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Major Challenges Facing NASA in 2011

Statement of

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Chairman Wolf, Ranking Member Fattah, and Members of the Subcommittee:

The Office of Inspector General (OIG) is committed to providing independent, aggressive, and objective oversight of the National Aeronautics and Space Administration (NASA), and we welcome this opportunity to discuss the major challenges facing the Agency.

At the present time, NASA finds itself in a state of significant uncertainty, particularly with respect to its human space program. The final Space Shuttle flights are scheduled for later this fiscal year and construction of the International Space Station is essentially complete; however, the Agency has not achieved significant momentum on space exploration directives contained in 2010 authorizing legislation because of funding and technical questions.

The most immediate challenge facing NASA's leadership is to manage the Agency's portfolio of space and science missions amid the continuing lack of clarity caused by conflicting legislative directives in the Authorization Act and a holdover provision in NASA's fiscal year (FY) 2010 appropriations law. The latter provision prevents NASA from terminating any aspect of the Constellation Program or from initiating any new program.[1]

Last month we sent a letter to Congress highlighting this issue. As we explained, due to language in NASA's FY 2010 appropriation carried over in the continuing resolution that currently funds NASA and the rest of the Federal Government, NASA is continuing to spend approximately $200 million each month on Constellation, aspects of which both NASA and Congress have agreed not to build. Without congressional intervention, by the end of February 2011 NASA anticipates spending up to $215 million on Constellation projects that, absent the restrictive appropriations language, it would have considered canceling or significantly scaling back. Moreover, by the end of FY 2011 that figure could grow to more than $575 million if NASA is required to continue operating under the current constraints and is unable to move beyond the planning stages for its new Space Exploration program.

In our letter, we recommended that Congress take immediate action to address this situation. We encourage this Subcommittee to support enactment of a legislative solution as soon as possible.

In addition to the difficulties inherent in operating an Agency without a full-year appropriation, NASA managers face a series of significant challenges in managing the Agency's diverse projects and programs. In November 2010, we provided the Administrator and Congress with our assessment of "NASA's Top Management and Performance Challenges."

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[1] Public Law No. 111-117 provides that "none of the funds provided herein and from prior years that remain available for obligation during fiscal year 2010 shall be available for the termination or elimination of any program, project or activity of the architecture for the Constellation program nor shall such funds be available to create or initiate a new program, project or activity, unless such program termination, elimination, creation, or initiation is provided in subsequent appropriations Acts." In July 2010, Congress placed an additional restriction on NASA providing that "funds made available for Constellation in fiscal year 2010 . . . shall be available to fund continued performance of Constellation contracts, and performance of such Constellation contracts may not be terminated for convenience by the National Aeronautics and Space Administration in fiscal year 2010." Pub. L. No. 111-212. NASA continues to be bound by both restrictions under the current continuing resolution.

Our report identified six broad issues that we believe constitute the key challenges facing the Agency:

- Future of U.S. Space Flight;
- Acquisition and Project Management;
- Infrastructure and Facilities Management;
- Human Capital;
- Information Technology Security; and
- Financial Management.

In deciding whether to identify an issue as a top management and performance challenge, we considered the significance of the issue in relation to NASA's mission; its susceptibility to fraud, waste, and abuse; whether the underlying issues are systemic in nature; and the Agency's progress in addressing the challenge. Several of the challenges we identified, specifically acquisition and project management and infrastructure and facilities management, are long-standing concerns likely to remain top challenges for the foreseeable future. In fact, recent cost overruns and schedule slippage in major NASA science programs, including the James Webb Space Telescope, underscore our ongoing concern about Agency project management practices.

Future of U.S. Space Flight

Throughout NASA's history, transitioning from a legacy flight system to the next system has always presented significant challenges, and conclusion of the Space Shuttle Program and transition to the next generation of space vehicles is no exception.

The Shuttle Program, originally planned for retirement at the end of FY 2010, is now scheduled to fly its final three missions by June 2011. Moreover, as discussed above, the Constellation Program – which was expected to produce the next generation of NASA space vehicles – essentially has been canceled, and NASA has been directed in the 2010 Authorization Act to develop a new space launch system and multi-purpose crew vehicle that meet specified requirements and use Constellation and Shuttle technology to "the extent practicable."

In addition, the Agency continues its efforts to stimulate the U.S. commercial space industry to develop vehicles to transport cargo and crew into space. Fostering development of commercial cargo and crew capabilities while simultaneously developing its own space launch system and crew vehicle presents significant challenges, not the least of which is whether NASA will receive the level of funding necessary to address all of these priorities on an aggressive yet realistic timetable. Moreover, the level of specificity in the Authorization Act regarding the design and development of NASA's future launch system and crew vehicle presents additional challenges for NASA program managers and engineers.

Last month, NASA provided Congress with a preliminary report describing its plans for developing the space launch system and crew vehicle required by the Authorization Act. In the report, the Agency discussed the challenges it will face under current funding scenarios to develop a "heavy-lift" vehicle and crew capsule while meeting the timetable specified in the Act. NASA acknowledged that it will need to find greater efficiencies and more innovative and less costly ways of doing business to meet the Act's directives.

Foremost among NASA's Shuttle-related priorities is the challenge to safely complete the Program's remaining flights. NASA originally planned to fly two Shuttle missions in 2011, but the Authorization Act provided for and NASA subsequently scheduled a third flight. However, it remains to be seen whether the Agency will obtain additional funding for this final Shuttle flight or whether it will need to pay for this extra flight using existing funds.

In addition to managing Shuttle funding challenges, the transition and retirement activities associated with ending the Shuttle Program present one of the largest such efforts ever undertaken by NASA. The Shuttle Program is spread across hundreds of locations, occupies more than 650 facilities, and involves more than 1.2 million line items of personal property with a total equipment acquisition value exceeding $12 billion. Given the significance and magnitude of the task, the OIG is examining NASA's transition and retirement efforts for the Shuttle Program. In December 2010, we released an audit report discussing NASA's disposition of Shuttle-related information technology equipment.[2] We found significant weaknesses in NASA's sanitization and disposal of computers and hard drives that resulted in IT equipment containing sensitive data being sold or prepared for sale. Among the serious issues we uncovered was the storage of hard drives removed from excess computers in an unsecured dumpster accessible to the public at Kennedy Space Center. An audit report that we expect to release in March 2011 examines NASA's controls over the disposition of other types of Shuttle property.

Once the Space Shuttle has flown its last flight, NASA will need to rely on other countries for access to the International Space Station until it develops its own follow-on system or a commercial vehicle is proven capable of carrying cargo and humans into space. With respect to cargo, for the past several years NASA has been working to develop commercial providers through its Commercial Orbital Transportation Services (COTS) Program. As part of this effort, Space Exploration Technologies Corporation (SpaceX) staged successful demonstration flights of its Falcon 9 rocket in June 2010 and its unmanned "Dragon" capsule in December 2010. Even with these successful test flights by SpaceX and planned demonstration flights by both SpaceX and Orbital Sciences Corporation later in 2011, NASA has no firm timetable to begin commercial cargo delivery to the Space Station.

Moreover, developing commercial vehicles to carry humans into space presents significant additional challenges, particularly with NASA's intent to "human-rate" any new flight system. Given the importance of this issue, the OIG is examining NASA's development of human-rating standards for commercial vehicles and evaluating NASA's process for certifying these vehicles.

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[2] NASA OIG, "Preparing for the Space Shuttle Program's Retirement: A Review of NASA's Disposition of Information Technology Equipment" (Report No. IG-11-009, December 7, 2010).

NASA also faces challenges related to obtaining cost-effective medium-class launch vehicles suited for many of NASA's upcoming science missions. While new launch vehicles in this class are currently under development as part of the COTS Program, in the near term NASA faces limited domestic availability. This situation has been exacerbated by the Department of Defense's decision to stop using the Delta II, the medium-class launch vehicle that has been NASA's launch vehicle of choice for nearly 60 percent of its science missions over the last decade. We are examining NASA's acquisition strategy for these medium-class launch vehicles in an ongoing OIG audit that we expect to issue in the next several weeks.

Finally, the Authorization Act extends the life of the Space Station until at least 2020 and directs NASA to maximize the Station's productivity and use and to enter into a cooperative agreement with a non-profit organization to manage the activities of the Station's national laboratory. Both of these directives present significant challenges for Agency managers. As discussed above, the retirement of the Space Shuttle signals an end to the United States' ability, at least in the short term, to transport supplies, experiments, and crew to the Station. Consequently, NASA will be dependent on the Russians to transport astronauts until commercial vehicles are available or until NASA's new multi-purpose crew vehicle and launch system is operational. In addition, NASA needs to continue developing incentives and partnerships to encourage use of the Space Station by U.S. Government agencies, other nations, and the private sector.

Acquisition and Project Management

Effective acquisition and project management practices are critical to NASA's ability to achieve its overall mission, but systemic weaknesses in these areas have proven a long-standing challenge for the Agency. The OIG is focusing increased attention on these issues to help ensure that NASA is paying contractors in accordance with contract terms and is receiving what it paid for on schedule.

NASA historically has struggled with establishing realistic cost and schedule estimates for its science and space exploration projects, with the James Webb Space Telescope being the most recent example of this problem. In July 2003, NASA scheduled the Webb Telescope for launch in August 2011 at an estimated cost of $1.6 billion. In succeeding years, the planned launch date slipped to June 2014 and the estimated total life-cycle cost increased to $5.09 billion. An independent review of the program released in November 2010 cited problems with budgeting and program management rather than technical performance as the reasons for the delays and increases in costs for this flagship science project. The report concluded that Webb's earliest possible launch date of September 2015 was dependent on the project making a series of critical management changes coupled with an infusion of an additional $500 million over and above the funds already identified for the project in the President's FY 2011 and FY 2012 budget profile.

To execute projects within established cost and schedule estimates, NASA needs to ensure that its project managers have the necessary training, authority, and resources. The OIG is initiating an audit that will examine the extent to which NASA's project managers are positioned to effectively manage Agency acquisition projects. Among the issues we will consider are a manager's role in overseeing development of the project, whether managers are provided with

stable requirements and adequate resources when projects begin, and the extent to which managers are empowered to control requirements growth and make funding decisions.

NASA spends approximately 85 percent of its $18 billion budget on contracts and awards. Given the significant amounts of taxpayer funds at risk, continued findings by the OIG identifying systemic weaknesses in NASA's contract management practices illustrate the importance of this top Agency challenge. For example, the OIG has identified instances of fraud and waste by program participants that call into question the effectiveness of the internal controls in NASA's Small Business Innovation Research (SBIR) Program. OIG investigations have found that some award recipients received multiple SBIR contracts for essentially the same research and provided duplicate deliverables or questionable research products. And in an audit issued last month, we found that SBIR awards made by NASA in 2008 contained an estimated $2.7 million in unallowable and unsupportable costs. We also found that NASA has not implemented appropriate internal controls to prevent fraud and abuse in SBIR contract awards.

Infrastructure and Facilities Management

NASA is the ninth largest Federal Government property holder, controlling a network of approximately 5,400 buildings and structures that support Agency research, development, and flight activities. For years, NASA has struggled with its aging and underutilized infrastructure and the related issue of managing its backlog of deferred maintenance projects. According to NASA's 2008 Real Property Asset Management Plan, approximately 10 to 50 percent of NASA's warehouses and 30 to 60 percent of its laboratories are underutilized. NASA officials also report that more than 80 percent of the Agency's facilities are 40 or more years old and beyond their design life. In FY 2009, NASA reported spending more than $283 million to repair and maintain its facilities even though Agency-wide deferred maintenance costs that year were estimated at $2.55 billion.

The Authorization Act directs NASA to examine its structure, organization, and institutional assets and develop a strategy for the most efficient retention, sizing, and distribution of facilities and other infrastructure consistent with NASA's mission. This report is due to Congress no later than October 11, 2011. The OIG is currently conducting an audit assessing the accuracy of the data used by NASA to develop its real property strategy. Other ongoing work in this area includes an audit examining NASA's plans to re-side Hangar One at the Ames Research Center and a review evaluating NASA's planning for construction of facilities.

Human Capital

The impending retirement of the Space Shuttle and NASA's redirection from the Constellation Program to development of a heavy-lift vehicle and crew capsule, coupled with an emphasis on supporting development of commercial space flight capabilities, require the Agency to deftly manage its workforce to meet shifting objectives. Consequently, maintaining a highly skilled, diverse, results-oriented civilian and contractor workforce is vital to successfully accomplishing NASA's mission. But NASA faces increasing competition from the private sector for the best scientific and engineering talent. Moreover, as its workforce ages NASA will face particular

challenges in attracting and retaining highly specialized skill sets to sustain key Agency capabilities.

Similarly, the cancellation of the Constellation Program and the increased reliance on the private sector to provide transportation to low Earth orbit raises new questions for the future of NASA's Astronaut Corps. NASA has taken an important step to address this challenge by enlisting the National Research Council to conduct an independent study examining the role and size of the Astronaut Corps following the Shuttle's retirement.

Finally, NASA employees routinely work side-by-side with contractors, international partners, and researchers from academia. Many NASA employees seek opportunities in the private sector following their Government employment and others move between jobs in the private sector and NASA. These conditions pose particular challenges to NASA leadership to ensure that employees abide by ethics laws and regulations. Moreover, as NASA moves more deeply toward privatization of some aspects of space exploration, this challenge may increase in both scope and complexity.

Ethics issues continue to account for a significant portion of the OIG's investigative caseload. For example, in a recent case a senior NASA manager was convicted of a criminal conflict of interest in connection with his participation in NASA contracts awarded to a company owned by his wife. Another senior NASA manager used a majority of the $1.5 million discretionary fund he controlled to initiate several studies that financially benefited him and a former NASA Chief of Staff.

Information Technology Security

NASA information technology (IT) systems and networks control spacecraft, collect and process scientific data, and enable NASA personnel to collaborate with their colleagues around the world. Users of these systems number in the hundreds of thousands and include NASA personnel, contractors, academia, and the public. As computer technology has advanced, NASA has become dependent on computerized information systems to carry out daily operations and to process, maintain, and report essential information. Accordingly, it is imperative that NASA properly protect its IT systems and networks.

Federal law and NASA policy designate the Agency's Chief Information Officer (CIO) as the NASA official responsible for developing IT security policies and procedures and implementing an Agency-wide IT security program. However, we have found that the CIO has limited ability to direct NASA's Mission Directorates to fully implement IT security programs, and consequently key Agency computer networks and systems operated by these Mission Directorates do not consistently comply with Agency-wide IT policy. Until the Mission Directorates fully implement NASA's IT security programs, the Agency will be at risk for security incidents that can have a severe adverse effect on Agency operations and assets.

Recent audit work by the OIG found that significant obstacles remain in NASA's effort to develop a highly effective IT security program. For example, as part of our FY 2009 and FY 2010 Federal Information Security Management Act (FISMA) audits, we found that NASA's

IT security program had not fully implemented key requirements needed to adequately secure Agency information systems and data. For example, NASA did not meet FISMA requirements for annual security controls and contingency plan testing. We also found that the CIO's Office had not effectively managed corrective action plans used to prioritize mitigation of IT security weaknesses.

In addition, our audit work has uncovered significant and recurring internal control weaknesses in NASA's IT security control monitoring and cybersecurity oversight. For example, we found that the Agency did not ensure that its computer servers remained securely configured over time and that the Agency's security practices could be improved by adding a control to verify that 100 percent of the devices connected to NASA's networks undergo vulnerability and patch monitoring. We also found control weaknesses related to user account management, the installation of unauthorized software, and inaccuracies with hardware and software inventories for a key NASA system.

The significance of NASA's IT security weaknesses is highlighted by the increasing number of cybersecurity threats facing the Agency. These threats are evolving, both in scope and sophistication, and present an ongoing challenge to NASA managers. For example, in May 2009 NASA notified the OIG of a suspicious computer connection and the subsequent OIG investigation confirmed that cybercriminals had infected a computer system that supports one of NASA's mission networks. Due to inadequate security configurations, the infection caused the computer system to make over 3,000 unauthorized connections to domestic and international IP addresses, including addresses in China, the Netherlands, Saudi Arabia, and Estonia.

In another case, the OIG alerted NASA to systemic IT deficiencies discovered during an investigation into unlawful computer intrusions at the Jet Propulsion Laboratory (JPL). The OIG determined that the intrusions resulted in the theft of approximately 22 gigabytes of program data illegally transferred to an IP address in China. The stolen data included information protected under International Traffic in Arms Regulations and Export Administration Regulations. The OIG investigation found that a significant contributing factor to the theft was inadequate security settings at JPL, which allowed the intruder access to a wide range of sensitive data.

To help the Agency address these and other critical cybersecurity issues, the OIG is initiating an audit that will examine whether NASA's Security Operations Center provides effective computer incident detection and response for all NASA computer networks and whether its related information system is effective in supporting NASA's computer incident detection and response capability.

Financial Management

After receiving disclaimers of opinion on its financial statements during the previous 7 years, NASA was able to provide sufficient financial evidence and documentation to allow auditors to issue a qualified opinion on the Agency's FY 2010 financial statements. The qualification was related to the valuation of property, plant, and equipment (PP&E) and materials in prior years and its possible effects on the current year statements of net cost and changes in net position. Over the past several years, NASA financial managers – working with the OIG and the

independent accounting firm – have made steady progress resolving previously identified weaknesses and their efforts resulted in the auditors' qualified opinion. While the ultimate goal for the Agency is an unqualified opinion, the FY 2010 results are a significant accomplishment that better positions NASA for the FY 2011 financial statement audit.

During FY 2010, NASA continued to develop policies, procedures, and controls to address its financial management weaknesses. For example, NASA revised its policy and procedures for quantifying its environmental cleanup costs associated with decommissioning PP&E. NASA also successfully implemented a new accounting standard to estimate property values. Nevertheless, challenges remain. NASA identified unexpected and erroneous adjustments in contractor-reported balances during the year, as well as large year-end accrual adjustments to record actual contractor-held property balances.

Due to the volatility of NASA's property balances and the risk of recording estimates for property, accounting for PP&E remains a significant management challenge. Ongoing efforts by NASA management to develop a rigorous review process that both validates and challenges the adequacy of estimation techniques and the sufficiency of supporting documentation are important in preparing for future audits of these estimates.

Conclusion

In addition to the OIG activities described in my testimony today, we have a number of other ongoing reviews that address both long-standing and emerging challenges facing NASA. For example, in separate audits we are examining whether NASA is effectively managing the Mars Science Laboratory and the National Polar-orbiting Operational Environmental Satellite System Preparatory Project to accomplish Agency objectives while meeting milestones and controlling costs. Other OIG audits are reviewing whether NASA's grant funds are being used for their intended purpose and how effectively NASA is managing its tuition assistance program.

Finally, we will continue to assess NASA's IT security and work with the Agency to improve its financial management through the annual audit of the Agency's financial statements.

We look forward to continuing our cooperative working relationship with NASA, this Subcommittee, and other congressional committees as we conduct audits and investigations that focus on the Agency's top management and performance challenges.