

**Statement of
The Honorable Charles F. Bolden, Jr.
Administrator
National Aeronautics and Space Administration**

before the

**Subcommittee on Commerce, Justice, Science, and Related Agencies
Committee on Appropriations
United States Senate**

Madam Chair and Members of the Subcommittee, today it is my privilege to discuss the President's FY 2012 budget request of \$18.7 billion for NASA. This request continues the Agency's focus on a reinvigorated path of innovation and technological discovery leading to an array of challenging destinations and missions that increases our knowledge, develops technologies to improve life and expand our presence in space for knowledge and commerce, and engages the public. With the President's signing of the NASA Authorization Act of 2010 (P.L. 111-267) on October 11, 2010, NASA has a clear direction and is moving forward. NASA appreciates the significant efforts that advanced this important bipartisan legislation, particularly efforts by the leadership and Members of this Committee. This is a time of opportunity for NASA to shape a promising future for the Nation's space program.

Because these are tough fiscal times, tough choices had to be made. But the proposed FY 2012 budget funds all major elements of the Authorization Act, supporting a diverse portfolio of programs, while making difficult choices to fund key priorities and reduce other areas in order to invest in the future. A chart summarizing the President's FY 2012 budget request for NASA is enclosed as Enclosure 1.

We have an incredible portfolio of human space flight, science, aeronautics and technology development. Within the human space flight arena, our foremost priority is our current human spaceflight endeavor – the International Space Station – and the safety and viability of the astronauts aboard it. The request also maintains a strong commitment to human spaceflight beyond low Earth orbit. It establishes critical priorities and invests in the technologies and excellent science, aeronautics research, and education programs that will help us win the future. The request supports an aggressive launch rate over the next two years with about 40 US and international missions to the ISS, for science, and to support other agencies.

At its core, NASA's mission remains fundamentally the same as it always has been and supports our new vision: **“To reach for new heights and reveal the unknown so that what we do and learn will benefit all humankind.”** This statement is from the new multi-year 2011 NASA Strategic Plan accompanying the FY 2012 budget request, which all of NASA's Mission Directorates, Mission Support Offices and Centers helped to develop, and encapsulates in broad terms the very reason for NASA's existence and everything that the American public expects from its space program.

On March 1, we outlined for the Committee our plan to establish new Exploration program offices to carry out our future work on the Multi-Purpose Crew Vehicle, Space Launch System, and Commercial Crew.

On March 9, we completed the Space Shuttle Discovery's STS-133 mission, one of the final three Shuttle flights to the International Space Station. Discovery delivered a robotic crewmember, Robonaut-2 (R2), and supplies that will support the Station's scientific research and technology demonstrations. And we are currently preparing the Space Shuttle Endeavour for the STS-134 mission to be launched on April 29, which will deliver the Alpha Magnetic Spectrometer, or AMS, and space parts including two S-band communications antennas, a high-pressure gas tank, additional spare parts for Dextre, and micrometeoroid debris shield to the Station.

Our human spaceflight priorities in the FY 2012 budget request are to:

- safely fly the last Space Shuttle flights this year and maintain safe access for humans to low-Earth orbit as we fully utilize the International Space Station;
- facilitate safe, reliable, and cost-effective U.S.-provided commercial access to low-Earth orbit first for cargo and then for crew as quickly as possible;
- begin to lay the groundwork for expanding human presence into deep space—the Moon, asteroids, eventually Mars—through development of a powerful heavy-lift rocket and multi-purpose crew capsule; and
- pursue technology development that is needed to carry humans farther into the solar system. Taken together, these human spaceflight initiatives will enable America to retain its position as a leader in space exploration for generations to come.

At the same time, we will extend our reach with robotic spacecraft and scientific observatories to expand our knowledge of the universe beyond our own planet. We will continue the vital work to expand our abilities to observe our planet Earth and make that data available for decision makers. We will also continue our groundbreaking research into the next generation of aviation technologies. Finally, we will make the most of all of NASA's technological breakthroughs to improve life here at home.

With the FY 2012 budget, NASA will carry out research, technology and innovation programs that support long-term job growth and economic competitiveness and build upon our Nation's position as a technology leader. We will educate the next generation of technology leaders through vital programs in science, technology, engineering, and mathematics education. And we will build the future through investments in American industry, creating high-tech jobs across the country and an innovation engine for the U.S. economy.

This year we honor the legacy of President John F. Kennedy, who, 50 years ago, set the United States on a path that resulted in a national effort to produce an unprecedented achievement. Now, we step forward along a similar path, engaged in a wide range of activities in human spaceflight, science, and aeronautics – a path characterized by engagement of an expanded commercial space sector and technology development to mature the capabilities required by increasingly challenging missions designed to make discoveries and reach new destinations.

NASA's Science Mission Directorate (SMD) continues to rewrite textbooks and make headlines around the world. Across disciplines and geographic regions worldwide, NASA aims to achieve a deep scientific understanding of Earth, other planets and solar system bodies, our star system in its entirety, and the universe beyond. The Agency is laying the foundation for the robotic and human expeditions of the future while meeting today's needs for scientific information to address national concerns about global change, space weather, and education.

- The Mars Science Laboratory will launch later this year and arrive at Mars in August 2012. It will be the largest rover ever to reach the Red Planet and will search for evidence of both past and present life.
- The Nuclear Spectroscopic Telescope Array (NuSTAR) mission will launch in early 2012 and become the first focusing hard X-ray telescope to orbit Earth.
- Research and Analysis programs will use data from an array of sources, including spacecraft, sounding rockets, balloons, and payloads on the ISS. We will continue to evaluate the vast amounts of data we receive from dozens of ongoing missions supported by this budget.
- A continued focus on Earth Science sees us continuing development of the Orbiting Carbon Observatory-2 (OCO-2) for launch in 2013 and other initiatives to collect data and conduct research on a broad spectrum of changes in the Earth system including climate, weather, and natural hazards.
- The budget reflects the scientific priorities for astrophysics as expressed in the recent Decadal Survey of the National Academy of Sciences. The budget supports small-, medium-, and large-scale activities recommended by the Decadal Survey.
- The Radiation Belt Storm Probe mission will launch next year, and development of other smaller missions and instruments to study the Sun will get underway here on the ground.

With the appointment of a new Chief Scientist, NASA will pursue an integrated, strategic approach to its scientific work across Mission Directorates and programs.

As we continue our work to consolidate the Exploration Systems and Space Operations Mission Directorates (ESMD and SOMD), both groups will support our current human spaceflight programs and continue work on technologies to expand our future capabilities.

- We will fly out the Space Shuttle in 2011, including STS-135 if funds are available, and then proceed with the disposition of most Space Shuttle assets after the retirement of the fleet. The Shuttle program accomplished many outstanding things for this Nation, and in 2012 we look forward to moving our retired Orbiters to new homes across the country to inspire the next generation of explorers.
- Completing assembly of the U.S. segment of the ISS will be the crowning achievement of the Space Shuttle's nearly 30-year history. The ISS will serve as a fully functional and permanently crewed research laboratory and technology testbed, providing a critical stepping stone for exploration and future international cooperation, as well as an invaluable National Laboratory for non-NASA and nongovernmental users. During FY 2011, NASA will award a cooperative agreement to an independent non-profit organization (NPO) with responsibility to further develop this effort. The NPO will oversee all ISS research involving organizations other than NASA, and transfer current NASA biological and physical research to the NPO in future years.
- In 2012, we will make progress in developing a new Space Launch System (SLS), a heavy-lift rocket that will be the first step on our eventual journeys to destinations beyond LEO.

- We will continue work on a Multi Purpose Crew Vehicle (MPCV) that will build on the human safety features, designs, and systems of the Orion Crew Exploration Vehicle. As with the SLS, acquisition strategy decisions will be finalized by this summer.
- NASA will continue to expand commercial access to space and work with our partners to achieve milestones in the Commercial Orbital Transportation Services (COTS) Program, the Commercial Resupply Services (CRS) effort, and an expanded Commercial Crew Development (CCDev) program. As we direct resources toward developing these capabilities, we not only create multiple means for accessing LEO, but we also facilitate commercial uses of space, help lower costs, and spark an engine for long-term job growth. While the request is above the authorized level for 2012, NASA believes the amount is critical, combined with significant corporate investments, to ensure that we will have one or more companies that can transport American astronauts to the ISS. With retirement of the Space Shuttle in 2011, this is a top Agency priority.
- Most importantly, NASA recognizes that these programmatic changes will continue to personally affect thousands of NASA civil servants and contractors who have worked countless hours, often under difficult circumstances, to make our human spaceflight, science, and aeronautics programs and projects successful. I commend the investment that these dedicated Americans have made and will continue to make in our Nation's space and aeronautics programs. These are tremendously exciting and dynamic times for the U.S. space program. NASA will strive to utilize our workforce in a manner that will ensure that the Nation maintains NASA's greatest asset – the skilled civil servants and contractors – while working to increase the efficiency and cost-effectiveness in all of its operations.
- The 21st Century Space Launch Complex program will focus on upgrades to the Florida launch range, expanding capabilities to support SLS, MPCV, commercial cargo/launch services providers, and transforming KSC into a modern facility that benefits all range users. The program will re-plan its activities based on available FY 2011 funding to align with 2010 NASA Authorization's focus areas, including cross organizational coordination between 21stCSLC, Launch Services, and Commercial Crew activities.

NASA's Aeronautics Research Mission Directorate (ARMD) continues to improve the safety, efficiency and environmental friendliness of air travel.

- Our work continues to address the challenge of meeting the growing technology and capacity needs of the Next Generation air travel system, or "NextGen," in coordination with the FAA and other stakeholders in airspace efficiency.
- NASA's work on green aviation technologies that improve fuel efficiency and reduce noise continues apace.
- We also continue to work with industry to develop the concepts and technologies for the aircraft of tomorrow. The Agency's fundamental and integrated systems research and testing will continue to generate improvements and economic impacts felt by the general flying public as well as the aeronautics community.

The establishment last year of the Office of the Chief Technologist (OCT) enabled NASA to begin moving toward the technological breakthroughs needed to meet our Nation's space exploration goals, while building our Nation's global economic competitiveness through the creation of new products and

services, new business and industries, and high-quality, sustainable jobs. By investing in high payoff, transformative technology that industry cannot tackle today, NASA matures the technology required for our future missions in science and exploration while improving the capabilities and lowering the cost of other government agencies and commercial activities.

- NASA recently developed draft space technology roadmaps, which define pathways to advance the Nation's capabilities in space and establish a foundation for the Agency's future investments in technology and innovation. NASA is working collaboratively with the National Research Council (NRC) to refine these roadmaps. The final product, expected in the first quarter of FY 2012, will establish a mechanism for prioritizing NASA's technology investments, and will support the initial Space Technology Policy Congress requested in the NASA Authorization Act of 2010.
- Through the Space Technology Program, OCT will sponsor a portfolio of both competitive and strategically-guided technology investments, bringing the Agency a wide range of mission-focused and transformative technologies that will enable revolutionary approaches to achieving NASA's current and future missions.
- In FY 2012, a significant portion of the Exploration Technology Development Program is moved from ESMD to Space Technology. These efforts focus on developing the long-range, exploration-specific technologies to enable NASA's deep space human exploration future. The integration of Exploration Technology activities with Space Technology eliminates the potential for overlap had NASA's space technology investments been split among two accounts. ESMD will continue to set the prioritized requirements for all Exploration Technology Development efforts and will serve as the primary customer of these mission-specific technology development activities.
- OCT continues to manage SBIR and STTR, and integrates technology transfer efforts to ensure that NASA technologies are infused into commercial applications, develops technology partnerships, and facilitates emerging commercial space activities

Recognizing that our work must continuously inspire not only the public at large but also students at all levels, NASA's Education programs this year focus on widening the pipeline of students pursuing coursework in science, technology, engineering and mathematics (STEM). As President Obama has said, "Our future depends on reaffirming America's role as the world's engine of scientific discovery and technological innovation. And that leadership tomorrow depends on how we educate our students today, especially in math, science, technology, and engineering."

- The FY 2012 request for NASA's Office of Education capitalizes on the excitement of NASA's mission through innovative approaches that inspire educator and student interest and proficiency in STEM disciplines. NASA's education program in FY 2012 and beyond will focus and strengthen the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in inspiring, encouraging, and nurturing the young minds of today, who will manage and lead the Nation's laboratories and research centers of tomorrow.
- Among NASA's Education activities will be a continued Summer of Innovation, building on the successful model piloted with four states this past year.

All of these activities place NASA in the forefront of a bright future for America, where we challenge ourselves and create a global space enterprise with positive ramifications across the world. The FY 2012

budget request provides the resources for NASA to innovate and make discoveries on many fronts, and we look forward to implementing it. See Enclosure 2 for a more detail summary of each activity.

Conclusion

As we enter the second half-century of human spaceflight, the Nation can look back upon NASA's accomplishments with pride, but we can also look forward with anticipation to many more achievements to come. The NASA Authorization Act of 2010 (P.L. 111-267) has provided us with clear direction that enables the Agency to conduct important research on the ISS, develop new launch vehicle and crew transportation capabilities to go beyond the bounds of LEO, utilize a dazzling array of spacecraft to study the depths of the cosmos while taking the measure of our home planet, improve aviation systems and safety, develop new technologies that will have applications to both space exploration and life on Earth, and inspire the teachers and students of our country. In developing and executing the challenging missions that only NASA can do, we contribute new knowledge and technologies that enhance the Nation's ability to compete on the global stage and help to secure a more prosperous future.

These are tough fiscal times, calling for tough choices. The President's FY 2012 budget request makes those choices and helps advance all of these bold aims, and we look forward to working with the Subcommittee on its implementation.

Madam Chair, thank you for your support and that of this Subcommittee. I would be pleased to respond to any questions you or the other Members of the Subcommittee may have.