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**Statement of
The Honorable Elizabeth M. Robinson
Chief Financial Officer
National Aeronautics and Space Administration
before the
Committee on Commerce, Science and Transportation
United States Senate**

Chairman Nelson and Members of the Committee, thank you for the opportunity to appear before you today to discuss the NASA Authorization Act of 2010 and how NASA is implementing direction in that Act, while NASA is operating under a FY 2011 continuing resolution.

With the President's signing the NASA Authorization Act of 2010 (P.L. 111-267), NASA has a clear direction and can begin making plans for moving the Agency forward. NASA appreciates the significant effort that has gone into advancing this bipartisan legislation, particularly efforts by the leadership and Members of this Committee. There are still details that the final FY 2011 appropriations outcome will provide but broad guidelines have now been enacted into law, making the road ahead much clearer. This is a time of excellent opportunity for NASA to shape a promising future for the Nation's space program. Today it is no longer a question of IF we will explore, but how.

The NASA Authorization Act of 2010 represents an important step forward in that, among other things, it:

- Authorizes continued investment in Science and Aeronautics, including an increase to accelerate deployment of important Earth science observation satellites.
- Extends the International Space Station (ISS) to 2020 and makes funding available for the NASA Launch Support and Infrastructure Modernization Program.
- Supports current commercial cargo efforts and supports expanding commercial crew development activities. Facilitation of the Nation's commercial spaceflight sector is a key component of the U.S. strategy to maintain safe and affordable space exploration capabilities throughout the next century.
- Authorizes development of a heavy-launch vehicle and continues the development of a crew capsule that will transport astronauts to many exciting destinations beyond low-Earth orbit (LEO).
- Authorizes a new space technology program that will provide cutting-edge, transformative technologies to support our future space exploration endeavors.

There is no doubt that this year has been a challenging one for the NASA workforce, both civil service and contractors. These men and women have been asked to put in long hours planning new missions for which funding was unknown, while at the same time, they were asked to steadfastly continue work on missions for which the future was uncertain or which were soon to be retired. Still, NASA's workforce

rose to the challenge because they are people who make the impossible happen every day. They are to be commended for their outstanding accomplishments over this past year. And, based on enactment of the NASA Authorization Act of 2010, the NASA workforce can look forward to many accomplishments yet to come.

FY 2011 Continuing Resolution

As noted earlier, NASA is looking forward to the completion of the FY 2011 appropriations process, so that the Agency can begin the important new work authorized by Congress.

As with other Federal agencies, NASA is operating under the restrictions set forth by the FY 2011 Continuing Resolution (CR). While NASA is funded to continue work that was already underway on programs and projects across the Agency, work may not begin on “new starts,” which may prevent NASA from moving forward on elements of the new programs and projects outlined in the NASA Authorization Act of 2010. Implementation of the NASA Authorization Act of 2010 provisions during the period of the current CR must, as a general rule, rely on existing authority. Each of these must be assessed on a case-by-case basis, and must be individually and specifically tied to prior authorization and appropriations acts, legislative history, and budget requests. The NASA Office of General Counsel (OGC) is conducting this analysis on an ongoing basis, and we will keep the Committee informed of our progress. Attached to my testimony is an assessment by the OGC which outlines the legal issues that need to be considered, the conclusions that have been reached to date, and a timeline for evaluating and reaching a conclusion on the critical initiatives in the NASA Authorization Act. To-date, however, NASA has not identified any particular activity authorized in the NASA Authorization Act of 2010 that would be considered a new start under guidelines set forth in the Government Accountability Office legal opinion issued on July 26, 2010 (B-320091).

While work within Exploration may begin to address the provisions of the Authorization Act, the CR restrictions maintain prohibitions on program element terminations within the Constellation Program, which may eventually limit application of funding needed for key Exploration activities.

In general, NASA is following several principles as we proceed under the FY 2011 CR:

1. The current FY 2011 CR directs funding at the FY 2010 “current rate.” As such, NASA has released funds to all programs in proportion to FY 2010 enacted controls, generally at the appropriations account level.
2. Since a CR generally provides a lump sum for each appropriations account, the sub-allocations outlined in the Authorization Act become the controlling factor, and would continue to govern unless specifically modified by the final FY 2011 appropriations act.
3. Any provisions of the NASA Authorization Act of 2010 that affect NASA operations must be followed unless or until modified by an Appropriations Act. The one exception is Authorized provisions deemed to be “new starts,” if any, that were not funded by a previous appropriations bill, i.e. FY 2010 appropriations. (See item 4 below.)
4. All administrative and other provisions from the FY 2010 appropriation continue to apply and NASA cannot begin or resume activities that were not funded the previous year. The FY 2010 Appropriations Act (Section 505) and the CR itself prohibit new starts and, other than continuing low-level planning activities, NASA is not providing funding for any activity that may be deemed a new start until a final FY 2011 appropriations bill is enacted.

5. Exploration work can begin to address direction included in NASA Authorization Act of 2010, so long as no program element terminations prohibited in the FY 2010 Omnibus Appropriation occur, and as long as NASA meets the restrictions outlined in item 4 above.

As programs proceed under CRs, NASA has been cognizant of what the House and Senate have included in their legislation with regard to the Agency, and we are reading the Authorization Act and the CR in concert wherever possible. NASA also continues to observe the FY 2010 Omnibus Appropriations limitations with regard to continuing work on Exploration activities during the period of the CR. When the final bills are adopted, NASA will have to apply constraints and funding levels in the final bill to the CR period. Therefore, during a long-term CR, NASA must generally reserve funding to accommodate potential new starts and differing funding levels in the final FY 2011 appropriations bill.

It should be noted that NASA is also working to complete reporting requirements outlined in the NASA Authorization Act of 2010 as soon as possible. However, due to the lack of a final FY 2011 appropriations act, NASA's ability to complete some of those reports may be hampered and, as such, interim reports may become necessary. NASA will continue to keep this Committee apprised about our status on these reports, particularly if interim reports are required.

The FY 2011 CR and NASA's Exploration Programs

As noted earlier, the FY 2011 CR is especially challenging for NASA's human spaceflight programs, particularly those currently managed by the Exploration Systems Mission Directorate (ESMD), as well as those that will be stood up once a final FY 2011 appropriation is received. A low-level planning effort is underway for robotic precursor and flagship missions, and commercial crew development efforts have been limited. Further complicating the matter is that the planning teams are working multiple planning scenarios for FY 2011, in anticipation of final appropriations outcomes.

On August 6, 2010, initial CR guidance was provided to ESMD programs. At that time, the most complete programmatic and funding information available for FY 2011 was contained in the pending Senate Appropriations Report. For that reason, NASA looked to the report to determine priorities and funding allocations at the program/project levels, while capping the total budget at the \$3.746B FY 2010 enacted level, consistent with the terms of the CR.

For the period of the FY 2011 CR, the Agency determined that the monthly funding distribution during the CR period through December 3, 2010 should support spend rates consistent with fourth quarter FY 2010 estimated cost levels. The Constellation Program was directed to place the additional funding on the prime contracts. (To date, all funds have been or are in the process of being placed on contracts.) Note that this monthly funding distribution during the CR will require significant adjustments post-CR to meet annual marks for FY 2011.

When the NASA Authorization Act of 2010 became law, the Agency adjusted CR guidance to reflect authorized priorities and funding distribution, while continuing to use the FY 2010 enacted appropriations level to set the overall spending rate for exploration. Also at this time, ESMD performed a reassessment of labor allocations across the portfolio of authorized programs, resulting in a shift between "Large Developments" (i.e., current Constellation and authorized Space Launch System and Multi-Purpose Crew Vehicle development) and "Other Exploration" (i.e., current and authorized technology, research and commercial capability development), resulting in a revised labor allocation for Constellation, and an increase in the program's annual mark from \$2.265B to \$2.308B (without labor).

On October 18, 2010, ESMD issued the following guidance to the Constellation Program:

- The Constellation Program should not exceed a monthly rate of \$243M a month through the period of the FY 2011 CR for procurement and travel. However, Constellation should plan to an annual control of \$2.308 billion (the authorized level, less labor) for procurement and travel.
- In FY 2011 execution during the CR, the following priorities that have been in place since the June re-plan are being used:
 - Avoid termination of prime contracts and sustain current operations (and avoid workforce dislocations) to the maximum extent practicable;
 - Continue development of critical capabilities, technologies, and commercial services; and,
 - Prioritize investments that support the initiatives under FY 2011 President's budget request and the NASA Authorization Act of 2010.

Since the \$243M monthly funding level (without labor) for the current CR period was established, actual Constellation/Large Development spending during September and October has been ~\$40M lower than planned. This means that the program faces no funding shortfall as the end of the initial CR period approaches. Under a full year CR scenario, to meet the total authorized level, monthly funding for Constellation/Large Developments would need to average ~\$182M (without labor) for the remaining ten months of the fiscal year.

Work on the heavy lift launch vehicle and multi-purpose crew vehicle was authorized by the NASA Authorization Act of 2010, and can proceed without an FY 2011 appropriations bill because it is associated with NASA's current Constellation Program. For example, on November 8, 2010, NASA announced the results of a Broad Agency Announcement issued in May with regard to Heavy Lift and Propulsion. As part of this competitive solicitation, utilizing approximately \$7.5M in FY 2010 dollars, NASA selected 13 companies to conduct studies examining the trade space of potential heavy-lift launch and space transfer vehicle concepts. The BAA is focused on achieving affordability, operability, reliability and commonality at the system and subsystem levels with multiple users, including other Government, commercial, science and international partners.

Additionally, work on NASA's successful Commercial Crew Development (CCDev) initiative, which was begun in FY 2010, continues. On October 25, 2010, NASA released a solicitation for CCDev2, seeking proposals to further advance commercial crew space transportation system concepts and mature the design and development of elements of the system such as launch vehicles and spacecraft. Proposals are due December 13, 2010, and award of multiple Space Act Agreements is planned for March 2011 for terms of 12-14 months. However, the awards are contingent on FY 2011 appropriations.

Together, the CCDev1 and CCDev2 efforts will stimulate efforts within the industry to develop and demonstrate human spaceflight capabilities, which could lead to the development of commercial crew transportation systems – one of the highest priorities in the President's FY 2011 budget request. NASA is cognizant of the restrictions included in the NASA Authorization Act of 2010 before we are authorized to proceed with a full-up commercial crew development competition, and we are developing our commercial crew plans based on those directives. We also are working in an expeditious manner to meet the associated reporting requirements outlined in the NASA Authorization Act of 2010.

Other FY 2011 CR Implications

The following is a summary of how other NASA programs are operating under the restrictions imposed by the FY 2011 CR:

- **Space Operations:**
 - **Space Shuttle:** Because the Shuttle continues to operate based on the FY 2010 rate under the FY 2011 CR, the program is able to meet all of its funding requirements during the first half of the fiscal year.
 - **STS-135:** If NASA is provided the funding, it would be able to support the flight of the STS-135 logistics mission to the International Space Station (ISS) as authorized under the NASA Authorization Act of 2010. To best manage workforce impacts, the Shuttle program needs to confirm approval to add the STS-135 mission by December 2010.
 - **NASA Launch Support and Infrastructure Modernization Program:** Although the NASA Authorization Act of 2010 authorizes upgrades of the launch complex at Kennedy Space Center (KSC), NASA is waiting for the enactment of an FY 2011 appropriations bill to fund this activity. A team at KSC is preparing to start up this program upon receipt of funding. They will select and initiate a set of projects consistent with the Authorization Act direction to support the Space Launch System. A report outlining the implementation plan for this modernization program is due to Congress no later than February 2011.
 - **ISS:** Both the President's FY 2011 budget request and the Authorization Act extended the ISS until at least 2020. Required activities to support ISS life extension will be performed under the FY 2011 CR and ISS research based on the FY 2010 budget also will continue during the CR. However, activities to increase ISS functionality will be delayed until FY 2011 funding is received. During the CR, SOMD will continue to plan to ramp up ISS user operations and to complete assembly of the ISS. Additionally, the Directorate will restructure the existing ISS utilization program into three primary components: 1) international partner uses; 2) NASA uses to enable future exploration; and, 3) U.S. uses by organizations other than NASA. This restructuring does not represent new research program content given that NASA has been pursuing ISS utilization in all three of these domains throughout the assembly period. Finally, SOMD plans to conduct a competitive acquisition for a cooperative agreement to manage a portion of the research on ISS. This initiative is a continuation of the existing research program under an alternate management structure that includes a "single Point Of Contact" for ISS research, consistent with specific Administration and Congressional guidance. The schedule for this initiative would lead to award of a cooperative agreement in the May 2011 timeframe pending the availability of funds within the FY 2011 appropriation.
- **Science:** Plutonium-238 (Pu-238) has provided power for 26 different NASA missions that have flown over the years, missions that have been enabled with radioisotope power systems that require this particular fuel. The NASA mission to explore the solar system depends upon spacecraft that rely on Pu-238 to fuel their energy needs because solar power is not a practical option for many missions. NASA's access to secure and reliable sources of Pu-238 is endangered. Russia has suspended implementation of its contract with the Department of Energy (DOE) for purchase of Russia's remaining supplies of Pu-238. Our existing domestic stockpile of Pu-238 is not being replenished and is expected to be depleted before the end of the decade. NASA and DOE have submitted to the Congress a plan for restarting domestic production to

provide a reliable and secure supply of Pu-238. Specifically, the President's FY 2011 budget request proposes \$30M for this purpose, \$15M in the request for DOE and \$15M in the request for NASA. The NASA Authorization Act of 2010 authorizes NASA to pursue a joint approach with DOE beginning in FY 2011 toward restarting and sustaining the domestic production of Pu-238. However, the FY 2011 CR does not fund NASA or DOE to initiate the authorized restart of domestic Pu-238 production. NASA and DOE will require appropriation of funds for FY 2011 and beyond in order to keep the supply of Pu-238, and with it the Nation's Planetary Science program, on track.

- **Space Technology:** While Space Technology planning continues during the FY 2011 CR, the Office of the Chief Technologist cannot fund this work until FY 2011 appropriations are enacted. This may have an impact on schedule given the time required to make awards once a final appropriation is received. NASA recently completed an analysis of the content of six Space Technology initiatives in the FY 2011 budget request: Space Technology Research Grants; NASA Institute for Advanced Concepts; Game-Changing Development; Franklin Small Satellite Subsystem Technology; Technology Demonstration Missions; and, Edison Small Satellite Missions. The NASA Office of the General Counsel concluded that they are continuations of existing initiatives from prior budget requests and program descriptions, with management consolidated in the Office of the Chief Technologist rather than managed across other Mission Directorates as was the prior practice. As such, continuation of these initiatives is not subject to the current CR restriction on "new starts," and NASA could issue solicitations for these efforts, subject to final FY 2011 appropriations.

Per direction contained in the NASA Authorization Act of 2010, the Office of the Chief Technologist has initiated a technology roadmapping activity to guide the Agency's long-term technology needs and inform the National Space Technology policy called for in this Act. NASA will complete development of this strategic guidance through a national dialogue with industry, academia and other government agencies facilitated through the National Research Council. The Office of the Chief Technologist anticipates the release of 14 draft technology area roadmaps to the NRC and the public in December 2010.

- **Aeronautics:** The Aeronautics Research Mission Directorate (ARMD) has two new activities planned for FY 2011 that we are eager to move forward with: the Unmanned Aerial System (UAS) Integration in the National Airspace System (NAS) Project and the Verification and Validation (V&V) of Flight-Critical Systems sub-project, which is under the Aviation Safety Program's System-Wide Safety and Assurance Technologies Project. Since these activities are new, ARMD can only engage in low-level planning activities until there is an enacted FY 2011 appropriation. These programs will benefit two segments of the aviation community: the segment involved with UAS access to the NAS, and the Joint Planning & Development Office. Although there is stakeholder interest in both of these research activities, lasting detrimental effects are not expected as a result of a FY 2011 CR due to the long-term nature of the work. To address near-term issues, ARMD remediation options include delaying the start of these activities, which will in turn delay the benefits of research results. Additionally, ARMD may have to re-scope activities for FY 2011, depending on how long NASA must operate under a CR.

Human Exploration Planning Efforts

As noted earlier, the Agency is reading the NASA Authorization Act of 2010 and the CR in concert, and we are continuing to observe any restrictions on new starts. However, NASA is also continuing prudent planning efforts to integrate new Exploration work across the Agency so that we are ready to move out

once FY 2011 appropriations are received. In particular, NASA is continuing the efforts of the Human Exploration Framework Team (HEFT).

HEFT was chartered in April 2010 for the purpose of establishing a framework for human space exploration that defines the knowledge, capabilities and infrastructure that NASA needs to send people to explore multiple destinations in the Solar System in an efficient, sustainable way. HEFT is not a decision making body; it is intended to provide *decision support* to NASA senior leaders as they plan the spaceflight activities for human exploration beyond LEO. HEFT will inform NASA senior leadership by providing credible, consistent, coherent, and transparent analyses of all aspects of potential human spaceflight architectures. In addition to its Steering Council, HEFT includes an Integration Team and domain experts drawn from across NASA.

The near-term objective for HEFT is to provide analysis to NASA leadership for consideration; this analysis will integrate the options, related priorities, and architecture implications of potential decisions. Per the Administrator's direction, HEFT is following three important principles in developing and analyzing architecture options; architectures must be:

- (1) **Affordable** during development and operations;
- (2) **Sustainable** over multiple years; and,
- (3) **Feasible** so that, in consultation with its international partners and our contractors, NASA knows that it can be achieved.

HEFT is seeking one or more human spaceflight architectures that "close" by satisfying key stakeholder expectations, including fitting within projected human spaceflight budget limits. This will enable NASA to proceed with developments that enable human exploration beyond LEO as soon as affordable, open up the inner solar system to human presence, and preserve planning flexibility deep into the future. The realization of any architecture option is, of course, subject to the availability of appropriated funds.

The first phase of HEFT concluded in early September 2010, and the second phase will conclude in December 2010. A smaller HEFT effort may continue indefinitely since the human spaceflight technical and programmatic environment will continue to evolve. Ultimately, the goal for HEFT is to generate a process that evolves into a long-term, permanent NASA activity to support human spaceflight strategic planning.

Conclusion

Chairman Nelson and Members of the Committee, thank you for the opportunity to appear before you today to discuss the NASA Authorization Act of 2010 and how NASA plans to implement that direction. NASA appreciates all the hard work and effort that has gone into enacting this legislation.

In the end, one thing is clear; even with the tremendous accomplishments of our past, NASA's best days are still ahead. NASA is at the beginning of a great adventure that will create opportunities and discoveries for generations and so, like you, NASA is eager to get started on that journey of exploration, both on our home planet and in the stars above.

I would be pleased to respond to any questions that you or the other Members of the Committee may have.