

Highlights of NASA's FY 2009 Budget & the Year Ahead

**Shana Dale
Deputy Administrator
National Aeronautics and Space Administration
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Good afternoon. I want to thank the National Space Club for their hospitality as I substitute for Mike since he's down at the Cape in preparation for the launch of the Space Shuttle *Atlantis* hopefully this afternoon. We both think the Club is a great venue to speak to members of the Washington space community about NASA's annual budget request, priorities, and where we wish to make progress in the year ahead, so these February luncheons are becoming a great tradition.

As you all know, we are celebrating NASA's 50th anniversary this year. The National Aeronautics and Space Act of 1958 provided the founding guidance for our agency, "to provide for research into problems of flight within and outside the earth's atmosphere." While this guidance has been updated through the years with various Presidential directives, legislation, and annual budgets and appropriations, the founding principles of the Space Act have withstood the test of time. Having worked on both the Hill and White House prior to joining NASA, I know how important it is to link these policies with the plans, programs, and budgets for an agency such as NASA to effectively carry out the direction given by our stakeholders.

This simple fact remains: NASA simply cannot do everything everyone might wish us to do. Before making such investments and commitments, our stakeholders in the White House and Congress need to carefully consider that which NASA is directed to do, and there is a great deal of dialogue necessary between us before agreeing to such commitments.

That is the fundamental decision-making process necessary in formulating a carefully-considered plan and budget to support it, before then carrying out such missions and research. It is not an easy process or for the faint of heart, so perhaps that is why the annual budget process is often compared to sausage-making.

However, when we take a step back and look at the overall final product for a moment—especially when we think about the fact that many such investments turned into revolutionary, history-making moments for NASA and our nation over the past fifty years with ripple effects that last for many generations—perhaps, in some small measure, it is those moments that make the many hours of labor at the budget meat-grinder worthwhile.

Many of us in the space community have felt the sense of awe and great pride when NASA launches a Space Shuttle. We have nervously awaited the first images from a satellite as we did recently with *MESSENGER*'s first, up-close pictures of the planet Mercury or when the Mars Rovers landed over four years ago. We have viewed our Earth in ways never imagined, and seen how in many ways the forces that impact the Earth's climate are intricately connected. We have endeavored to make air travel safer, more environmentally friendly, and more capable to meet the demands of our growing population. And we have peered through space telescopes to see old stars dying out and new star systems being born.

At a fundamental level, NASA is in the inspiration business, so when we discuss the budgets to carry out the many, great tasks before us, let us not lose sight of that. We are accomplishing something greater than ourselves.

So, while this is a luncheon instead of a breakfast, let's take a look at the sausage on our plates for FY 2009. NASA's budget request is \$17.6 billion, a 1.8% increase over this year's enacted appropriations which demonstrates the priority the President has given to NASA. While many in the space community wish we had more, we need to recognize the perception of NASA's budget is quite different on the outside. Most of the American public, when polled, believe NASA's budget is comparable to that of the Pentagon.

They are under this impression because what NASA accomplishes, on the cutting-edge of space and aviation, is so highly visible. NASA is the most recognized agency in the Federal government, though our annual budget is less than one penny out of every Federal dollar. NASA is highly recognized because of our exciting mission and tremendous accomplishments—we are the premier space agency of the world.

This high recognition brings with it the obligation for NASA to work even more diligently to communicate to the American taxpayer and the world the

benefits of our exciting new missions and what they mean for life here on Earth. Rather than bemoaning any misperceptions, let us instead work to dispel them and focus on the achievements and progress being made with the resources provided, proving that the American taxpayer's small investment in NASA is money well spent.

So, let us now turn to where we are with our plans going forward with the FY 2009 budget presented to the Congress this week. For Exploration, NASA's best estimate remains March 2015 for bringing the *Orion* and *Ares I* on-line with the funds currently projected to be available, and we should thank the Congress for fully funding our request for those efforts in the FY 2008 omnibus appropriations. Rick Gilbrech, Doug Cooke, Jeff Hanley and the Constellation team in government and industry are trying to beat those predictions for *Orion* initial operating capability, and the Constellation team across this great country is working to effect the transition of facilities, equipment, and people from the Space Shuttle program as it carries out its final missions.

With J-2X power pack hot-fire tests just last week, pad abort demonstrations this fall out at White Sands, and Ares I-X flight tests from KSC Launch Pad B planned for spring 2009, as well as the progress being made to get to Preliminary Design Review for the *Orion* and *Ares I* later this year, the Constellation team has their work cut out for them in the months and years ahead. We are all looking forward to looking up—in awe—when the *Ares V* rocket first launches, to be followed soon thereafter by the launch of a crew of astronauts onboard the *Orion* returning America to the Moon. It will take such hard work and small steps this year and many more to follow to make that giant leap.

Mike Griffin and I firmly believe that in order for space exploration to be truly sustainable, it cannot be “all government all the time.” Thus, with the Government Accountability Office affirming NASA's use of our other transactions authority, we intend to soon award additional COTS partnerships with U.S. companies, and we hope to spur this sustainable growth of the space economy by developing U.S. commercial space transportation services to and from the International Space Station. If these commercial, entrepreneurial companies—large or small—are successful, it will enhance U.S. access to Earth orbit and the International Space Station, while providing substantial savings to the taxpayer compared to NASA

government-owned and operated capabilities geared toward missions to the Moon.

To that end, NASA's budget for FY 2009 provides \$173 million to leverage the private investments of others to develop and demonstrate such commercial transport capabilities to meet NASA's needs in supporting the ISS, and we maintain NASA's \$500 million commitment to carry out such COTS demonstrations. With over \$2.6 billion in NASA funds available over the next five years to purchase cargo and crew services to support ISS operations, we would much rather be using this money to purchase cargo and crew services from American commercial companies than foreign entities. This is a wise investment.

In this and many other ways, we hope to spur the Space Economy. We define the Space Economy as the full range of activities that create and provide value to human beings in the course of exploring, understanding and utilizing space. The Space Economy impacts just about every aspect of how we live, work, and play, including weather and climate monitoring.

In another way that space exploration cannot be "all government all the time," NASA awarded a contract just last month to the Zero-G Corporation. Zero-G is in the business of providing parabolic, microgravity flight services to the public with their Boeing 727 aircraft. NASA's contract with Zero-G is for experiments, training, and education in microgravity environments. The Zero-G aircraft can provide near zero gravity conditions; partial gravity conditions at Lunar and Martian gravities; and other partial gravity levels.

A specific project that is planning to use this contract is called the Facilitated Access to the Space environment for Technology development and training, or FAST, project. FAST is based in NASA's Innovative Partnerships Program and will focus initially on establishing cost-sharing partnerships to use parabolic flight services targeted at demonstrating NASA-needed technologies. A solicitation for partnerships will be released this spring. The objective is joint development of technology that is of primary interest to NASA and will advance Technology Readiness Levels after successful demonstration in the appropriate reduced-gravity environment.

In the future, NASA might leverage the emerging commercial suborbital capabilities being built out in the Mojave Desert and elsewhere, ostensibly for tourism, and see how they might be used to meet many NASA needs.

NASA is examining this possibility for the FAST project and potentially others, and we will report more on this as any plans develop.

This is also an exciting year for NASA's Science missions, and the guidance of Alan Stern, NASA Associate Administrator for the Science Mission Directorate, to his team is: "We need to get more science from the budget we have and turn heads in the scientific discoveries we make. We know we can do better." With the resources provided the Science Mission Directorate in the FY 2009 budget and five year runout, the Science Mission Directorate team has put together an exciting portfolio of missions, both large and small.

Many of you will recall that soon after Mike Griffin came onboard at NASA in April 2005, he worked to re-balance the Science portfolio by fixing the disruption of funding between the Earth Sciences and Mars Science program with an amendment to the President's budget that summer. He looked forward to the completion of a much-needed, first-ever decadal survey to help set priorities for the Earth science community that NASA, NOAA, and the USGS initially requested in 2003 and received in January 2007.

There has been great recognition on the part of the public and policy-makers of the value of the research coming from NASA's Earth scientists. NASA satellites supply more global climate change data than those of any other organization in the world, and we are the largest contributor to the inter-agency Climate Change Science Program (CCSP), providing the most grant-based research funding of any organization. It is only through NASA's investments in measuring the forces and effects of climate change that we have such insights and understand its implications to our home planet.

Based on NASA satellite data, we have not only seen the receding ice sheets of Greenland and Antarctica, but have quantitatively measured how fast these ice sheets are melting. NASA scientists have observed the smallest Arctic sea ice coverage ever recorded in 2007, and when comparing that ice coverage for the months of September over the past two years, the loss of sea ice corresponds to the combined geographical areas of California and Texas. Using satellite altimetry, we have recorded rising global sea levels in excess of 3.2 millimeters per year over the past decade, with approximately half of that increase due to this sea-ice melting and the other half due to thermal expansion as the ocean absorbs more heat. In regards to nitrogen oxide emissions, one of the greenhouse gases that form smog, NASA

sensors helped researchers document their doubling in Asia from 2000 to 2006.

When terrible forest fires raged across Southern California last fall, NASA's Earth-observing satellites and an unmanned aircraft specially-equipped with thermal-infrared sensors and real-time data transmission capabilities peered through heavy smoke and darkness and found hot spots and flames. NASA's Ikhana aircraft then transmitted this information to the National Interagency Fire Center which distributed the imagery over the internet in near real-time to fire incident commanders, who would then deploy firefighters where they were most needed. Our nation's investment in NASA's Earth Science program is paying dividends.

In the FY 2009 budget request, NASA is providing \$910 million over the next five years to develop high-priority Earth Science decadal survey missions, including the Soil Moisture Active/Passive (SMAP) mission for soil moisture mapping and the second generation ICESat mission. The budget plan also keeps those Earth Science missions already under development, like the Landsat Data Continuity Mission, Glory, NPP, and others, on track.

Turning now to other major initiatives in the Science Mission Directorate, SMD is also initiating detailed formulation studies for a flagship outer planets mission in FY 2009 for launch in the 2016-17 timeframe. SMD plans to select the destination and science objectives for this flagship mission late this year, and we hope to have significant international collaboration on this mission. This year, we also are initiating two high priority, revolutionary missions: the Joint Dark Energy Mission for astrophysicists, in partnership with the DOE Office of Science, and the Solar Probe heliophysics mission.

The Science and Exploration Systems Mission Directorates are working together on a series of lunar missions to meet both their objectives, to increase our scientific understanding of our Moon as well as to prepare for human exploration and exploitation of our nearest celestial neighbor. The FY 2009 budget five year runout increases our investment in Lunar Science by \$344 million to leverage not only the investments by the Exploration Systems Mission Directorate, but also several international missions.

We especially are looking forward to the launch in the coming months of India's *Chandrayaan-1* spacecraft, which includes two NASA payloads. As Mike discussed with Chairman Nair (nigh-EER) of the Indian Space Research Organisation last week, we hope to collaborate in more such endeavors with them.

Late this year, NASA plans to launch our Lunar Reconnaissance Orbiter and LCROSS secondary payload on an Atlas V, and SMD is formulating the GRAIL lunar gravity mapping mission scheduled to launch in 2011. Exploration Systems is developing some small lunar landers to transition to Science missions, and they are working together on other small satellites and missions of opportunity to characterize lunar dust and other lunar science priorities.

For Aeronautics Research, we bade farewell to Lisa Porter just last week as she goes to work on game-changing technologies to aid the Intelligence Community. At the same time, we welcomed Jaiwon Shin who stepped into her shoes...figuratively speaking. Last December, the President approved the National Plan for Aeronautics R&D and Related Infrastructure, as a follow-on to the Aeronautics R&D Policy approved one year earlier. This comprehensive plan provides high-priority research challenges, goals, and objectives for all Federal agencies, including NASA.

We are aligning our aeronautics research efforts with the many other agencies in the Federal government also conducting such research. In partnership with the member agencies of the Joint Planning and Development Office, we are conducting innovative fundamental research on the environmental, safety, and capacity challenges facing our nation's air transportation system, both on the ground and in the air. NASA also is pursuing innovative partnerships with commercial companies that will better leverage such private investment toward the President's strategic goals.

Most importantly, NASA's Aeronautics program is conducting cutting-edge research; research that enables us to solve problems we don't know how to solve today, to design systems we cannot design today. Being on the cutting-edge also means that NASA is taking additional technical risks, and thus, our efforts must be accompanied by technical rigor, which requires adherence to the scientific method and peer review in order to be credible. I firmly believe that this guiding philosophy will be Lisa's lasting legacy to NASA's Aeronautics program.

And finally, in this review of NASA's plans in the FY 2009 budget, we should all recognize NASA's greatest challenge over the coming years: safely flying the Space Shuttle to assemble the International Space Station and honor our commitments prior to retiring the Shuttle in 2010, while bringing new systems on-line by 2015 or sooner. In addition to the ten remaining assembly missions, we are maintaining the option to fly up to two contingency flights to the International Space Station if it becomes clear that they can be completed before the end of 2010.

These are busy days onboard the International Space Station. Last week, astronauts Peggy Whitson and Dan Tani performed a 7-hour spacewalk to replace a solar array motor that suffered an electrical failure and the new motor is now working fine. I'm sure many of you recall all the debris they found in the solar array joint during a spacewalk last fall. Today, Peggy, Dan, and cosmonaut Yuri Malenchenko are making preparations to greet the STS-122 crew of the Space Shuttle *Atlantis*, currently on the launch pad, so that they can install the European *Columbus* laboratory module.

While we were all on the edge of our seats last November watching Scott Parazynski's dramatic spacewalk to repair a torn solar array, not many in the space business realize that last year was the busiest ever for spacewalking in all of NASA's history. Our astronauts carried out 144 hours of spacewalks, almost 10% of total time for spacewalks conducted in the entire history of the U.S. and Russian space programs. We will likely beat that record again this year, and I'm sure that all of us here are looking forward to the dramatic spacewalks necessary for the final servicing mission to the Hubble Space Telescope.

An IMAX camera system will be onboard the Shuttle to document the repairs and upgrades to that fantastic instrument. Our hope is that this IMAX movie will help to inspire the next generation of astronomers and astronauts through such fantastic images.

In this and many ways, I hope that NASA and the broader space community are learning how to better communicate what space exploration, Earth and space science, aeronautics research, and the investments necessary to do such great things mean to not only our nation's economic and technical competitiveness, but also how we aspire to do great things.

Many of you here today might have noticed the upgrades NASA recently made to our website, nasa.gov. We made these changes due to the feedback we had received by our many users. In NASA's history, our website has been visited by over 400 million different users since first coming online, and more than two billion webpages have been downloaded, delivering over 42 million videos and 20 million streams of live NASA TV.

NASA's Return to Flight launch of STS-114 commanded by Eileen Collins was the largest single live event in internet history with approximately 438,000 webcasts, even more than the NCAA basketball tournament. When NASA's Deep Impact mission slammed into the comet Tempel 1 on July 4th, 2005, the nasa.gov website transmitted over 180,000 simultaneous streams of live video, even more than the Live 8 concerts that occurred around the world that same week.

Now, I'm hardly saying that nasa.gov is more popular than the Google or Yahoo websites or even Bono of U2. In fact, we can learn a lot from them when it comes to capturing young people's attention, but I think we should recognize some things we are doing right in promulgating information about NASA's missions and research as well as educating and inspiring young people to study math, science, and engineering.

We also need to recognize that we should think of more and better ways to convey the spirit of exploration and excitement of scientific discovery to them. It is not simply NASA's responsibility to pass on the torch to the next generation, but something each and every one of us here today should strive to do. This is our legacy, which is more important than simply 6/10ths of 1 percent of the Federal budget.

Thus, the straightforward advice to NASA's Science team holds just as true for science as it does for aeronautics, human spaceflight, strategic communications or many other efforts at NASA as well as to each of us here. *We know we can do better.* There's a lot of hard work that goes into what we do at NASA, and it will require a dedicated sense of purpose to make the next giant leap for mankind.

In the immortal words of President John F. Kennedy, "Now is the time to take longer strides." So, with that, I want to thank the National Space Club for hosting this luncheon today and thank you all for helping to inform our stakeholders about the importance of NASA's mission and budget.

Today, our thoughts and prayers are down at Launch Pad 39A, hoping for a safe launch of the Space Shuttle. Go Atlantis!

Thank you.