science

The President is requesting $1.361 billion for planetary science, a decrease of $76.6 million compared to the FY2015 appropriations. Planetary science is very popular on both sides of Capitol Hill and any decrease is certain to cause complaints. The new chairman of the House Appropriations CJS subcommittee, Rep. John Culberson (R-TX), is a very strong supporter of planetary science, especially a robotic mission to Europa, a moon of Jupiter that is thought to have a liquid ocean under its icy crust. NASA did not plan to launch a mission to Europa because of budget constraints, but Culberson has been one of the leaders in Congress adding money to NASA's budget for each of the past three years to work on such a project. In FY2015, for the first time, NASA requested a small amount for Europa – $15 million – which Congress increased to $100 million. The FY2016 request is for $30 million and almost certainly will be increased by Congress. The question is whether it will add money to funding for the Science Mission Directorate (SMD) or reduce other SMD accounts to compensate.

Asteroid Redirect Mission (ARM)

President Obama's proposal two years ago to send a robotic probe to a small asteroid and redirect it into a retrograde orbit around the Moon where it would be visited by astronauts to retrieve a sample and return it to Earth has been controversial since it began. This is not a line item in NASA's budget and the money for it is spread across the Science Mission Directorate (SMD), the Space Technology Mission Directorate (STMD) and the Human Exploration and Operations Mission Directorate (HEOMD). ARM is part of an "Asteroid Initiative" that includes other funding in the Office of the Chief Technologist.

It is very difficult to track the money for this program since it is located in so many places and not identified in NASA's budget documents or congressional appropriations bills. Table 3 displays the figures provided to SpacePolicyOnline.com by NASA on February 2, 2015. This year, NASA stresses that most of the $220 million associated with the program is not specifically for ARM, but is being "leveraged" from activities that NASA would engage in even if ARM did not exist. NASA counts only $38 million in the HEOMD budget for formulation and the $7 million in the Office of Chief Technologist for the Asteroid Grand Challenge as "direct" funding.

ARM involves locating asteroids, developing high power solar electric propulsion (SEP), and developing a robotic probe (powered by SEP) and capture system to either bag a small asteroid or pluck a boulder from a larger asteroid and nudge it into lunar orbit. NASA calls those Option A and Option B, respectively, and in March 2015 chose Option B for implementing the mission. NASA continues to insist that ARM will cost $1.25 billion, but it is not clear what is included in that estimate. It does NOT include the costs of the crew portion of the mission (launching the astronauts and their activities at the asteroid) or the launch of the robotic spacecraft. NASA officials say that it does include the cost of SEP and presumably includes the cost of the spacecraft and the mechanism for capturing the boulder from the asteroid's surface.

The NASA Advisory Council (NAC) has been asking intense questions about the cost of the portion of the mission that involves redirecting the asteroid for many months. It wanted an independent cost estimate (ICE) for Options A and B before the choice was made, but NASA declined to do so. NAC is concerned that if the cost grows beyond $1.25 billion, it could delay achieving NASA's long term goal – sending humans to Mars – and does not see the relevance of moving an asteroid to that goal. At its April 2015 meeting, NAC adopted a finding that NASA should not send the SEP-powered spacecraft to an asteroid at all, but instead send it all the way to Mars and back as a test of the SEP. Findings are not recommendations and NASA does not need to respond to the finding, but other policymakers, especially in Congress, may be influenced by it.

SLS/Orion and Commercial Crew

This year's budget request continues the long standing tension between Congress and the Obama Administration over the relative priority of building SLS and Orion versus commercial crew.

Congress directed NASA to build SLS and Orion in the 2010 NASA Authorization Act. They want the agency to focus on sending humans beyond low Earth orbit (LEO) – eventually to Mars – not only on utilization of the International Space Station, which is in LEO.

In 2010, NASA was advocating a public-private partnership to build commercial crew transportation systems to take astronauts to and from the ISS. The compromise reached in the 2010 NASA Authorization Act allowed NASA to proceed with commercial crew while at the same time it began a new "heavy lift" launch vehicle, SLS, and crew spacecraft, Orion, to take crews beyond LEO. Members of the House and Senate have complained each year since then that the Administration favors commercial crew over SLS/Orion and routinely adds money for SLS/Orion and cuts funding for commercial crew.

This year is no different. NASA is requesting significantly less for SLS and Orion than Congress appropriated for FY2015 and a substantial increase for commercial crew, as shown in Table 1. NASA officials including Administrator Bolden insist that if Congress does not provide the full $1.2 billion for commercial crew, NASA will have to renegotiate its fixed price contracts with Boeing and SpaceX and would not be able to guarantee that the systems will be ready by the end of 2017 as currently planned. Until the commercial crew systems are available, NASA will continue to be dependent on Russia to ferry astronauts to and from ISS. NASA has not had an ability to launch people into space since the space shuttle was terminated in 2011.

NASA FY2016 Appropriations

NASA's appropriations are part of the Commerce-Justice-Science (CJS) bill, one of 12 appropriations bills on which Congress is supposed to act in each fiscal year. The House and Senate Appropriations Committees have CJS subcommittees. The House CJS subcommittee held a hearing on the FY2016 request on March 4, 2015 and the Senate CJS subcommittee held its hearing on April 16, 2015.

House Appropriations Action

The House Appropriations Committee approved its version of the CJS bill on May 20, 2015 by voice vote. No amendments to the NASA section of the bill were adopted.

Table 1 shows the amounts recommended in the bill and accompanying report. Although the total is the same as the request -- $18.529 billion – the funding is allocated differently. The committee cut funding for Science; Space Technology; Space Operations; Safety, Security and Mission Assurance; and Construction, Environmental Compliance and Restoration (CECR). Additions are made to Aeronautics, Exploration, and Education. The two areas most affected are Science, especially the earth science program, and Exploration.

***Science*.** The bill reflects CJS subcommittee chairman John Culberson's (R-TX) enthusiasm for a robotic probe to Europa, a moon of Jupiter with an icy crust covering a liquid ocean, which means it is a candidate for the existence of life. The bill adds $110 million to the $30 million requested for Europa, specifies that it be launched by 2022, and that SLS be used as the launch vehicle. NASA had not planned on paying for a Europa mission and does not see how it can afford one for launch as early as 2022. Culberson clearly has other ideas. In fact, the report accompanying the bill directs NASA to create an "Ocean Worlds Exploration Program" of which the Europa mission is part. The program's goal is to "discover extant life on another world." The bill also specifies that $25 million of the $625 million it allocates for Space Technology (which is cut $100 million from the request) be spent on "icy satellite surface technology and test-bed activities." Europa is an icy satellite (or icy moon) and although the current proposal for a Europa mission is for an orbiter, advocates want to add a lander.

The bill also adds $26.5 million for astrophysics, which partially pays for a $35.8 million increase for NASA's exoplanets program to accelerate efforts to directly image exoplanets using the Wide-Field Infrared Survey Telescope (WFIRST). NASA plans to build WFIRST after the James Webb Space Telescope (JWST) is completed.

The earth science program bears the brunt of cuts to offset those increases as well as an overall cut to the Science budget of $51 million. The committee reduces earth science by $258.1 million compared with the $1.947 billion request, approximately 13 percent less. No funds are provided for the Thermal-Infrared Free-Flyer (TIR-FF) that NASA is proposing to ensure there are no gaps in providing thermal infrared imaging data.

Exploration. Another area of disagreement with the Obama Administration is the requested funding for SLS and Orion. The committee's report says the request "reflects flagging commitment on the part of NASA to present a bold vision." Orion is funded at the requested level of $1.096 billion, but significant funds are added for SLS development whether compared to the request or current funding. Conversely, the request for commercial crew is cut.

The bill adds almost $500 million above the $1.357 billion requested for SLS development. The request, however, is sharply less than the $1.700 billion Congress provided in FY2015, a source of congressional complaints that NASA is underfunding the program. The committee provides $1.850 billion, of which no less than $50 million is for an "enhanced upper stage." SLS requires a large upper stage to launch many of the envisioned payloads that is often called the "exploration upper stage" or EUS. NASA does not have the funds for it now and is developing

an "interim" upper stage for early SLS flights. Advocates think it would be more cost effective to move directly to the EUS. The committee also creates a new SLS budget line, "program integration," funded at $53 million. The bill combines the $1.850 billion for SLS development (including EUS), the $410 million for associated ground systems (same as the request), and the $53 million for program integration for a total of $2.313 billion. The comparable number in the request is $1.767 billion, so, in total, for all three aspects of the SLS program in the Exploration budget, the committee adds $546 million, a 31 percent increase.

Commercial crew, by contrast, would receive $1 billion even, $224 million less than the request (a 20 percent cut), but $195 million more than FY2015.

Asteroid Redirect Mission. In its report, the committee says that while questions remain about ARM's overarching mission, it has been useful in motivating NASA to develop new rocket propulsion technologies, which the committee supports. It urges NASA to finalize a mission concept that "will galvanize support and interest."

NASA and White House Reaction. On May 19, the day before full committee markup, the Director of the Office of Management and Budget (OMB), Shaun Donovan, sent a letter to the chairman and ranking member of the House Appropriations Committee (Rep. Hal Rogers, R-KY, and Rep. Nita Lowey, D-NY) expressing White House concerns about the bill overall, including NASA. NASA Administrator Charlie Bolden posted his own concerns on his blog. The top issue for both of them is the cuts to Space Technology and commercial crew that they see "imperiling" the Journey to Mars, in Bolden's words. While the cuts in other areas, such as earth science, warrant a mention, they are not at top of the list. Donovan's letter did not threaten a presidential veto (normally such a position would be taken before the bill goes to the floor for a vote, not at this stage of the process), but said the White House looks forward to working with the committee to resolve the issues.

That was the position of Democrats on the Appropriations Committee during markup as well. Rep. Mike Honda (D-CA) introduced, but withdrew, an amendment to add money to the Science budget. CJS ranking member Rep. Chaka Fattah (D-PA) thanked him for withdrawing it so that everyone could work together to find a solution. Subcommittee chairman Culberson said he is a big fan of science and would try to fix the problem within the budget caps imposed by the Budget Control Act (BCA). Fattah rejoined that he would try to raise the caps. (See the discussion of the budget cap issue at the beginning of this report.)

NASA Authorization Bills

(Not sure of the difference between an appropriation and an authorization? See our "What's a Markup" Fact Sheet.)

NASA's authorization ("oversight") committees are the House Science, Space, and Technology (SS&T) Committee and Senate Commerce, Science, and Transportation Committee. The 2010 NASA Authorization Act (P.L. 111-267) is the most recent NASA authorization act. Its funding recommendations covered only through FY2013, but the policy provisions remain in effect until and unless they are repealed or replaced.

House-passed 2015 NASA Authorization Act. The House passed a one-year FY2015 NASA authorization (H.R. 810) on February 10, 2015 under suspension of the rules. It is virtually identical to the 2014 NASA Authorization Act passed by the House in 2014 other than substituting the amounts appropriated for NASA for FY2015 for those appropriated for FY2014. The Senate never acted on the 2014 bill and it died at the end of the 113th Congress. It has not yet acted on the 2015 bill.

House NASA Authorization Act for 2016 and 2017 (H.R. 2039). The policy provisions of H.R. 2039 are virtually identical to those in H.R. 810. The funding provisions are completely new, however, since they cover future years. As shown in Table 2 below, the funding recommendations are complicated because the bill recommends funding at two different levels depending on whether or not the budget caps set in the 2011 Budget Control Act (BCA) are removed.

- The first set of funding recommendations assumes the BCA caps are lifted. A press release from committee Republicans refers to those levels as "**aspirational**."
- The second set assumes the BCA caps are not lifted; the press release calls that set "**constrained**."
- A third scenario is mentioned – where the funding falls somewhere in between – in which case any additional funds would be applied proportionately among all of NASA's funding accounts.

In total, the aspirational level for FY2016 is the same as the President's request of $18.529 billion. The constrained level is what NASA received for FY2015 -- $18.010 billion. There are many differences, however, in how the legislation would allocate that money compared to the President's request.

Proposed cuts to NASA's earth science program were the most divisive issue during committee markup on April 30. Whether compared to NASA's current FY2015 budget or the President's FY2016 request, under either the aspirational or constrained scenario, earth science would be sharply reduced.

NASA's earth science program is funded at $1.773 billion in FY2015. The request for FY2016 is $1.947 billion. Under the bill's aspirational scenario, it would receive $1.450 billion in FY2016. Under the constrained scenario, it would receive $1.199 billion. Using current funding and the aspirational scenario for FY2016, it would be an approximately 18 percent cut. Compared to the President's request, it would be a roughly 26 percent cut. If the BCA caps are not removed and the constrained scenario plays out for FY2016, it would be about a 32 percent cut compared to current funding or a 38 percent cut compared to the President's request.

House and Senate Republicans on NASA's authorization committees argue that NASA's unique expertise is space exploration and studying the Earth should not be one of its priorities. Although many also are climate change skeptics, publicly they do not frame their arguments in that context, instead insisting that other agencies should pay for that research, not NASA.

Space technology is another area that would suffer compared to the President's request. It is currently funded at $596 million. The President's request for FY2016 is $725 million. Under the bill's aspirational scenario, it would receive $596 million – its current level – for FY2016.

Compared to the request, that is a cut of about 18 percent. Under the constrained scenario, space technology would receive $500 million, approximately 16 percent less than today and about 31 percent less than the President's request.

By comparison, NASA's human exploration program – the Space Launch System (SLS), Orion, and associated ground systems – and planetary science and astrophysics fare much better as shown in Table 2. The President's request would cut funding for SLS and Orion; this bill would restore them to their FY2015 levels. Republicans and Democrats in Congress complain that the Obama White House underfunds SLS and Orion knowing full well that they are congressional priorities because the White House favors the commercial crew program. The House bill does provide the full request for commercial crew in FY2016 ($1.244 billion) under the aspirational scenario, but less ($1.136 billion) in the constrained scenario.

The President's request also cuts planetary science, another congressional favorite. It is funded at $1.438 billion this year and the request would cut that down to $1.361 billion. The House bill instead would raise it to $1.5 billion regardless of what happens with the BCA caps. The bill states that up to $30 million is specifically for the Astrobiology Institute. Astrophysics (excluding the James Webb Space Telescope, which has its own budget account) is currently funded at $685 million and the President's request would increase it to $709 million. The House bill would raise it even more, to $731 million, under the aspirational scenario. In the constrained scenario, it would receive the $709 million requested.

Overall, the House bill demonstrates well known differences between Republicans and the Obama White House over NASA's priorities. Congressional Democrats also disagree with the Obama Administration on many of those issues, but earth science funding is one area where Democrats have tried to protect NASA's program.

The committee approved the bill on April 30, 2015, on a party-line vote. The debate was highly partisan.

Table 1: NASA's FY2016 Budget Request and Congressional Action (in $ millions, see notes below)

			Authorization			Appropriations		
Account	**2015 Appro**	**2016 Req**	**House cmte apprvd (note 6)**	**Senate**	**Final**	**House (cmte apprvd)**	**Senate**	**Final**
Science	**5,244.7**	**5,288.6**	**4,951.7**			**5,237.5**		
Earth Science	*1,772.5*	*1,947.3*	*1,450.0*			*1,689.2*		
Planetary Science	*1,437.8*	*1,361.2*	*1,500.0*			*1,557.0*		
Astrophysics	*684.8*	*709.1*	*730.7*			*735.6*		
JWST	*645.4*	*620.0*	*620.0*			*620.0*		
Heliophysics	*662.2*	*651.0*	*651.0*			*642.0*		
Education	*42.0*	*note 5*	*note 5*			*note 5*		
Aeronautics	**651.0**	**571.4**	**571.4**			**600.0**		
Space Technology	**596.0**	**724.8**	**596.0**			**625.0**		
Exploration	**4,356.7**	**4,505.9**	**4,953.1**			**4,759.3**		
Expl Sys Dev	*3,245.3*	*2,862.9*	*3,310.0*			*3,409.3*		
(Orion)	*(1,194.0)*	*(1,096.3)*	*(1,200.0)*			*(1,096.3)*		
(SLS)	*(1,700.0)*	*(1,356.5)*	*(1,700.0)*			*(1,850.0)*		
(Expl Ground Sys)	*(351.3)*	*(410.1)*	*(410.0)*			*(410.0)*		
(Prog Integration)	*N/A*	*N/A*	*N/A*			*(53.0)*		
Commercial Spflt	*805.0*	*1,243.8*	*1,243.8*			*1,000.0*		
Expl R&D	*306.4*	*399.2*	*399.2*			*350.0*		
Space Operations	**3,827.8**	**4,003.7**	**3,992.5**			**3,957.3**		
ISS	*N/A*	*3,105.6*	*N/A*			*3,075.6*		
Space & Flt Sprt	*N/A*	*898.1*	*N/A*			*881.7*		
Education	**119.0**	**88.9**	**119.0**			**119.0**		
Safety/Security/MS	**2,758.9**	**2,843.1**	**2,843.1**			**2,768.6**		
CECR	**419.1**	**465.3**	**465.3**			**425.0**		
Inspector General	**37.0**	**37.4**	**37.0**			**37.4**		
TOTAL	**18,010.2**	**18,529.1**	**18,529.1**			**18,529.1**		

Notes: (1) Columns may not add due to rounding. Text and numbers in *italics* are subtotals. Text and numbers in (*italics in parentheses*) are sub-subtotals. Figures for NASA's FY2015 appropriations are from the joint explanatory statement to accompany the FY2015 Consolidated and Further Continuing Appropriations Act (the "CRomnibus). Figures for the FY2016 request are from NASA budget materials at http://www.nasa.gov/budget. The budget account "Safety, Security and Mission Services" previously was called Cross-Agency Support. Congress changed the name in the FY2015 appropriations bill.
(2) CECR = Construction, Environmental Compliance and Restoration. CoF = Construction of Facilities. NA = not applicable/ not available/not specified
(3) The Asteroid Initiative is not specifically identified in NASA's budget documents. Funding is spread through the Human Exploration and Operations Mission Directorate, the Space Technology Mission Directorate, the Science Mission Directorate, and the Office of Chief Technologist. See table 3.
(4) The Space Launch System (SLS) is funded in three different accounts. For convenience, table 4 delineates that funding.
(5) In the FY2015 budget, Congress broke out funding for education within the Science Mission Directorate (SMD) as a separate line item. The FY2016 request includes $20 million in the Astrophysics line item for education and outreach for the entire directorate. The House Appropriations CJS committee report states that $32 million of the $735.6 million in the astrophysics line is for SMD education.
(6) As shown in Table 2 below, the House authorizing committee presented two budget scenarios: "aspirational" and "constrained" depending on whether the NASA budget would be constrained by budget caps. The subsequent House Appropriations Committee action recommended total NASA funding of $18,529.1 million, which is the same as the House authorizing committee's aspirational level. Therefore, the aspirational level is used in this table.

Table 2: House NASA Authorization Act for 2016 and 2017 (H.R. 2039)
(in $ millions)

Account	2015 Appropriated	2016 Request	House Auth 2016 (see note 2)		House Auth 2017 (see note 2)	
			Aspirational	Constrained	Aspirational	Constrained
Science	**5,244.7**	**5,288.6**	**4,951.7**	**4,678.6**	**4,935.3**	**4.678.6**
Earth Science	*1,772.5*	*1,947.3*	*1,450.0*	*1,198.5*	*1,450.0*	*1,198.5*
Planetary Science	*1,437.8*	*1,361.2*	*1,500.0*	*1,500.0*	*1,500.0*	*1,500.0*
Astrophysics	*684.8*	*709.1*	*730.7*	*709.1*	*730.7*	*709.1*
JWST	*645.4*	*620.0*	*620.0*	*620.0*	*569.4*	*620.0*
Heliophysics	*662.2*	*651.0*	*651.0*	*651.0*	*685.2*	*651.0*
Education	*42.0*	*see note 3*	*not specified*	*not specified*	*not specified*	*not specified*
Aeronautics	**651.0**	**571.4**	**571.4**	**571.4**	**580.0**	**571.4**
Space Technology	**596.0**	**724.8**	**596.0**	**500.0**	**596.0**	**500.0**
Exploration	**4,356.7**	**4,505.9**	**4,953.1**	**4,845.4**	**5,268.0**	**4,845.4**
Expl Sys Dev	*3,245.3*	*2,862.9*	*3,310.0*	*3,310.0*	*3,681.5*	*3,310.0*
(Orion)	*(1,194.0)*	*(1,096.3)*	*(1,200.0)*	*(1,200.0)*	*(1,349.6)*	*(1,200.0)*
(SLS)	*(1,700.0)*	*(1,356.5)*	*(1,700.0)*	*(1,700.0)*	*(1,899.6)*	*(1,700.0)*
(Expl Ground Sys)	*(351.3)*	*(410.1)*	*(410.0)*	*(410.0)*	*(432.3)*	*(410.0)*
Commercial Spflt	*805.0*	*1,243.8*	*1,243.8*	*1,136.1*	*1,184.8*	*1,136.1*
Expl R&D	*306.4*	*399.2*	*399.2*	*399.2*	*401.7*	*399.2*
Space Operations	**3,827.8**	**4,003.7**	**3,992.5**	**3,950.4**	**3,992.5**	**3,950.4**
ISS	*not specified*	*3,105.6*	*not specified*	*not specified*	*not specified*	*not specified*
Space & Flt Sprt	*not specified*	*898.1*	*not specified*	*not specified*	*not specified*	*not specified*
Education	**119.0**	**88.9**	**119.0**	**119.0**	**119.0**	**119.0**
Safety/Security/MS	**2,758.9**	**2,843.1**	**2,843.1**	**2,843.1**	**2,843.1**	**2,843.1**
CECR	**419.1**	**465.3**	**465.3**	**465.3**	**436.1**	**465.3**
Inspector General	**37.0**	**37.4**	**37.0**	**37.0**	**37.0**	**37.0**
TOTAL	**18,010.2**	**18,529.1**	**18,529.1**	**18,010.2**	**18,807.0**	**18,010.2**

Note 1: Columns may not add due to rounding. Numbers in *italics* are subsets. Numbers in *(italics enclosed in parentheses)* are sub-subsets.

Note 2: The bill (H.R. 2039) authorizes amounts for FY2016 and FY2017 under two scenarios. In a press release, the committee refers to them as "aspirational" and "constrained." The higher "aspirational" levels assume that the budget caps in the 2011 Budget Control Act (BCA) are removed by Congress. The lower "constrained" levels assume the BCA caps remain in place.

Note 3: In the FY2015 appropriations bills, Congress broke out funding for education within the Science Mission Directorate (SMD) as a separate line item. The FY2016 request includes $20 million in the Astrophysics line item for education and outreach for the entire directorate.

Table 3: Funding for the Asteroid Initiative, Including the Asteroid Redirect Mission (ARM) (in $ millions)

Purpose	FY2014 Enacted	FY2015 Request	FY2016 Request
"Direct" Funding (see notes)			
ARM Formulation (HEOMD)	0	0	38
Asteroid Grand Challenge and related activities (Office of Chief Technologist)	7	7	7
"Leveraged" Funding (see notes)			
Asteroid Detection (SMD)	40.5	40	50
Solar Electric Propulsion (STMD)	39	93	69
EVA Suits, In-Space Robotic Servicing (HEOMD)	40	40	56
TOTAL	126.5	180	220

Notes: Figures in this table are from a chart provided to SpacePolicyOnline.com by NASA on February 2, 2015. That chart listed only the FY2015 requested figure, not the FY2015 appropriated level. The final funding for FY2015 must be approved by Congress when it sees NASA's operating plan.
The figures in this chart differ somewhat from how NASA has described funding for ARM in the past, so is not directly comparable to the tables in earlier versions of this fact sheet.
For FY2016, NASA distinguishes between "direct" and "leveraged" funding for ARM, where direct funding is specifically related to the Asteroid Initiative (which includes ARM) while "leveraged" funding is for NASA activities that would be undertaken even if the Asteroid Initiative did not proceed.
HEOMD = Human Exploration and Operations Mission Directorate. SMD = Science Mission Directorate. STMD = Space Technology Mission Directorate

Table 4: Funding for the Space Launch System (in $ millions)

Account: Subaccount	FY2014 Enacted	FY2015 Request	House Appropriations (passed)	Senate Appropriations (committee)	Final FY2015	FY 2016 Request
Exploration: Exploration Systems Development/ SLS	1,600.0	1,380.3	1,600.0	1,700.0	1,700.0	1,356.5
Exploration: Exploration Systems Development/ Exploration Ground Systems	318.2	351.3	315.0	351.3	351.3	410.1
CECR: Exploration Construction of Facilities	*139.3	52.3	52.3	**52.3	*not specified	10.0
TOTAL	**2,057,5**	**1,783.9**	**1,967.3**	**2,103.6**		

Notes: CECR = Construction, Environmental Compliance and Restoration.

* The $139.3 figure for FY2014 CECR is from NASA's FY2016 budget request and is slightly less than the $142 million figure included in the explanatory statement accompanying the FY2014 Consolidated Appropriations Act or the explanatory statement. The total for FY2014 enacted is adjusted accordingly. The FY2016 budget request does not show how much was appropriated for FY2015 in the CECR account. It will be added if and when it becomes publicly available.
** The Senate committee report for the FY2015 appropriations bill, S. Rept, 113-181, does not break down the spending in the CECR account, but says that it is the same as the request, so this table shows the requested amount.