

National Aeronautics and  
Space Administration

**Office of Inspector General**  
Washington, DC 20546-0001



November 10, 2008

TO: Administrator

FROM: Inspector General

SUBJECT: NASA's Most Serious Management and Performance Challenges

As required by the Reports Consolidation Act of 2000, this memorandum provides our views of the most serious management and performance challenges facing NASA. We continue to use this forum as a means to draw attention to areas within the Agency's key programs and operations that need to achieve greater economy, efficiency, effectiveness, and accountability. In determining whether to report an issue as a challenge, we consider the significance of the programmatic, institutional, and external concerns in relationship to the Agency's mission; susceptibility to fraud, waste, and abuse; whether problems are systemic; and whether there are safety issues that could result in injury or loss of life.

Through various initiatives and by implementing recommendations made by the Office of Inspector General (OIG) and other evaluative bodies, such as the Government Accountability Office (GAO), NASA is working to improve Agency programs and operations and address the following challenges:

- **Transitioning from the Space Shuttle to the Next Generation of Space Vehicles.** Effectively planning, implementing, and monitoring transition activities while maintaining the capabilities required to fly the Space Shuttle safely and effectively.
- **Managing Risk to People, Equipment, and Mission.** Ensuring that effective risk management, safety, and mission assurance controls are in place to provide robust and reliable operations in the context of very challenging mission schedules and budget constraints.
- **Financial Management.** Ensuring that the Agency implements the appropriate processes, controls, and resources to improve NASA's ability to efficiently provide reliable information to management; address continuing problems, such as NASA's internal control over property, plant, and equipment (PP&E); and comply with the Chief Financial Officers Act and other Federal requirements.
- **Acquisition and Contracting Processes.** Ensuring that adequate requirements and cost estimates are developed, program costs are adequately managed, and the most advantageous acquisition and procurement strategies and safeguards are in

place to promote competition and ensure programs and projects are within schedule and performance parameters.

- **Information Technology (IT) Security.** Continuing efforts to address management, operational, and technical weaknesses and to implement effective controls to protect the information and information systems vital to the Agency's mission.

NASA's greatest challenge remains the transition from Space Shuttle operations to Constellation Program implementation. Although the 2004 "President's Vision for U.S. Space Exploration" tasked NASA with retiring the Shuttle while simultaneously developing and deploying the capability to sustain human and robotic exploration to the Moon and beyond, restrictive budgets, technological hurdles, and geopolitical considerations have complicated programmatic decisions along the way. Thorough and detailed planning is required to coordinate the multitudes of interrelated schedules needed to smoothly transition human capital and critical skills, real and personal property, and related capabilities to support projects within the Constellation Program without compromising the safety and effectiveness of Shuttle operations.

Schedule pressures, from the Shuttle being essential to complete the International Space Station (ISS) before the planned 2010 retirement to convening Constellation Program life-cycle reviews on the defined timeframes, continuously reshape NASA operations. NASA needs to guard against maintaining a schedule at the expense of accepting undue risk. NASA must maintain a robust process for voicing safety and engineering concerns while balancing schedule pressures with the demands of mission execution.

Human capital assets are the backbone on which NASA is reliant for the successful accomplishment of its missions. Balancing the simultaneous requirements of safely flying and then retiring the Shuttle, hiring a workforce capable of managing the Constellation Program from development to implementation, and maintaining an experience base throughout the planned 5-year gap in U.S. space flight capability with the necessary skills to safely operate Constellation Program assets is a challenge that continues to weigh heavily on Agency officials at all levels.

We note that some members of Congress are interested in extending Shuttle flights beyond those currently scheduled. The NASA Authorization Act of 2008 includes language that directs NASA not to take any action that would prevent the Shuttle from flying beyond 2010. Any action taken to extend the Shuttle would be inconsistent with the plan NASA has executed for almost 5 years, which was dependent on Shuttle retirement in 2010. In 2003, the Columbia Accident Investigation Board (CAIB) concluded that "recertification . . . is essential if the Shuttle is to continue operating for another 10 to 20 years." The CAIB's recommendation was that, "[p]rior to operating the Shuttle beyond 2010, develop and conduct a vehicle recertification at the material, component, subsystem, and system levels." While many Shuttle improvements have been made over the past 5 years, the in-depth and costly processes associated with recertification have not been undertaken because the plan has been to end the program by

2010. This is but one example of many complicated and interrelated problems associated with continuing to operate these 1980s vehicles, designed and built with 1970s technology, beyond 2010. The Agency is currently conducting a Shuttle extension study to identify what additional work will be required if Shuttle operations are extended.

The scope of the Constellation Program's development challenges extend to technical and research challenges. Thrust oscillation; the establishment, definition, and refinement of requirements; and research into the effects of long-duration space flight on humans are among the technical issues currently challenging the successful development of Constellation Program assets. NASA must be vigilant in its process of establishing and validating project requirements. Program risks increase when contractual obligations are established prior to the completion of research that would help define requirements. A disciplined approach using established life-cycle reviews should provide decision makers the knowledge needed to make informed decisions.

NASA's financial management remains on the list of challenges because of continued significant weaknesses in NASA's financial management processes and systems, including issues related to internal control over property accounting. These deficiencies have resulted in a disclaimer of opinion on NASA's financial statements since FY 2003. Many of the deficiencies disclosed by the independent public accounting firms' audits resulted from a lack of effective internal control procedures and from data integrity issues. Although NASA has made progress in addressing these deficiencies, the FY 2008 audit of NASA's financial statements disclosed that similar deficiencies still exist.

Two of the most significant deficiencies involve the financial statement preparation process and NASA's internal control over PP&E. NASA's financial statement preparation process contains deficiencies in Agency-wide internal control, which impaired NASA's ability to report accurate financial information on a timely basis. NASA's ongoing PP&E weakness has been improved through the implementation of new policies and procedures in FY 2008. However, certain legacy accounting issues related to the ISS and the Shuttle continue to impair NASA's ability to accurately report financial information related to PP&E. NASA's challenge will be to ensure its newly implemented processes and controls are operating effectively to accurately record capitalized property in a timely manner.

NASA also continues to face acquisition and contracting challenges. Over the past several years, the Agency has been addressing project management and contracting process weaknesses and has made progress in implementing a more disciplined approach. However, NASA continues to encounter cost overruns in major programs and projects that in many instances are due to ineffective cost-estimating processes used to provide the information necessary to establish priorities and quantify risks. Although NASA has made fundamental improvements to its acquisition approach, weaknesses in the execution of that approach continue to be reflected in the application and timing of project milestone events and NASA's inability to fully define project requirements prior to entering into contractual arrangements.

The Agency has also made commendable progress in the establishment of an Acquisition Integrity Program. However, we continue to report on the existence of management weaknesses in the prevention of conflict of interest violations, with some violations resulting in criminal convictions. We believe that the Agency's commitment to ethics is essential to NASA's ability to effectively and efficiently execute the Agency's mission. Through the establishment of the Acquisition Integrity Program, NASA has taken positive steps to address weaknesses in acquisition and contracting, and we believe that NASA's continued focus in these areas and on ethics compliance and awareness will yield even more improvements.

During FY 2008, NASA's Office of the Chief Information Officer (OCIO) reported making progress against the corrective action plan for IT security and worked diligently to address known weaknesses and implement effective management, operational, and technical controls intended to protect the information and information systems vital to the Agency's mission. In addition, the OCIO reported substantial progress with Federal Information Security Management Act (FISMA) requirements, to include 97 percent of non-national security systems being reported as certified and accredited.

We independently assessed the Agency's actions taken to improve IT security and found that although the Agency has made significant progress, much work remains to ensure adequate management focus and completion of planned security actions. Based on the results of our review, we believe that the OCIO should focus its efforts in the coming year on issuing clearer guidance, better oversight of external systems, and ensuring end-to-end visibility and monitoring of NASA networks and systems. Therefore, to ensure continued focus on IT security deficiencies as well as ensure that sufficient management attention and adequate resources are provided, we continue to report IT security as a management and performance challenge.

In FY 2009, the OIG will continue to conduct work that focuses on NASA's efforts to meet these challenges as part of our overall mission to promote the economy and efficiency of the Agency and to root out fraud, waste, abuse, and mismanagement. If you have any questions, or need additional information, please call me at 202-358-1220.

signed

Robert W. Cobb

Enclosure:

NASA's Most Serious Management and Performance Challenges

## NASA's Most Serious Management and Performance Challenges

### Transitioning from the Space Shuttle to the Next Generation of Space Vehicles

As part of the "President's Vision for U.S. Space Exploration" in 2004, NASA was directed to return the Space Shuttle to flight as soon as practical, focus the use of the Shuttle on completing the International Space Station (ISS), and retire the Shuttle by 2010. One of NASA's greatest challenges associated with achieving the President's Vision is maintaining the capabilities required to fly the Shuttle safely and effectively while transitioning human capital and critical skills, real and personal property, and related capabilities to support projects within the Constellation Program without compromising Shuttle operations. Over the past few years, many oversight and evaluative bodies, such as the National Research Council (NRC), the Government Accountability Office (GAO), and the NASA Office of Inspector General (OIG), have reported on various aspects of the Constellation Program and the transition. These bodies continue to monitor NASA's progress at the request of the Agency and Congress.

**Constellation Program.** The President's Vision tasked NASA with developing and deploying the capability to sustain human and robotic exploration to the Moon and beyond. Restrictive budgets and technological hurdles have forced NASA to delay some of the Constellation Program's milestones. The target date of the Orion crew exploration vehicle's first piloted flight moved from 2013 to 2014, which will likely require modification to the existing contracts and impact planned testing of that first piloted flight. Based on recent funding history and budget requests, NASA estimates that the chance of Constellation meeting its initial operational capability commitment date of 2015 is about 65 percent.

As NASA continues to move toward advancing piloted space exploration while leading the world in aviation and space innovation, NASA must be vigilant in its pursuit of defining and establishing the requirements necessary to accomplish a smooth transition successfully. However, NASA is still in the process of defining many requirements for the Constellation Program and continues to be negatively impacted by requirements being developed concurrently with program implementation decisions. Additional program risks are imposed when NASA enters contractual arrangements for work before having clearly defined requirements, which could result in increased costs and schedule delays.

System engineering and integration challenges continue to test the analytical abilities of NASA engineers. Throughout last year, engineers for the Ares I rocket, the crew launch vehicle being designed to take Orion into space, were focused on resolving a thrust oscillation problem that had some analysts predicting that potentially dangerous vibration could occur in the Orion cabin. Engineers recently presented NASA senior management their final recommendations for fixing the problem, which could add weight to the rocket

and crew vehicle combination. Critics are concerned about how the two projects (Ares I and Orion) may be affected, although NASA engineers insist that the combination retains enough weight margin to accommodate the proposed fix for the thrust oscillation problem. However, additional unanticipated complexities, such as mass and weight changes or changes to power load requirements, raise the risk that the Constellation Program could suffer from additional cost and schedule pressures. Taking a disciplined approach to ensure adequate and appropriate review at each life-cycle phase should provide key decision makers the information and assurances necessary for them to make informed decisions.

NASA must also strive to better understand the effects of long-duration space flight on human performance. While researchers have gained a tremendous amount of information from long-duration human missions, such as those carried out on the ISS, many questions remain. An NRC panel reported that NASA may have focused too much attention on short-term goals and may not be effectively applying sufficient resources toward numerous human risk factors nor developing technology vital to long-duration lunar missions and to reaching Mars. The NRC panel also cited NASA's neglect of nuclear thermal propulsion, a technology crucial to successfully accomplishing longer human missions. Nuclear thermal propulsion could result in a round trip to Mars being less than 500 days instead of the currently projected 900. As NASA gets closer to 2015 and the expectation of using Orion for human space flight, NASA must continue its research and development of new technologies that will keep the crew healthy and safe while maintaining performance requirements of the Ares I/Orion combination, including the physical constraints of mass, power, and weight.

**Managing the Transition.** As the last currently scheduled flight of the Space Shuttle in 2010 approaches, management of the transition between Shuttle operations and the first projected human space flight in 2015 will become increasingly detailed. NASA must maintain the capabilities required to fly the Shuttle safely and effectively while transitioning human capital and critical skills, real and personal property, and related capabilities to support projects within the Constellation Program. In addition, the need to adequately support activities aboard the ISS during the projected 5-year gap in U.S. space flight capability continues to be of great concern.

During FY 2008, Congress, GAO, and other external entities have focused on certain aspects of the transition effort: the effects of the period between the last Shuttle flight and the first Orion flight, on NASA's civil service and contractor workforce, and on the sustainment of the ISS. Workforce issues include maintaining the critical skills now present in the Shuttle workforce throughout the Shuttle's remaining flights while placing additional emphasis on defining and cultivating the skill sets needed by the Constellation Program, especially those that will be needed at Kennedy Space Center. Although other NASA Centers are engaged in development and production activities for the new vehicles, the primary focus of the Kennedy workforce is launch and maintenance—activities that will not be needed at full capacity until the new crew exploration vehicles are ready for flight. GAO and the OIG are also working together to monitor the transition of facilities and hardware, in addition to reviewing the development of the next generation space vehicles and supporting equipment.

While NASA remains committed to a successful and smooth transition from the Space Shuttle to the Constellation Program, international concerns also remain as obstacles to the success of the President's Vision. Sustaining the ISS during the gap period is crucial to realizing the scientific research potential of the ISS and protecting the extensive U.S. and foreign investments in the ISS. NASA had planned to rely on international partners and commercial providers for logistics support and crew rotation necessary to sustain and operate the ISS during the gap period. However, the current capabilities of commercial transportation, constrained schedules, and funding requirements for NASA's Constellation Program diminish the hope of readily available transportation for crew members and cargo to and from the ISS during the planned gap. The lack of adequate support could seriously impair the utility of the ISS as a scientific research asset for the United States and partner nations if Congress and NASA do not commit sufficient resources to ensuring that logistics support can be realized after the final flight of the Space Shuttle.

Although plans have been developed that could conceivably delay the Shuttle's retirement in order to fill the U.S. space flight gap past 2010, implementing those plans is likely to be expensive. In 2003, the Columbia Accident Investigation Board recommended that, as part of a Service Life Extension Program, NASA should recertify the Shuttle at the material, component, system, and subsystem level prior to operations beyond 2010. Shuttle managers forecast that, after 2010, there will be no spares available for auxiliary power unit gas generators, hydraulic actuators, and other critical hardware. In addition, Shuttle managers reported that 2 years ago NASA began terminating contracts with the majority of vendors providing Space Shuttle parts, including the Space Shuttle Main Engine and External Tank contracts. Shuttle suppliers have already begun retooling efforts, and convincing suppliers to again produce unique specialty items based on 30-year-old technology is likely to come at a premium price.

The Administrator, recognizing the significance of the transition being properly managed, directed that the Space Shuttle retirement plan and progress be included routinely in the agenda for NASA's quarterly Senior Management Council meetings, to include transition metrics, decisions, and impacts on facilities. This attention on transition management at the most senior levels of the Agency is sound, but major challenges remain. GAO recently reported that NASA is still facing challenges in defining the full scope and cost of the Shuttle transition and retirement activities. For example, GAO stated that NASA has not developed final plans or cost estimates for making artifacts, such as the orbiters, safe for public display. However, NASA plans to include more mature transition and retirement estimates in its next budget submission.

## **Managing Risk to People, Equipment, and Mission**

Effective risk management, safety, and mission assurance controls are key to supporting robust and reliable operations in the context of very challenging launch and mission schedules. NASA programs are constantly confronted by risks introduced by fiscal constraints and schedule demands. International and commercial partnerships also

involve risks due to the ever-changing geopolitical environment and U.S. economic constraints. Close scrutiny by NASA management of adherence to the fundamentals of project and program management, risk identification and mitigation, and proven acquisition strategies is beneficial toward the accomplishment of Agency goals.

**Schedule Challenges.** Schedule pressure to complete the ISS by 2010 is substantial. NASA must guard against schedule pressure manifesting itself in the acceptance of undue risk. NASA's robust logistic planning, ensuring the delivery of major ISS hardware before it is needed, can ease some of the schedule pressure experienced. As NASA continues to make changes to the Shuttle flight schedule, NASA must also continue to adequately safeguard the Shuttle's workforce and infrastructure through a rigorous and multilayered review process. We recognize that it is a serious performance and management challenge for the Agency to balance mission execution in defined timeframes against the imperfections of hardware, while ensuring that a robust process exists for voicing safety and engineering concerns. However, a process that achieves anything less is unacceptable.

**Technical Challenges.** Technical issues continue to challenge the Shuttle Program and add risk to mission success. Specifically, NASA has been addressing the reliability of the fuel tank's engine cutoff sensors and the continued danger posed by the shedding of foam insulation from the external fuel tank. Undoubtedly, there will be unforeseen technical challenges that will need to be addressed as long as the Space Shuttle continues operations. The added schedule and fiscal stresses of meeting these technical challenges are compounded by those involved in developing and maintaining the Constellation Program's acquisition schedule.

Sound program and project management principles, technical and safety risk identification, and sound mitigation strategies are paramount to successfully developing and operating programs and projects that push the envelope of technological advancement. For the next fiscal year, the OIG plans to dedicate considerable resources to reviewing the Agency's risk management efforts at the program and project levels. Our focus will include monitoring NASA's implementation of requirements detailed in the NASA Policy Directive 7120 series, Program/Project Management, and the implementation of GAO best practices and OIG recommendations.

**Budgetary Challenges.** Aside from the tremendous schedule and technical challenges associated with retiring the Shuttle in 2010 while simultaneously developing the next generation of space vehicles, accomplishment of those missions is susceptible to budgetary constraints imposed through the appropriation process. The implications associated with this budgetary reality add ever-increasing risk to an organization responsible for leading the Nation in space and aeronautics research and development and whose programs are designed to operate over several decades.

Budget constraints and the emphasis on implementing the President's Vision, National Academy of Sciences recommendations, and other stakeholder priorities also influence operations within the NASA Directorates not directly involved in the Constellation Program. While the major space exploration and operational program challenges



continue to be a difficult balancing act, other Mission Directorates within NASA, such as the Aeronautics Research Mission Directorate (ARMD) and the Science Mission Directorate (SMD), certainly feel the impact. For example, the Landsat Data Continuity Mission and Global Precipitation Measurement projects have been unable to move past the formulation phase for the past decade. Research and development activities for the Next Generation Air Transportation System have also been influenced by decreasing ARMD budgets. NASA has had to fund these projects at less than optimal levels in order to support shifting budget priorities imposed by Congress and react to recommendations from external entities.

Decreasing ARMD budgets over the past decade have also forced ARMD to focus its efforts more toward fundamental research, leaving the application of that research to industry and operational developers. This focus has the potential to cause technological readiness gaps between NASA's fundamental research work and the technological maturity expected by partner agencies. Close and detailed coordination will be required to ensure the seamless transfer and implementation of new technologies into the operational environment.

Despite many successful Shuttle missions, the tragic loss of life in the Columbia and Challenger accidents and the risk-adverse nature of society today have raised some questions about the benefits of space exploration. Although NASA's programs have advanced the Nation's knowledge in science and technology, the debate over the cost to implement the President's Vision is emblematic of the challenge NASA will face as congressional interest continues and the Administration changes.

**Key Partnerships.** International and commercial partnerships are vital to implementing the President's Vision. Such partnerships involve risks that include changes in U.S. foreign relations policy and economic constraints.

While the President's Vision directs NASA to pursue opportunities for international partnerships in support of the Nation's exploration goals, Congress has raised concerns about the reliability of Russia to remain a partner for the ISS and the related provision of crew delivery service to and from the Space Station. Currently, the U.S. purchase of transportation services using the Russian Soyuz spacecraft is permissible through a waiver of the Iran, North Korea, and Syria Nonproliferation Act. On September 30, 2008, President Bush signed a temporary spending bill that included an extension of the waiver to 2016, enabling NASA to continue purchasing seats for astronauts going to the ISS.

NASA is also facing significant challenges in its plan to honor its commitments to deliver cargo. NASA plans to rely on the commercial sector to develop space vehicles to use for cargo delivery once ISS assembly is complete and to help the United States honor its international commitments. However, delays in the Commercial Orbital Transportation Services Program and the likely unavailability of U.S. crew vehicles increase the likelihood that NASA will be forced to rely on international partners and the Russian Soyuz spacecraft to transport cargo and crew to the ISS. Although the President granted a waiver to the Iran, North Korea, and Syria Nonproliferation Act, the Soyuz has recently

experienced hard landings as the result of ballistic reentry, which have raised questions as to the spacecraft's safety. NASA is actively working with Russia on modifications to the reentry profiles and continues to monitor the situation.

## **Financial Management**

Since FY 2003, NASA has not been able to produce auditable financial statements or provide sufficient evidence to support statements throughout the fiscal year. NASA has received a disclaimer of opinion on its financial statements from the independent public accounting (IPA) firms conducting the audits: PricewaterhouseCoopers (PwC) in FY 2003 and Ernst & Young LLP (E&Y) in FYs 2004 through 2008. These audit reports identified instances of noncompliance with generally accepted accounting principles (GAAP), reportable conditions,<sup>1</sup> material weaknesses in internal control, and noncompliance with the Federal Financial Management Improvement Act of 1996 and the Improper Payments Information Act of 2002. Many of the deficiencies the audits disclosed resulted from a lack of effective internal control procedures and from data integrity issues. Although NASA has made progress in addressing these deficiencies, E&Y noted similar deficiencies during the FY 2008 audit of NASA's financial statements. Two of the most significant deficiencies involve NASA's financial statement preparation process and internal control over property, plant, and equipment (PP&E). As shown in the following table, these deficiencies have been reported for several years.

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<sup>1</sup> The term "reportable condition" was replaced by "significant deficiency," effective for FY 2007 reporting, with the issuance of Statement on Auditing Standards No. 112, "Communicating Internal Control Related Matters Identified in an Audit."

Internal Control Deficiencies						
Fiscal Year		2008	2007	2006	2005	2004
Independent Public Accountant		E&Y	E&Y	E&Y	E&Y	E&Y
Audit Opinion		Disclaimer	Disclaimer	Disclaimer	Disclaimer	Disclaimer
Internal Control Deficiencies	General Controls Environment <sup>a</sup>	—	—	—	—	material weakness
	Financial Statement Preparation Process and Oversight	material weakness	material weakness	material weakness	material weakness	material weakness
	Property, Plant, and Equipment	material weakness	material weakness	material weakness	material weakness	material weakness
	Fund Balance with Treasury <sup>b</sup>	—	—	—	material weakness	material weakness
	Environmental Liability Estimation <sup>c</sup>	—	—	—	reportable condition	reportable condition
<p><sup>a</sup> The General Controls Environment weakness had mostly been resolved by FY 2005. The segregation of duties component of this weakness was subsequently included in the Financial Statement Preparation Process and Oversight weakness for FYs 2005–2008.</p> <p><sup>b</sup> The Fund Balance with Treasury reconciliations weakness cited in FY 2005 had mostly been resolved by FY 2006; a weakness relating to timely resolution of Budget Clearing Account balances was included in the overall Financial Statement Preparation Process and Oversight weakness for FY 2006 and was resolved in FY 2007.</p> <p><sup>c</sup> The deficiency cited for Environmental Liability Estimation had mostly been resolved by FY 2006. Control deficiencies surrounding the software application used to prepare the estimates, and a lack of involvement by the appropriate Office of the Chief Financial Officer in related accounting matters was included in the Financial Statement Preparation Process and Oversight weakness for FYs 2006–2008.</p>						

**Financial Statement Preparation Process and Oversight.** NASA has made progress in improving its internal control over financial reporting during FY 2008. NASA developed the Comprehensive Compliance Strategy (CCS) to focus on ensuring compliance with GAAP and other financial reporting requirements. The CCS also covers the standards and requirements necessary to resolve deficiencies noted in recent audit reports and other communications from independent entities, such as GAO. The CCS serves as the basis for implementing comprehensive, proactive corrective actions Agency-wide and is being implemented through a phased approach that is being executed on a continuous basis. NASA uses its Continuous Monitoring Program (CMP) to assess and evaluate internal controls, compliance with GAAP, and evidence that balances and activities reported in its financial statements are accurate and complete by requiring Centers to perform a set of control activities. It is NASA's expectation that the use of the CCS and the CMP will resolve its deficiencies. However, NASA management and E&Y continued to identify weaknesses in Agency-wide internal controls, which impair NASA's ability to timely report accurate financial information.

E&Y found that certain issues had been identified within the Centers' CMP submissions to Headquarters but that those issues were not resolved in a timely fashion. Delays in correcting self-identified issues are a recurring matter at the Agency. Also, Headquarters personnel were not aware that the Centers were not performing certain specified control activities or that the Centers had implemented alternative procedures. Insufficient

oversight by Headquarters personnel may result in untimely or ineffective implementation of corrective actions and an increased risk that the Centers may fail to timely detect misstatements or inaccuracies in their financial records. Consequently, these misstatements may become part of the Agency's financial statements. In addition, E&Y identified certain weaknesses in performing the CMP at the Centers that could impair NASA's ability to correct material errors in a timely fashion. For example, the results of certain control activities performed by the Centers were not properly reported to Headquarters. Also, some control activities were not completed in accordance with the applicable CMP guidance. Instead, the Centers implemented alternative procedures. Failure to properly perform the CMP control activities could result in lack of, or untimely, completion or correction of material issues, leading to errors within the Agency's financial statements.

In accordance with Office of Management and Budget Circular No. A-123, "Management's Responsibility for Internal Control," Appendix A, "Internal Control Over Financial Reporting," the Agency assessed, documented, and drafted a report on its internal control over financial reporting. NASA found a number of significant deficiencies<sup>2</sup> noted primarily in three processes: Cost Management, Procurement and Payment Management, and Revenue and Receivables Management. These significant deficiencies were mostly due to lack of documentation retention, lack of supervisory review, and various other issues related to completion of activities related to the CMP, such as reconciliations. Internal control deficiencies<sup>3</sup> were also noted throughout many of the processes. These internal control deficiencies were primarily due to inadequate documentation of reconciliations and insufficient retention of supporting documentation.

**Property, Plant, and Equipment.** To address the PP&E material weakness, NASA implemented new PP&E capitalization policy and procedures, effective October 1, 2007. The policy and procedures are intended to ensure that the value of capitalized assets going forward will be accurate. NASA costs associated with capitalized PP&E are accumulated in the relevant PP&E Work Breakdown Structure (WBS) elements within the Core Financial module, which should enable NASA to identify, track, and accumulate the costs associated with the value of capitalized PP&E. For contracts with effective dates on or after October 1, 2007, contractors are required to report the cost of each capitalized asset as a separate item on required contractor cost reports. NASA also designed a process to reconcile the monthly contractor cost reports and the capitalized PP&E amounts recorded in NASA's Contractor-Held Asset Tracking System (CHATS) and the Core Financial module. However, the deficiencies E&Y noted during the

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<sup>2</sup> A significant deficiency is a control deficiency, or combination of internal control deficiencies, that adversely affects the agency's ability to initiate, authorize, record, process, or report external financial data reliably in accordance with GAAP such that there is more than a remote likelihood that a misstatement of the agency's financial statements, or other significant financial reports, which is more than inconsequential, will not be prevented or detected. Significant deficiencies do not have to be reported outside of the agency; however, they should be reported internally for management's consideration and require corrective action plans for remediation.

<sup>3</sup> An internal control deficiency exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent or detect misstatements on a timely basis.

FY 2008 audit fundamentally flow from contracts executed prior to the implementation of NASA's new capitalization policy. For these types of contracts, NASA waited to obtain disbursement data for capitalization, instead of predetermining the amounts of property it expects to buy, has contracted for, or has purchased. Management also integrated and expanded PP&E validation procedures into the monthly CMP. Management is currently making further revisions to the PP&E sections within the CMP, including the contractor-held PP&E validation checklists. While progress has been made for new property acquisitions, legacy accounting issues related to the ISS and the Shuttle will continue to impair NASA's ability to report financial information related to PP&E.

In May 2008, NASA implemented the Integrated Asset Management (IAM)/PP&E module to track and value NASA's capitalized personal property. The IAM/PP&E module within the Integrated Enterprise Management Program is capable of uploading contractors' PP&E data from CHATS once NASA's validation procedures have been completed. This should minimize the risk of errors that previously existed when CHATS data was exported to an Excel document in support of manual journal vouchers to record contractor-held PP&E. However, E&Y noted that NASA capitalized, through contractor-held work-in-process reported in CHATS, approximately \$1.3 billion for a project that was determined to be research and development according to the new capitalization policy. It was E&Y's understanding that NASA removed those amounts from the capitalization balance when preparing the financial statements.

**Next Steps.** Although much progress has been made in developing policies, procedures, and controls to address NASA's financial internal control deficiencies, NASA's challenge will be to ensure its newly implemented processes and controls are operating effectively to accurately record capitalized property in a timely manner. The Agency must also continue to ensure that the Office of the Chief Financial Officer is staffed with properly trained personnel who can address the Agency's financial management and accountability challenges; ensure that accounting practices are consistent with applicable standards and are consistently applied; establish internal controls that provide reasonable assurance that the financial statements are supported, complete, and accurate; and implement recommendations made by E&Y, the OIG, and GAO.

## **Acquisition and Contracting Processes**

One of NASA's longstanding management challenges relates to systemic weaknesses identified in its acquisition and contracting processes. GAO first identified NASA's contract management as a high-risk area in 1990, citing NASA's undisciplined cost-estimating processes in project development and the project managers' inability to obtain information needed to assess contract progress. The GAO noted improvements to NASA's processes in its most recent update to the high-risk areas, "High Risk Series: An Update" (GAO-07-310, January 2007). During 2008, the OIG also noted NASA's continued progress toward implementing disciplined project management processes. However, both GAO and OIG audits and investigations continue to reveal systemic issues in the areas of acquisition and procurement.

**Cost Estimates.** In a recent review of selected NASA programs, GAO found that NASA still lacks the disciplined cost-estimating processes and financial and performance management systems needed to establish priorities, quantify risks, and manage program costs. GAO noted that the Agency will continue to face challenges in effectively overseeing its contractors until it has the data, tools, and analytical skills needed to alert program managers of potential cost overruns and schedule delays, allowing them to take corrective action before problems occur. Recently, NASA has reported cost overruns on some of its major programs, including the Mars Science Lab, which could impact the success of other programs whose funding may be redirected.

In another recent review, GAO reported that NASA faces disparate challenges in estimating the cost to retire the Space Shuttle and transition to the Constellation Program. Although NASA expects to retire the Shuttle in 2010, it has yet to decide which facilities and equipment will transition to the Constellation Program and which will be sold, demolished, or preserved for historic value. Proper estimation of the cost to transition and dispose of its facilities and assets are critical to the long-term financial planning for the Constellation Program. According to GAO, NASA will need to determine the status of as many as 654 facilities worth an estimated \$5.7 billion and equipment estimated at \$12 billion. According to NASA officials, the Agency is working on two major initiatives to address these challenges.

During our audit of the FY 2008 budget request for NASA's Constellation Program, we found that the cost estimates used to support the budget request could have been better documented. We noted that NASA could improve its budgeting process by adopting the standards recommended by the GAO's July 2007 exposure draft, "Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs," and ensure that budget requests incorporate supportable cost estimates based on historical or actual cost data, vendor quotes, and spreadsheets with detailed calculations prepared by subject matter experts showing how they arrived at the cost estimates.

**Acquisition Process.** GAO and OIG audits have continued to report systemic issues involving NASA's acquisition process. Given that NASA spends approximately 85 percent of its budget on contracts, these systemic weaknesses pose significant challenges to NASA's ability to make informed investment decisions. In response to these challenges, NASA revised its acquisition policy in 2007, which was a positive step in improving NASA's ability to complete its programs and projects within cost, schedule, and performance parameters. However, implementation of the revised policy has created its own challenges by fundamentally changing NASA's approach to acquisition.

More than 2 years ago, GAO testified that NASA's acquisition strategy of awarding a long-term contract for the design, development, production, and sustainment of Orion before developing a sound business case placed the project at risk of significant cost overruns, schedule delays, and performance shortfalls. Later, in October 2007, GAO noted that gaps in the Ares I Project included inadequate knowledge of requirements, costs, schedule, technology, design, and production feasibility. GAO also noted that, given the complexity and interdependencies of the Constellation Program, these challenges were significant.

In June 2007, the OIG initiated an audit of the Orion Project because it was one of the first space flight projects to implement the revised policy, which requires space flight projects to conduct life-cycle reviews during each phase of the project's life cycle. These reviews are considered essential elements of conducting, managing, evaluating, and approving space flight projects. However, during our audit of the Orion Project, we found that NASA conducted a life-cycle review with a vehicle configuration that was not at the proper maturity level to proceed to the next phase. As a result, a significant portion of the vehicle configuration that eventually did proceed to the next phase had not been completely evaluated for compliance with requirements, which increased the risk of costly rework and schedule delays.

In April 2008, GAO again testified that while NASA was working toward a preliminary design review for Ares I and Orion, there were considerable unknowns as to whether NASA's plans could be executed within schedule and cost parameters because NASA was still in the process of defining many performance requirements. While GAO stated that NASA would be challenged to meet the schedule given the level of knowledge that still needed to be attained, GAO also noted that NASA had recognized the risks involved with its approach and had taken steps to mitigate some of those risks.

**Standards of Ethical Conduct Compliance.** There is great proximity between NASA and the private sector, including both industry and academia. With approximately 85 percent of NASA's budget being dedicated to contracts, there is great incentive for private sector interests to influence NASA employees. There is also substantial interaction between NASA's scientists and researchers and those with non-governmental entities, and incentives abound for such acts as sharing information that is sensitive but unclassified. Many NASA employees often seek opportunities in the private sector to pursue financial opportunities beyond their Government employment. With the interchange of talented personnel between the public and private sectors, the advent of term appointments, the use of Intergovernmental Personnel Act appointments, and the use of contractors to meet personnel needs, management is challenged to ensure that ethics laws and regulations applicable to each category are identified and followed. It is imperative that NASA employees, as stewards of NASA's mission and budget, are aware of and comply with the applicable ethics laws and regulations.

We believe that the Agency's commitment to ethics is crucial to maintain the confidence of Congress and the taxpayer so that NASA can fulfill its mission to further science and technology and to explore the universe. The consequences of not having a strong commitment to ethics or of having a workforce that does not embrace a culture of ethical compliance not only undermines the public's trust in Government but inherently causes a further disruption in Agency programs, given the host of consequential activities such as bid protests, contract cancellations, and inquiries by the investigative arms of Congress as well as the OIG.

We also note the Office of the General Counsel's commitment to ethics compliance and awareness, as the Office expanded its resources in the past 2 years to focus on acquisition integrity. Nevertheless, ethics issues, for the Agency as a whole, still accounted for a significant number of cases and allegations examined by the OIG's Office of

Investigations in recent fiscal years. Several of those investigations led to criminal convictions of NASA employees, but also caused protracted procurements. Examples of such ethics-related investigations undertaken by the Office of Investigations include the following:

- NASA employees accepting gifts and meals from a contractor.
- NASA employees' use of public office to advance private business interests.
- A NASA employee who knowingly leaked procurement sensitive information to a contractor. NASA management, after being informed of this, reprimanded the employee, but then temporarily promoted the employee to greater responsibility and also nominated the employee for an Agency award covering the same time period that the information was leaked.
- NASA contracting officer's technical representatives (COTRs) accused of obtaining contracts, in their personal capacities, from the very NASA contractor they were tasked to oversee.
- A NASA employee accused of influencing funding issues for a private sector entity with which the employee had a consulting relationship.
- A NASA employee, as a member of a Source Selection Board, evaluating a private sector company with which the employee was recently employed.
- A former NASA employee accused of using a budget under the employee's control when employed by NASA to award sole-source contracts to private sector entities for which the employee subsequently became a consultant.
- A NASA Standing Review Board (SRB) member reviewed a contract's technical requirements (source selection information) while working for a private sector company that competed for the NASA contract.

Although most of the examples are still under investigation, and may or may not be violations of applicable laws or regulations, they are emblematic of the types of allegations that arise with a technical workforce that works closely with the private sector in order to accomplish NASA's mission. In the fourth example, NASA had to cancel a contract and re-procure services; two NASA COTRs were convicted of violating criminal conflict of interest laws.

The OIG also completed an audit related to the establishment of the Orion Project's SRB. NASA establishes SRBs because having projects reviewed by a group of independent experts provides a unique view that may have been overlooked by project personnel. However, to provide an impartial opinion to NASA management, SRB members should be independent of the project. We found that 6 of the Orion SRB's 19 members were not fully independent of the Orion Project. Those 6 Orion SRB members were employees and, in 4 cases, were also stockholders of companies having contracts for Orion work. This occurred because NASA's internal control processes for triggering conflict of



interest and ethics review were deficient. For example, had NASA initially determined that the Orion SRB was an advisory committee subject to the Federal Advisory Committee Act (FACA),<sup>4</sup> NASA's ethics process associated with advisory committee participation would have been triggered, resulting in a focus on board member independence and conflict of interest resolution. Because of their employee or stockholder status, those members had a vested interest in the project's success, making it necessary to carefully evaluate their suitability to serve on an advisory board that emphasizes "objectivity and independence." Because of our finding on the Orion SRB, we initiated a review on all Constellation Program SRBs to determine whether similar issues exist. Our preliminary work indicates that similar conflict of interest issues also exist on the other Constellation Program SRBs.

The OIG continues to work with Agency ethics officials to identify and address these issues through both training and enforcement; prudence would dictate that the Agency continue to examine the effectiveness of its ethics training and processes, given the continued numbers of ethics allegations and instances indicated.

## **Information Technology (IT) Security**

Since 2006, NASA has been reporting IT security as a material weakness in the Administrator's annual Statement of Assurance. Demonstrating its commitment to improving its security posture, NASA has worked diligently throughout the year to address known weaknesses and implement effective management, operational, and technical controls intended to protect the information and information systems vital to the Agency's mission.

NASA reported IT security as a new material weakness in the Administrator's FY 2006 Statement of Assurance, issued November 15, 2006, due to recurring IT security deficiencies in areas such as patch management, management of network services, backup of systems, and certification and accreditation of IT systems. NASA continued to report IT security as a material weakness in the Administrator's FY 2007 Statement of Assurance, issued November 15, 2007, based on IT security deficiencies identified during an Agency-wide IT security review by the Office of the Chief Information Officer (OCIO) and ongoing OIG audits and investigations.

During FY 2008, the NASA OCIO reported making progress against the IT security corrective action plan and also reported that NASA was adequately meeting the requirements of the Federal Information Systems Management Act (FISMA). The NASA OCIO stated that the Cyber Threat Analysis Program will "proactively discover and handle sensitive intrusions into NASA's cyber assets." The program includes threat identification, threat reporting, and advanced analysis that includes reverse engineering and data forensics methods. NASA is also in the process of implementing the Security Operations Center Project to consolidate security operations and incident response

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<sup>4</sup> As amended, 5 U.S.C. app §§ 1-16.

capabilities and provide the Agency with end-to-end visibility and monitoring of NASA networks and systems. In addition, the OCIO reported substantial progress with FISMA requirements, to include 97 percent of non-national security systems being reported as certified and accredited.

Based on the Agency's progress, the OCIO concluded that IT security was no longer a material weakness that needed to be reported in the FY 2008 Statement of Assurance, provided certain conditions were met. These conditions include continuous and substantiated progress with regard to the IT security corrective action plan and increased visibility into the security posture of mission assets through full implementation of the Security Operations Center, including regularly scheduled compliance reviews.

The OIG performed a limited review to independently assess NASA's actions taken to improve IT security. We found that the OCIO's progress included closing 91 percent of OIG recommendations to improve IT security in FYs 2005 through 2007; establishing the IT Security Program Management Office; establishing the Cyber Threat Analysis Program; revising the incident management program, which included implementation planning for the Security Operations Center; and substantially improving Agency compliance with FISMA requirements. Based on the work we performed, we agree with the OCIO's conclusion that IT security should no longer be reported as a material weakness. However, much work remains to ensure adequate management focus and completion of the planned IT security corrective actions.

As part of our FISMA audit, we reviewed certification and accreditation documentation for 39 of 607 non-national security Agency systems and 6 of 47 non-national security external systems<sup>5</sup> for compliance with FISMA requirements. We found that all 39 Agency systems we reviewed were compliant with FISMA requirements for certification and accreditation. However, only 3 of the 6 external systems complied with certification and accreditation requirements. In addition, we found that the Agency's plan of action and milestones (POA&M) process was not fully compliant with FISMA requirements. Based on the results of our FISMA review, we believe that the OCIO should focus its efforts in the coming year on clearer guidance and management of external systems to ensure compliance with FISMA requirements.

Although the development of a Cyber Threat Analysis Program is representative of the Agency's progress, the Agency is still developing and implementing various other projects involving incident management. For example, the Security Operations Center is in the planning phase and much work remains to be done to meet the current estimated completion date of March 2009. Additional time will also be required to demonstrate the effectiveness of this program.

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<sup>5</sup> NASA Standard Operating Procedure, ITS-SOP-0033, "External System Identification and IT Security Requirements," July 19, 2007, defines an external system as an IT system used by NASA to store or process "NASA information that is critical to the mission or operations of NASA. . . . External systems are generally owned by outside agencies, contractors, universities, or other organizations and provide services to other customers besides NASA."

Other challenges the Agency faces include increased sophistication of cyber attack technology, new phishing techniques, and spyware programs that continue to prove ever more damaging with the advancement of technology. For example, the ISS recently was infected by a computer virus intended to gather personal information. The virus was believed to be either in the initial software load or possibly transferred from a personal flash drive. In addition, several NASA Centers continue to experience IT security incidents, which the OIG is investigating. Whether or not the Agency's Cyber Threat Analysis Program and revised incident management program can effectively demonstrate results can only be determined over time.

The NASA OCIO should continue to report quarterly to the Senior Assessment Team until planned actions are fully implemented and demonstrating the desired results. This should ensure continued focus on IT security deficiencies as well as ensure that sufficient management attention and adequate resources are provided. Therefore, we continue to report IT security as a management and performance challenge.