

## Media Teleconference: NASA Administrator Discusses 2014 Fiscal year Budget Proposal

### Speakers:

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### Moderator:

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3 p.m., EDT

Wednesday, April 10, 2013

**TELECONFERENCE OPERATOR:** Welcome, and thank you for standing by. At this time, all participants are in a listen-only mode. At the end of today's presentation, we will conduct a question-and-answer session. To ask a question, please press Star/1. Today's conference is being recorded. If you have any objections, you may disconnect at this time.

Now I would like to turn the meeting over to Mr. Allard Beutel. Sir, you may begin.

**MODERATOR:** Great. Thank you.

Welcome to this Media Teleconference about NASA's Fiscal Year 2014 Budget Proposal. Here to discuss the details, including the agency's new Asteroid Initiative, is NASA Administrator Charles Bolden and NASA Chief Financial Officer Elizabeth Robinson. We will start with our two briefers and then open it up for your questions.

Administrator Bolden?

**ADMINISTRATOR BOLDEN:** Thank you very much, Allard, and thanks to all of you this afternoon for joining us. I know it's been a very busy day for us and probably the same for you.

Let me talk just very briefly. I'll give you an overview and then ask Dr. Robinson to take us through the details of the budget.

The President's Fiscal Year 2014 budget ensures that we, the U.S., remain the world's leader in space exploration and scientific discovery for years to come, while making critical advances in aerospace and aeronautics to benefit the American people. This budget reflects the fiscal realities of our time and aligns NASA's full spectrum of activities in order to meet the President's challenge to send humans to an asteroid in 2025 and Mars in the 2030s, all in more innovative and cost-effective ways that will inspire the world. Our work will improve life on Earth, protect our home planet, create jobs, and strengthen the American economy.

NASA is using game-changing technologies advanced by the administration to develop a first-ever mission to identify, capture, and retrieve an asteroid. This mission raises the bar for human exploration and discovery, helps us protect our home planet, and brings us closer to a human mission to an asteroid. It brings together the best of NASA's efforts in all areas to achieve the President's goals faster and cheaper.

Our American industry partners are innovating new ways to reach space, creating jobs and enabling NASA to focus on new technologies that benefit all of our missions. This budget keeps commercial cargo resupplied to the International Space Station on track, and it provides the necessary resources to launch American astronauts from U.S. soil within the next 4 years. The Space Station remains the core of our next great leap in exploration, helping us learn to live and work in space, demonstrating new technologies, and making research breakthroughs not possible here on Earth. This budget continues investments into rocket and crew vehicle that will take astronauts to deep space, and it drives development of space technologies, such as solar electric propulsion, that will power tomorrow's mission.

On the heels of what I consider to be the incredibly successful Curiosity last August, the Fiscal Year '14 budget includes another funding for another Mars rover marching into 2020. It includes operations of rovers and orbiters already there, the MAVEN mission launching this November to study Martian upper atmosphere and also InSight, which is a Martian lander to be launched in 2016 that will probe deeper into the Martian soil.

The budget will sustain NASA's vital role in helping us understand the Earth systems and climate and the dynamics between our planet and the Sun. We will continue our steady progress toward our next great observatory as we develop and conduct critical tests on the James Webb Space Telescope.

This budget supports the administration's plan to consolidate and make more efficient the many STEM education programs across the federal government, ensuring that NASA's unique ability to inspire the next generation is maintained. We've had to make some tough choices with this budget, but NASA is using its resources strategically for a unified, cohesive exploration program that raises the bar of what humans can achieve.

And now it's my pleasure to introduce our Chief Financial Officer for the agency, Dr. Beth Robinson. Beth?

**DR. ROBINSON:** Thank you.

I'm going to be speaking from a presentation, which you can find on [NASA.gov](http://NASA.gov), which is our summary presentation of the budget. In addition, you can find our very detailed congressional justification, if you want to get even more into the detail, and also there's several other presentations about some of the highlights that will be there, including the Asteroid Mission.

As we start, I think it's on Ustream as well, and so if we go to the first slide. I always like to talk about the benefits first of our budget. Budgets are a lot about cost and resource utilization and all that, but we do it for a reason. We do it because we're trying to advance aeronautics and space activities for the benefit of the taxpayer. We do that in several ways. We have global leadership positions in space exploration and scientific discovery, which strengthen our economy through investments and innovations in both science and technology as well, and then to draw that, we improve life here on Earth. So between those goals, we can justify everything in this budget and are working hard on it.

Now I am going to the next slide. There are highlights in this presentation, but Charlie has given such a great overview that I am going to start talking first about the specific funding highlights. Those include that we fully fund the Space Launch System and the Orion Multi-Purpose Crew Vehicle. In the '14 budget time, the Orion actually is going to fly its first test flight, and SLS will follow with an uncrewed Orion on top in 2017, and then the first crewed flight is in 2021.

This budget also fully funds the Commercial Crew Program. It's our plan to restore America's ability to launch humans into space from American soil, and as I'll explain later when we get to the program budget specifics, it's very important that we fund it at the \$821 million level of our request in order to ensure that we're able to fly those missions by 2017.

Another highlight is all the work that we're supporting on the International Space Station. It's our unique on-orbital National Laboratory. There's just a very broad swath of research that's going on and will go on in the budget year on the ISS, including biology and physiology experiments, as well as earth science and technology demonstration. We don't have the time here to go in depth to the many hundreds of experiments that are being conducted and will be, so I encourage you to find out about those.

We do all this by investing in crucial and cutting-edge space technologies as well as aeronautics technologies, and in particular, in the aeronautics area, we have a new initiative on advancing composites and their use, making them more easily usable in aviation.

We fund crucial Earth science land imaging capabilities, and we have some new responsibilities, which I'll talk about when we talk about the science programs. We're constructing the next great observatory, James Webb, which is on track to launch in 2018. We are also formulating, and will soon be constructing, the next Mars rover, after Curiosity. Curiosity is still driving around the Martian planet, and we here on Earth are developing its successor to launch in 2020.

We also have a launch in the near term in November of MAVEN. MAVEN is a mission that will fly to Mars, get there in September of 2014, and it will be studying the Martian atmosphere.

One of the newest features of our budget is the Asteroid Initiative and as part of that our Asteroid Mission, and that mission provides the first-ever ability for humans to move around objects in our cosmos and to have astronauts go and visit an asteroid. And as you remember,

the President challenged us to do this back in 2010. He said to do it by 2025, and we now have a plan to do that in perhaps as early as 2021. And this is on our overall pathway to Mars in the 2030s.

Finally, a new feature of our budget is the administration's reorganization of STEM, of science, technology, engineering, and mathematics education activities. This is across the 13 agencies that already participate in those programs. There is a consolidation into the Department of Education, National Science Foundation, and the Smithsonian. The Education Department will be focusing primarily on K-through-12 activities and in fact will be undergraduate and graduate activities, and then the Smithsonian will be focusing on hands-on experiential-type learning. And NASA is going to play a very important role in this, and this initiative provides the ability for NASA to reach out to even broader education audiences than we have so far.

Okay. Before we get to the numbers, there are a few things that I have to say to make sure that we're all sort of on the same page of the understanding behind the numbers. The first has to do with sequestration. If you followed the events today and over the weekend, you know the President believes we should replace sequestration with ablated deficit reductions, and the proposal does that. So the overall discretionary formulation of the budget is to the original Budget Enforcement Act cap, not the sequestered cap, and so our budget as part of that is \$17.7 billion.

Our out-year funding assumptions are that we'll remain at that nominal level, the \$17.7 billion through the budget window, and we've accepted that challenge to formulate our program within that tight funding constraint. But also we know that the out-years should be considered notionally, and that we'll be adjusting those levels as we get to those years.

Underneath the top line, there is a government-wide activity to promote efficient and effective spending. We've been doing this on this campaign now for a couple of years. In the first year, we reduced spending on travel, on non-mission-related travel, supplies, materials, printing, IT, by about \$100 million. This year that we're in now, we're on track to reduce it by \$200 million and to make those funds available for direct mission activities, and in this year. So, in the budget year, in '14, we are going to be continuing those initiatives that we've started already and ensuring that we have \$200 million left in that type of spending since previous years that we can then make available for mission-oriented activities.

Also, underneath the top line, we are aligning our NASA workforce. In the post-Shuttle era, our workforce is now reallocated and retrained to work on the new suite of programs, and consistent with our budget limitations, we have been reducing the rate of rehiring and will continue to do that in 2014.

All of the numbers that I am going to talk about in full-cost. That means that the civil servant amounts, the utility amounts, other things like that, that are directly associated with the project are charged to the project, so there are broader support-type functions that are funded in the last accounts that I'll be talking about in the Cross-Agency Support account.

And given the times that we live in, most of the comparisons on funding that I'll be talking about are to 2012. The 2013 number is still a little bit unsettled. What was reflected in the budget itself is what was in current law at the time, which was the CR plus the 0.612 percent amount. We have since moved on, since the databases were locked under those periods under that CR. We have since moved on, and we are formulating our 2013 operating plan to send to Congress in a month or so.

All right. Now we're finally to numbers. So we're on Slide 11. I'm not going to dwell too much on this chart, this table, except to say a few things. One, we do actually add up to \$17.715 billion. The out-years, you will see are flat at the account level. Themes and projects underneath those can vary. There are two exceptions to that. One is that we held Exploration and Space Ops together. If you add them together, we held them flat but allowed trades between those accounts. And the second thing is that for the last couple of years, we've had a construction account where we can only fund our major construction in that account. So programs like our Exploration programs and Space Operations programs that have construction pieces in them, in the budget year in '14, we take out that money and put it into the construction account, so that we can execute the construction projects.

All right. On to 12, we have a very vigorous plan for NASA mission launches through 2020. FY13, actually that we're in right now, is actually a smaller number of launches than normal, but we are going to make up for that in '14 and '15. You are going to hear me talk about a number of launches as we go through the specifics.

So now I'm going to go line by line through the budget, theme by theme, and so we start first with Earth Science in the science account. In this account, we have two launches in 2014, OCO-2 and the Global Precipitation Measurement mission. We're also formulating and developing many others, two of which are going to actually fly in calendar year 2014, although fiscal year 2015, and that's SMAP and SAGE III. We're maintaining our weather and climate change modeling capabilities and are continuing to work with all of our partners to address the need for the various datasets of our communities.

And there are three changes in that regard in this Earth Science portfolio. The first is that we are partnering with NOAA to refurbish the DSCOVR satellite, and in particular, there are two instruments which are already on the spacecraft but need to be provided energy and a couple of other connections, and so we are funding that, actually here in '14, and there is some money in '15—sorry—we're funding it right now in '13, and we are hoping to finish it up in '14. That's number one.

Number two is that the program administered by NOAA for the Joint Polar Satellite System has a plan for a number of launches, and included in that plan are a suite of climate centers. And there have been several independent studies of the JPSS program, and some of them have said that it would be a good idea for NASA to take over the funding for those instruments. So this

budget does that, and we begin the formulation and construction of those instruments in 2014. There's about \$40 million allotted for that.

And the third major change has to do with the Landsat Data Continuity Mission and its follow-on. We did launch LDCM earlier this year and are in the process of turning it over to the Department of Interior. The idea had then been that the Department of Interior would fund the follow-on, the next Landsat, which I think would be Landsat 9, and it had been the proposal by the administration for the last couple of years, but it has yet to be enacted. So the decision was made this year that NASA would once again build the follow-on for the Landsat, to maintain the continuity of the Landsat datasets, and so we'll be working with Department of Interior, who still owns the requirements, and OSTP to formulate how we're going to do that. Obviously, one option is to build, copy in the next-generation Landsat 9 satellite. There are also other opportunities with commercial datasets with suits of instruments that could be brought on earlier and for less funding, so we're going to be looking at all of that.

All right. Moving on to Planetary Science, this is one of the first places that you see the Asteroid Initiative. I will pause in a few charts to talk about the whole of the Asteroid Initiative, but I'll say right now that in terms of new money in the budget for our focus on hazardous asteroids and what we would do about them if we found them, we have \$105 million. 78 of that is for the Asteroid Mission, where we'll actually encounter and manipulate and sample and characterize an asteroid itself.

The first block of money—we fund these activities in four different areas: in Planetary Science, in the Space Technology Mission Directorate, and two places in the Exploration account. So the first place here is in Planetary Science. This is an enhancement of our asteroid detection capabilities. These are both to isolate and map and track potentially hazardous near-Earth objects, but it also will help us identify a target for the Asteroid Mission.

The Obama administration for the last 3 or 4 years has been progressively increasing this budget. It had been about 2- to \$4 million as of about 5 years ago, and it is now in the 2013 budget as \$20 million. And this proposal in 2014 would double it to 40.

Also, in the Planetary Science program is the funding of the development of the OSIRIS-REx mission, which is going to launch in 2016 and will encounter and return a sample from an asteroid, and we are going to be building off the efforts in this program both to how one approaches an asteroid and operates near an asteroid, as well as the sampling techniques that the community has developed for OSIRIS-REx. This will provide critical information for all of our Asteroid Initiative efforts.

As I said before, Planetary Science is funding the next robotic Mars science rover for launch in 2020, funds the launch of MAVEN will get to Mars at the end of the fiscal year '14, and the new feature of this budget is change in our ways that we've been partnering with the Department of Energy to produce plutonium-238. I think many of you know that we need plutonium-238 to power missions that we send deep into the solar system, so that they're too far away to use

solar power effectively, and we had been working with DOE, with a small amount of funding, to refurbish their existing enterprise to produce such material, and that has been going on now for a couple of years. But during that time, we now know that NASA is really the only user of these kinds of capabilities at the Department of Energy, and so since the administration has a user-pays philosophy, we are now in a position to pay for the entire enterprise, including the base infrastructure, at DOE. And we'll be partnering with DOE in the next couple of months to figure out how to best do this and how to streamline the program to produce plutonium-238.

Next slide is about the Astrophysics program. This is the portion that is distinct from the construction of James Webb, so this is focused very much on supporting our operating mission in the recently selected Explorer Mission. We are continuing to get SOFIA to full operational capability and have a number of exciting activities going on here, including long-duration balloon flights in Antarctica.

Moving on to James Webb, James Webb is on track for launch in October 2018, and indeed, Fiscal Year 2014 is going to see many important milestones. The first is that we are going to complete the science instruments and begin their testing as an integrated science payload. We are going to complete the Critical Design Review of the spacecraft bus, and finally, we're going to complete the telescope primary mirror assemblies and begin integration of the secondary mirror support structure. So there's going to be a lot of activity in the James Webb program in '14.

In Heliophysics, we're working toward the launch this year in '13, in June, so not so far very away, of IRIS, and then in a couple of years in 2015, we'll be launching MMS. In formulation, we are working with ESA on the Solar Orbiter Collaboration Mission, and we're working on the large Heliophysics Mission, the Solar Probe Plus. This is a study in contrast. We have a large mission here. We also have some of our smallest missions. We have a new feature in the Heliophysics budget of what we call "CubeSat investigations." These are very small satellites, costing about 1- to \$2 million each, and they have a host of payloads and other ways, and they are very targeted and have some very innovative science they are going to do. So I would encourage you to talk to the science folks about that program.

On Slide 18, I just want to remind you, though it's not in our budget but in the budgets of several other agencies, there are funds that they provide to NASA to do work for them. One of our largest partners is NOAA, and we build for them the Joint Polar Satellite System, the Geostationary Operational Environmental Satellite. Those are Jason-3, and as I mentioned before, DSCOVR.

Moving out of the science programs into aeronautics. Aeronautics, we are maintaining our very strong portfolio of foundational research and our collaboration with the Department of Transportation on the next-generation transportation system, and specifically, we are looking at integration of Unmanned Aerial Vehicles into the national airspace system. We are looking at new aircraft engine technologies that dramatically reduce fuel burn, noise, and emissions, but this year, we also have a new initiative, which is to reduce the timeline for development

and certification of innovative composite materials and structures, and these are very innovative materials. As you know, composites are already used in the aviation industry. See the Dreamliner, for example. So that these are very advanced composite materials and structures that we think will help out the industry a lot.

Next slide is on Space Technology. Space Technology is a very exciting program that produces a lot of new things on a very steady cadence. We have a lot of small collaborations within the NASA workforce and also with academia, small businesses, and the aerospace industry at large, and then we do some very big things, like build a 5.5-meter composite cryogenics propellant tank or the largest solar sail ever, and then a new feature of this budget is that we are accelerating the work on the high-powered solar electric propulsion capability, which will be the capability that will power the mission that goes to the asteroid and brings it back to Earth.

So we are taking a little pause here on Slide 21 to just remind ourselves of where the Asteroid Mission and the Asteroid Initiative are. The proposed mission leverages and aligns existing activities in science, as we discussed, the asteroid observing efforts, the demonstration of new propulsion technologies and space tech, and then also some features that we'll be talking about in the HEO budget, the development of the SLS rocket and Orion vehicles to take the humans to the asteroid and a number of new technologies to encounter and sample and work with the asteroid itself in the Exploration R&D account.

As I said before, the budget overall provides over \$100 million, \$105 million to support identification and general mitigation strategies for asteroids as well as initiating the planning and early development of the asteroid mission itself.

The formulation of this mission is in the early stages. We expect to perform a number of reviews this summer and be able to take a quantum leap, a big leap forward in terms of our planning for this mission, and we are very committed to pursuing an affordable and feasible effort.

Moving on to the Human Exploration and Operations Mission Directorate. Obviously, one of the headliners here is our support and funding for the Space Launch System and Orion Multi-Purpose Vehicle along with the ground systems that go with supporting it, and in fact, those ground systems, there's a lot of activity at Kennedy right now on the Launch Complex 39, the VAB, the Launch Control Center, and all of this is to support the 2017 launch for SLS.

We are also maintaining Orion on track for their un-crewed test flights in 2014 and 2017 as part of the SLS flight and then the first crew flight for SLS and Orion in 2021. Again, I would remind you that it's a little difficult to compare the numbers here because of the amount of funding that we've transferred to the construction account, but \$142 million of this program is over in the construction account.



Then, also, this is a place that we are going to be planning and doing the early development for the Asteroid Capture Mission, and remember it will be the astronauts in Orion that will go and visit the asteroid once it's back in trans-lunar space.

The next component of HEO is the Commercial Spaceflight Program. As I talked about earlier, this is our bid to develop an affordable U.S. Commercial Crew space transportation capability and thereby reduce our dependence on Russian spaceflight capabilities for our crew exchange. Our request is \$821 million, and there's a couple things I'd like to say about this.

First, many people have expressed that they think this program is longstanding, that it's meant to go on for a number of years, and while that's true that just for a small number of years, we really think of it as a project, as something we are trying to develop this capability by 2017. And so like all development projects here at NASA, there is something called the "development curve," where you can start out a little lower as you're developing and planning, but that at some point in the development of the capability, you need to grab hold of the resources and move forward, so that you can develop it in a most cost-efficient manner.

So you can see that development profile here on Slide 23 where indeed we are at higher levels in '14, '15, and '16, but then by 2017, when we are first—the capability is emerging, you are going to see the amounts go down. We would just like to stress the necessity of this type of funding level to ensure that we have this capability and we have a robust and safe option to send the U.S. astronauts to the Space Station.

Moving to the next part of the HEO budget is the Exploration Research and Development programs. These are dedicated to exploration issues. The first is the Human Research Program, which is looking at all the research needs to ensure that humans can stay in space for a long time and travel to great distances. One of the near-term milestones on that roadmap is to have astronauts stay for a year or more on the International Space Station, and we just announced we're going to do that, so we're marching along that roadmap.

The second part of this program is the Advanced Exploration Systems Program, which rapidly develops prototype systems and demonstrates key capabilities for our ongoing missions, and this is the place where there is about \$40 million in the Asteroid Initiative to develop the kinds of technologies that one needs to interact with what we call here an "uncooperative target." Asteroids are uncooperative, because they tend to spin. They have surfaces which are difficult to grab hold of, and there are all sorts of intricacies. So the AES program is going to be developing the technologies that we need to operate in and around an asteroid.

Next comes the International Space Station. I joked that this is almost our 11th center. It's just up in space, because we do operational activities here to maintain the continuous crew of six, and then also, like I said before, there's a very large swath of research that is going on and will go on in FY14 on the International Space Station, from physiology and biology to Earth science to technology demonstrations from our Space Technology Program. And one of the most interesting is that we are reusing some hardware up on the Station to launch the ISS RapidScat

capability that will measure ocean-surface wind speed and direction, and that's literally only one of the many exciting things it's doing, and I encourage you to look at all those hundreds of experiments.

We couldn't do any of that stuff in the sky if we didn't have our assets on the ground, both human and facilities, and they are supported in our Space and Flight Support account. This provides our space communication, both near Earth and deep Earth. This is where we fund our crew and their training. This is where the Launch Services Program resides, still manage three launches in '14, MAVEN, TDRS-L, and OCO-2, and of course, we'll provide analysis and resources to support all of NASA's other missions.

This is also where we fund our rocket test facilities. We test the rockets before we send them up, and so we have to maintain that capability. And then, also, this is where we are preparing to more vigorously and on a more sustainable fashion interact with our Commercial Crew partners. We have the 21st Century Space Launch Complex funded here, where we're working at KSC on a number of the facilities to make them more useful to our commercial partners, and again, this is one of the places where the funding isn't comparable. There's \$26 million of this Construction Initiative is over in the construction account.

Okay. Next is education. We have \$94 million here. First and foremost, I want to point out that there's some core NASA activities which are explicitly funded here, the Space Grant, EPSCoR, MUREP, and GLOBE programs. In addition, there's about \$27 million where, as I said before, there's a consolidation now to create some broad, far-reaching programs in the Department of Education, NSF, and Smithsonian. They know right off the bat that there's some assets here that they want to use, and so we have about \$6.8 million to make those kinds of assets available to them, like our intern database and other things.

We also have about \$20 million that will fund NASA-specific activities, activities that occur on NASA centers using NASA FTEs and civil service workers to carry them out. One example, actually the only example that is now outside of the education program itself, is what we call our Space Technology Fellows Program. That program is to bring the fellows to NASA Centers to work on space technology activities, and so that's considered to be mission-related, but the more broad-reaching, out into the education community, we now through this reorganization initiative have a great opportunity to bring NASA assets to bear for a broad array of programs. If you can imagine, we still have the ISS downlinks into schools, and now this can be incorporated into many different types of STEM programs, and we can make that downlink available to schools across the nation in a more integrated and far-reaching manner than we have to date. So it's a very exciting initiative on the part of the administration.

And finally, we couldn't do any of this without our Centers. We do have 10 Centers here on the ground, Headquarters and our 9 field centers. In the CAS account, we have funds for our management and operations, and we also have a small initiative here on cyber security, which is part of a government-wide initiative to ensure that we have robust connections to the Internet and monitoring of our networks and equipment. And then we have our Construction

and Environmental Compliance account, and again, of the \$69 million, we've already talked about how \$166 million of this is associated with the program, but there is a base institutional amount, which we are using to fund our long-term plan to consolidate and refresh our facilities at our Centers. The Environmental Compliance account is continuing our environmental cleanups and our responsibilities to all of those areas, and we are making progress on all of them. So this is all good news in our Construction and Environmental Compliance account.

So that is our tour through the intricacies of the NASA budget a little bit, and so now I believe we're going to open it for questions.

**MODERATOR:** What we are going to do, we have a limited amount of time and several dozen people on. We are going to have one question only. If we have additional time, we'll come back around and ask you to go from one news organization, since we have a couple with multiple people on from the same organization. So to get to as many people as possible, we are going to ask that you do that. You do Star/1 on the phone, and that gets you lined up, if you do have a question. Then the operator will call on you, and when you ask your question, please direct it to the specific person you'd like to ask it. We will open it up now. The operator can start the questions.

**TELECONFERENCE OPERATOR:** Yes. And our first question is from Seth Borenstein with the Associated Press. Your line is open.

**QUESTIONER (Associated Press):** Yes. Thanks for doing this. I guess this is partially to Beth and partially to Charlie. Looking just at planetary, is there a comparable for the annualized '13 CR for the Planetary as 1.2? And more importantly, for Charlie, the reduction in planetary brings you down to 2007 levels. It's at least the second or third straight large cut. There's a lot of complaints in the planetary community. Can you explain the rationale? Does this administration just find the planets less interesting, why the continuous cuts in Planetary Science?

**ADMINISTRATOR BOLDEN:** Do you want to do the first one?

**DR. ROBINSON:** Okay. This is Beth. Hi, Seth.

A couple of things. The 1.2 level is roughly comparable to our 2013 level that we're estimating right now. It's not gone final, and so we think we're basically at steady-state, and I would just add that one of the reasons, if you look over time, the science themes go up and down in terms of their spending, and they are in large part driven by their flagship missions. So I don't think it's surprising that there's been some adjustments in the Planetary Science line that's at post-launch and now in operational phase for Curiosity. We're also going to be launching MAVEN, and so we've done a lot of work there, so we're ramping that down, but then, of course, we'll be ramping up again as we approach 2020 for the next Mars rover.

**ADMINISTRATOR BOLDEN:** And, Seth, let me add just a couple of things. One is—and people will not remember, but the very first time you saw the reduction in Planetary, it was when we took James Webb Space Telescope out of Astrophysics. I apologize to the nation for having been the one that felt the worst about having not noticed the JWST was in trouble, and we went to the Hill and went to the administration and said this is the most ambitious scientific endeavor of our time, and we cannot lose it, if at all possible. So we made some adjustments in management, both NASA and the prime contractor. We had Science make some sacrifices, and so that's what I think you will see. It drove Planetary down the first time, and a large portion of that, if you remember, came from the Mars program.

The irony is the most robust part of the Planetary program now is the Mars program, and it's because we have now found ways to be much more frugal. We have found ways to be much more efficient. We found lower-cost missions that give us the same return on the investment, and so I would have to say that materially or content-wise, I think we've lived up to our commitments with the planetary community for the most part.

**MODERATOR:** Next question.

**TELECONFERENCE OPERATOR:** Our next question is from Tariq Malik with Space.com. Your line is open.

**QUESTIONER (Space.com):** Thank you. I had just a follow-up, I think, to Seth's question for the Administrator.

I did notice that there was a heavy reliance on Mars through that 2020 in both this presentation and the one from OSTP, and I'm wondering beyond that, for Planetary Science, what projects are you looking to fund even in the initial stages, such as cooperation with ESA on more far-flung interplanetary probes or capitalizing on the plutonium restart that was mentioned earlier, to expand kind of beyond the Red Planet, which seems to dominate now through 2020? Thanks.

**ADMINISTRATOR BOLDEN:** That's sort of a wide-ranging question, so let me try to get something out of it, first of all, by saying, as I have said before, I think—it is my opinion, my humble opinion, that NASA leads the world in space exploration. I think you are asking about follow-ons, and what we have said all along with our Mars robotic missions is that they are precursors to fulfilling the President's challenge to us to put humans in Martian orbit in the 2030s.

We talked at some length, Beth and I both, and we've been talking all day about an Asteroid Mission that did not even exist when we started all this, and again, we found ways to synergize the efforts that are going on inside the agency to take advantage, to leverage, if you will, work that is going on in Space Tech, Human Exploration, and Science to accomplish a number of objectives, not the least of which is protecting the planet. So all of this is, hopefully, leading to humans on Mars, and I hope that that answers the question. I think that's what you asked.

**TELECONFERENCE OPERATOR:** Our next question is from William Harwood with CBS News. Your line is open.

**QUESTIONER (CBS News):** Thanks. This is, I think, for Beth.

You mentioned twice in your comments about the need for full funding for a commercial-manned spaceflight. I realize you can't tell me what the lower limit would be to keep this in 2017, but can you speak to that generally? If you don't get full funding, I'm assuming that translates directly into pushing all these guys downstream. Anything else you can say to that, I'd appreciate it.

**ADMINISTRATOR BOLDEN:** This is Charlie, and I'm going to intercept and make the answer to that question, as I look at your old colleague, Mr. Cabbage.

We have set a bottom line, and our calls to our members leading up to today, we made it very clear. \$822 million is the bottom line for us to be able to deliver on the schedule date of the program. We can continue to limp along, and we can facilitate the success of Commercial Crew for the nation, but we cannot do it in 2017 if we go below \$822 million.

And as we've told the Members this week, our intent is to be up on the Hill working with them, looking at our budget, trying to help them understand that we think we have a way to get there without taking anything from other programs.

**TELECONFERENCE OPERATOR:** Our next question is from Marc Kaufman with National Geographic. Your line is open.

**QUESTIONER (National Geographic):** Thank you very much. I think this question is probably for Mr. Bolden.

I would be very interested to get your take on what the public should take out of the idea of the asteroid pull. From a scientific and from an exploration perspective, what would be the high points or the reason to do it?

**ADMINISTRATOR BOLDEN:** Well, first of all, if I go back to my basic premise that we lead the world in space exploration, what I would hope the public would take from it is that this mission allows us to better develop our technology and systems to explore farther than we've ever been before. That means to an asteroid and to Mars, places that humanity has dreamed about as long as I've been alive but has had no hope of ever attaining, and I think we are on the threshold of being able to tell my kids and my grandkids that we're almost there.

So, you know, you asked the age-old question why. I would refer you back to our vision, and NASA's vision says we reach to new heights to pursue the unknown, so that the stuff that we

learn and do makes life better for humans here on the planet, so that's the "why," if you ask me why should the American public be excited about this.

For young men and women—and I use the term very, very loosely—for anyone who still aspires to enter the field of science, engineering, technology, I think today, looking at this mission and the fact that NASA appears to really be doing what the President asked us to do back on April 15th of 2010, it gives them a reason to want to go off to college, want to get with some professor who is doing research that's going to enable solar electric propulsion to come on board quicker. They are going to be doing research with professors who are doing the kinds of things that people dream about all along. So I think we're doing our duty to inspire young people. It's a whole bunch of stuff.

**MODERATOR:** And this is Allard. I just want to give a heads-up that because of a prior commitment, we have the Administrator for another 10 minutes or so, but Ms. Robinson can stay another 15 minutes past that. So if you have any specific questions to the Administrator, there will be another 10 minutes or so.

We'll take the next question, please.

**TELECONFERENCE OPERATOR:** Our next question is from Irene Klotz with Reuters. Your line is open.

[Pause.]

**QUESTIONER (Reuters):** [In progress]—in relocation mission through like 2021, and could you also just please explain a little bit about the \$40 million breakout? The same figure was used to describe two different activities, one tracking asteroids and the other one, this developing technologies for uncooperative targets. It sounds more like dealing with children. But are those just two projects that happen to have the same price, the same cost on them, or are those confused a little bit? Or am I just confused? Thanks.

**DR. ROBINSON:** Thank you for the clarifying question. Let me start from the top. There's 105 million for the entirety of the—of new money for the Asteroid Initiative. There's 20 million in the Science Planetary, which is an enhancement of our asteroid detection capabilities, and that's the first 40, because there's a base of 20, and so we're doubling to 40. But the new money there is 20.

Then there is about \$45 million in the Space Technology Program. 38 of that is for the acceleration of the Solar Electric Power Demonstration Project, and there's 7 million there for a broader initiative to look at hazard mitigation technologies. And then the 40 that you spoke of, which is in the Exploration—Advanced Exploration Systems Program, and that's for the uncooperative targets. And so that's 20 plus 40 plus 45 plus 40.

**QUESTIONER (Reuters):** Thanks. And the overall into the out-years of this mission?

**DR. ROBINSON:** Okay. Well, we are at the early stages of this mission, and we are going to be doing formulating activities. It's still at a very high level, though, but throughout the summer and developing the kinds of estimates, initial estimates for this kind of project, and we'll be doing that in the context of our '15 budget submission.

And there have been some estimates published by others. In particular, the Keck study published a figure of \$2.6 billion. We do not think at this point that it will be that expensive for two reasons. One is that the Keck study didn't take into account all the activities we already have going on in our base, so we wouldn't need 2.6 billion of new money. And also, because the Keck study was very particular about what kind of asteroid it wanted to go get, and it was focused on carbonaceous chondrites, which are actually a little farther away than a lot of other asteroids, and so it would take you longer to go get—on average longer to go get it, so the program would be longer.

And so, for those two reasons, we think that the price is likely to come in of new money, new investment, at below that. So that's sort of roughly for us a small flagship-type mission and the kind that we work into our budget on a routine basis.

**QUESTIONER (Reuters):** Okay. But obviously not including SLS, Orion.

**DR. ROBINSON:** Yes, not including those. That was one example of something that they did not take into account that we would have those, already flying Orion into trans-lunar space. So we wouldn't need to purchase that capability, for example.

**QUESTIONER (Reuters):** Thanks very much.

**TELECONFERENCE OPERATOR:** Our next question is from Geoff Brumfield with National Public Radio. Your line is open.

**QUESTIONER (National Public Radio):** Hi, there. So you're saying this is new money for the Asteroid Mission, but, of course, NASA's budget is, I believe, decreasing slightly overall. So where is this money actually coming from? And part two, do you really think it's enough? A lot of people I've spoken to don't.

**DR. ROBINSON:** Okay. Well, in the world that we live in, in NASA, our requirements go up and down in terms of the money that we need. We have projects that are in different stages of formulation. Sometimes they need more money, sometimes, you know, when they are in their peak, and at other times, they need less. So when we say new money, the main thing is that if we didn't have this mission, we wouldn't have the 105—if we didn't have this mission, we wouldn't have the 105 million. And if we didn't have the mission itself, we wouldn't have the 78, and so for us, it's new money because it's associated with new content. And the administration is very excited about it and has committed new resources for it.

**TELECONFERENCE OPERATOR:** Our next question is from Keith Cowing with NASAWatch.com. Your line is open.

**QUESTIONER (NASAWatch.com):** Mr. Bolden, last fall, you had a staff meeting where you had said that Mars is the goal, and that you were going to go over to the White House and, quote, pound your shoe on the table to get a strong commitment from the President or from the administration on sending humans to Mars. I've checked the documents and I've been listening. I seemed to have missed something. There is not a commitment there. Did they ignore your plea? And secondly, as part of this, you said that you needed to have that strong commitment in order to figure out how to extend the Space Station. Since they haven't given you that strong commitment, can you still make decisions about how you want to keep the Space Station going?

**ADMINISTRATOR BOLDEN:** Keith, I will say very simply, you know, our central focus is continuing to lead the world in space exploration, and there are three things that this budget will allow us to do. One is to continue to sustain the International Space Station the way that we know it needs to be done, particularly with the support of commercial crew and cargo that gets us away from the dependence on Russians and foreign partners for transport of cargo and crew. It allows us to continue to develop the technology and the systems to explore farther in the universe than we've ever been, and that's responding to the President's challenge on an asteroid and taking humans to Mars. And then, finally, it continues our record, our unquestioned record of groundbreaking scientific discovery and aeronautics research, and I would only refer you to Curiosity, the Boeing 787, on and on and on. Thanks very much.

**TELECONFERENCE OPERATOR:** Our next question is from Janet Anderson with Marshall Public Affairs. Your line is open.

[Pause.]

**MODERATOR:** Do we have any questions there?

[No response.]

**MODERATOR:** Nope? Okay. Move to the next call, please.

**TELECONFERENCE OPERATOR:** The next question is from John Mangels with Cleveland Plain Dealer. Your line is open.

**QUESTIONER (Cleveland Plain Dealer):** Hi, General Bolden. You had said to Senator Mikulski in a letter in February in response to her questions about potential sequester cuts that there were a number of technology demonstration missions on the bubble. I'm interested in one in particular, the Cryogenic Propellant Storage and Transfer Demo Mission. Is that still funded, and where does that fit in your larger picture?



**ADMINISTRATOR BOLDEN:** That is still funded. It is a project that the Space Technology Mission Directorate competitively decided should go to Glenn, and my understanding from Mike Gazarik and his team there is that it's coming along very well. It is an integral part of the forward-looking futuristic, if you will, way that we are going to expand humanity's capability of going ever deeper into space. That will primarily be to help commercialize deep space, if you will.

You know, the one thing that they will need, without having something like a heavy-lift launch vehicle and a large upper stage will be a way to launch from Earth as light as possible, refuel on orbit, and then they can go deeper. And so we're committed to that, and it plays an integral part in our facilitating the ability of commercial entities and nongovernmental entities to go farther and help us with exploration.

**TELECONFERENCE OPERATOR:** Our next question is from Brian Berger with SpaceNews. Your line is open.

**QUESTIONER (SpaceNews):** Thanks. This question is for Beth.

So your budget proposal keeps key programs on track, and it starts the Asteroid Mission. Can NASA still do this if the White House and Congress don't head off 2014 sequestration?

**DR. ROBINSON:** That's a very good point. Of course, the President's proposal is to do that, and he's set forth a detailed architecture of how to replace the sequester. But if that doesn't happen and this request is sequestered, then you're right. We won't be able to do the broad class of activities that were planned here, and, you know, we'll face that when we get to it, and so—but we're very excited about what we can do for this request and for what it means in terms of the importance of space to this administration and what we can do.

**TELECONFERENCE OPERATOR:** Our next question is from Frank Konkel with Federal Computer Week. Your line is open.

**QUESTIONER (Federal Computer Week):** Hey, this is for Charles.

I believe the IT budget is down, I think 27 million from '012 numbers. I just wondered what the implications there would be for NASA on cloud services that they use, cyber security, and IT in general going forward here.

**ADMINISTRATOR BOLDEN:** Can you—I think you said the "IT budget"?

**QUESTIONER (Federal Computer Week):** Yep.

**ADMINISTRATOR BOLDEN:** Okay. I'm going to defer to Beth. You know, she's trying to get you an answer on that, and if we don't find it here quickly, we'll get back to you, because I don't know the answer to that myself. But we'll get it for you.

**QUESTIONER (Federal Computer Week):** that would be great. Thanks.

**DR. ROBINSON:** I'm sorry. This is Beth, and I think you're referring—okay. So, as you know, we spend about \$1.8 billion in total on IT, but that's total, all of the equipment, all the IT equipment done by all the missions for all sorts of purposes, including our old VAX that is still tracking our satellites that are out by Pluto and stuff.

In terms of the agency core investment in IT services, which is in the CAS budget, we have requested 168 million for that, which is a \$10 million increase over '12. So I'm not sure which number you're referring to.

**MODERATOR:** Okay. Unfortunately, that's all the time we have for General Bolden. He's got to go to another appointment, but Ms. Robinson has agreed to stay for a couple more questions, so we'll take the next one.

**TELECONFERENCE OPERATOR:** Our next question is from Marcia Smith with SpacePolicyOnline.com. Your line is open.

**QUESTIONER (SpacePolicyOnline.com):** Thank you. I think the question actually was more for Charlie than for Beth, but, Beth, maybe you want to take a stab at it.

I'm trying to understand the Asteroid Mission and really what its focus is. When Charlie talks about it, it's all as part of the steps towards Mars. It actually should have several communities behind it. There's a planetary defense community. There's a scientific community, and there's a human exploration community. So is NASA working with all three of those communities to have a united front to try and get this proposal approved, or is each set of people working on their own goals? How is that all being coordinated?

**DR. ROBINSON:** Well, now that we can talk officially about the mission, it will go forward in a much more concerted way, but that is certainly our plan. This plan, you know, is one mission, but it does meet a number of goals that we have, and you've laid them out. Planetary defense is an important part. It's an important part of the overall Asteroid Initiative, and the mission itself is helping us to learn how to operate in close proximity and interact with an asteroid.

Then it also has scientific benefit, because we'll learn—obviously, we're going to be—as part of the overall initiative, we're going to be tracking and cataloging more. Then when we go, when the mission itself goes, we'll learn more about that specific type of asteroid. Again, asteroids are very heterogeneous, and so even though we've had a couple of robotic missions to them, that certainly doesn't get at the wealth of information from asteroids.

And one of the exciting things about this one is that when the astronauts go there, they're going to be able to bring back a big sample. The OSIRIS-REx sample is not all that big. I think you know the Japanese one came back, and it was actually quite, quite small. And so this is a

whole new level of sample, size, and characteristics that we can look at, because it's always—you know, you're never sure if you're getting something that's a large part of the asteroid or it's just an anomaly on the asteroid itself, because they can be conglomerates, as you know.

Anyway, I think it's very exciting scientifically, and it's exciting for the human exploration community because we are being very deliberate in the formulation of this mission to ensure that the technologies that we're investing in are also on our pathway to Mars. They are the ones—we need advanced in-space propulsion. We need the ability for astronauts to handle and move things in space, and so we need all of the elements of this, of this mission as well, to perfect and advance our capabilities in space on our way to Mars.

So you're right. We think all three of those communities and in fact the broader public should be really excited about this. I don't know about your kids, but my kids are excited about it, and so I think it does address all those goals, just like you said, Marcia.

**TELECONFERENCE OPERATOR:** Our next question is from Jason Rhian with AmericaSpace.com. Your line is open.

**QUESTIONER (AmericaSpace.com):** Hi. I had a question pretty much for Charlie, but I was wondering—this is kind of off topic, but with the President's initiative to send—to the Asteroid Mission, there's been a lot of speculation about asteroid mining. In fact, I believe this press release issued by Senator Bill Nelson stated that there was some aspects to it that could entail that.

Now, my question is some of these asteroids are valued within the ten to trillions of dollars. Has that been in any way played into the consideration for this mission, or was it simply to fulfill the President's directive? Thank you.

**DR. ROBINSON:** I think the President's directive was built on a number—he himself was focused on a number of things. Probably, first and foremost is planetary defense, so we can know more about these bodies that come into close proximity of the Earth, but it is true that there is a space mining community that's small but developing. That has not been part of our discussions in terms of selecting an asteroid or anything like that. That was a bigger feather in the Keck study. Obviously, we're looking for interest, for all sorts of interest in this Asteroid Mission in terms of the kinds of scientific and industrial uses that could be spawned from it, and so I think we are probably going to take that into account. But at this point, I can tell you that the mining aspect of it has been—has not been first and foremost in our thoughts in developing the overall initiative and the Asteroid Mission itself.

**MODERATOR:** And we have just enough time for a couple more questions, and then that's it. We'll go to the next one.

**TELECONFERENCE OPERATOR:** Our next question is from Stephanie Ogburn with Climate Wire. Your line is open.

**QUESTIONER (Climate Wire):** Hello? Yes. I'm wondering a little bit more about the change in the budget to move the climate sensors from the JPSS over back to NASA instead of being with NOAA. I'm just wondering if you can kind of elaborate a little bit more on—that's in the Decadal Survey Mission's line item, I'm thinking, and I'm just wondering what part of that \$114.7 million, that project is in.

**DR. ROBINSON:** Okay. It is in the Decadal Survey, and I'm trying to find the list of the instruments here.

Do you have it?

**MODERATOR:** No, I don't.

**DR. ROBINSON:** Okay. We seemed to have misplaced the book that has the detail on the individual instruments, but, yes, it is in line with Decadal Survey.

You may hear paper going back and forth because we're looking.

We're just going to have to get back to you. We just don't have it here.

**MODERATOR:** We'll give you a call back after, Stephanie, and we'll get the information for you.

And I guess we'll take our last caller now.

**TELECONFERENCE OPERATOR:** Our last question is from Mathew Travis with Zero-G News. Your line is open.

**QUESTIONER (Zero-G News):** Thanks. I guess I get to finish this up. I was looking at the education part of the budget, and I notice what looks like about a 31 percent decrease in funding. I'm wondering, Beth, if you could go into more detail about that and the rationale for it and how it fits in with consolidating the education program as well as NASA working more closely with other organizations. Is NASA looking to get a multiplier effect by partnering with other organizations, or is there going to be a decrease in STEM activity or a combination of? I'm just curious about that. Thanks.

**DR. ROBINSON:** Right. Thank you.

So there are a number of factors here, so bear with me as I explain them. First and foremost, we have a very strong commitment here to science education, science and STEM education at large, and we do not think that this proposal will reduce our activity. In fact, we think it will increase it, and like I said before, increase the breadth of the impact of the NASA assets that we can bring to bear.

It will change how we do it. As I think you know, we've had the kind of philosophy that every mission will contribute to education assets and curricula development and other things like that, and when we're part of a larger program, we may do that differently.

And so in terms of our structure here at NASA, we had had education funding throughout our accounts and particularly the science account, and so this not only represents a consolidation and reorganization across the agencies, but also within NASA itself where we are consolidating much of—not all because, as I said before, there's some very mission-specific activities, like the space technology fellowships, but by and large, we're consolidating a lot of that activity into the Education Directorate. And so it's difficult, I think, to compare apples to oranges, though, in part because there are a couple of programs that are beneath the lines, Space Grant, EPSCoR, MUREP, which have gotten funded at different levels. So you see in part some longstanding view on the part of the administration about the funding, appropriate funding levels for Space Grant and EPSCoR, and sometimes they get plus-up as they go through the congressional appropriations process, and so you see some adjustments that way. That accounts for some of the downward adjustments.

And then also, because of the consolidation, we really think that we're going to have access to in fact a larger amount of money in terms of our collaboration with Education, NSF, and Smithsonian, and so we'll be able to leverage all of those resources. I wouldn't quite say multiply our effect, but I would say leveraging and alignment and streamlining of these many programs, many of which were utilizing the same types of infrastructure and things like that.

So I think it's very exciting for NASA to be able to join this broader community and bring our assets to bear, and we're really looking forward to getting started on it.

**MODERATOR:** Okay. Thanks. That's all the time we have.

We do expect to have a transcript of the teleconference and will post it on NASA's Budget page by tomorrow, April 11th, and an audio replay of the teleconference will be available in about an hour at 800-867-1931, and passcode is 1379. Again, the number is 800-867-1931, passcode 1379. All of our budget material, including the charts that Ms. Robinson presented here are available on our Budget page, [www.NASA.gov/budget](http://www.NASA.gov/budget).

Thanks for joining us.

**TELECONFERENCE OPERATOR:** This now concludes today's conference. You may disconnect at this time.