



NOV 13 2007

TO: Administrator

FROM: Inspector General

SUBJECT: NASA's Most Serious Management and Performance Challenges

As required by the Reports Consolidation Act of 2000, these are our views of the most serious management and performance challenges facing NASA. Over the past year, NASA has been working to address these challenges and improve Agency programs and operations 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). An overarching challenge concerns how NASA integrates diverse programmatic and institutional functions across geographically dispersed operations. Each of the five challenges listed below, and summarized in the enclosure, is colored by this overarching challenge.

- **Transitioning from the Space Shuttle to the Next Generation of Space Vehicles.** Balancing schedule and resource constraints while maintaining the capabilities required to fly the Space Shuttle safely and effectively and, simultaneously, developing the next generation of space vehicles.
- **Managing Risk to People, Equipment, and Mission.** Effectively managing risk, safety, and mission assurance controls to ensure reliable operations in the context of aggressive launch and mission schedules, funding limitations, and other future uncertainties.
- **Financial Management.** Ensuring that the Integrated Enterprise Management Program (IEMP) improves NASA's ability to efficiently provide reliable information to management, supports compliance with the Chief Financial Officers Act and other Federal requirements, and strengthens the Agency's Internal Control Program to address continued problems such as NASA's internal controls over property, plant, and equipment and materials (PP&E).
- **Information Technology (IT) Security.** Improving management and operational and technical controls to protect the information and information systems vital to the Agency's mission.
- **Acquisition and Contracting Processes.** Developing adequate cost estimates, managing program costs, and ensuring that NASA is using the most advantageous acquisition and procurement strategies and safeguards to promote competition in contracting and to maximize the Agency's ability to fulfill its missions.

Transitioning from the Space Shuttle to the next generation of space vehicles remains on the list of challenges because of the complexity of balancing the human capital, equipment, and property needs of the Space Shuttle Program with the needs of the Constellation Program without compromising either program. The challenge arises within the framework of a projected 5-year gap between the last expected flight of the Space Shuttle in 2010 and the first projected flight of the Crew Exploration Vehicle (CEV) in 2015.

That 5-year period will challenge NASA's ability to maintain employee skill sets, efficiently utilize its infrastructure and suppliers, and provide adequate support to the activities of the International Space Station (ISS). At issue is maintaining the critical skills now present in the Space Shuttle workforce throughout the remaining Shuttle flights while placing additional emphasis on defining the skill sets needed by the Constellation Program. NASA's plans to rely on international partners and commercial providers during the 5-year gap period to provide the support necessary to operate the ISS will also be a challenge because the capabilities, schedules, and funding requirements for NASA, its international partners, and commercial cargo vehicles are not yet firm enough to ensure that the ISS mission objectives can be fulfilled.

NASA's role as the Nation's leader in space and aeronautics research and development contains inherent risk management challenges. Continuing to confront the Agency are operational and safety risks and mitigating these risks is a continuous challenge.

Even when the risk management system is robust, activities such as flying the Space Shuttle involves the acceptance of substantial amounts of risks. For example, notwithstanding risk mitigation efforts by the Agency subsequent to the *Columbia* accident and since return to flight, foam continues to liberate from the external tank and potentially threaten the orbiters and their crews. The alternative to managing (and accepting) the risk would be to permanently ground the Shuttles. Grounding has occurred for temporary periods to address specific issues or to conduct a comprehensive review of issues. However, grounding the Shuttles prior to the planned retirement of the Space Shuttle program in 2010 would result in a failure to accomplish the missions that have been laid out for the program over the next 3 years. The Agency's willingness to accept risks, such as those associated with continued Shuttle flights to accomplish the mission, may reflect or it may exceed the Nation's tolerance for such risk. NASA refers to the Shuttle as a test flight and experimental vehicle recognizing the risk inherent in the program. A misalignment between the risk NASA accepts and the Nation's tolerance for such risk will bear no negative consequence so long as NASA's risk acceptance is rewarded with successful flights. Were tragedy to strike again, however, the merits of manned space flight to the moon and Mars would likely be reevaluated.

NASA programs are constantly challenged by risks introduced by fiscal and schedule tightening that result from internal weaknesses such as failing to adequately identify requirements prior to program execution and not adequately overseeing contractor performance. NASA programs are also challenged by risks associated with the reprioritization of resources to meet continually evolving demands. These pressures can be manifest in subtle and incremental ways. These fiscal challenges are not new and

NASA's past difficulty in developing systems within cost, schedule, and performance parameters are well documented.

NASA's financial management remains on the list of challenges because of continued internal control problems affecting the Agency's ability to produce complete and accurate financial statements and provide sufficient evidence to support statements throughout the fiscal year. These deficiencies have resulted in a disclaimer of opinion on its financial statements by Independent Public Accountant audits since FY 2003. Many of the deficiencies the audits disclosed resulted from a lack of effective internal control procedures and data integrity issues. Although NASA has made progress in addressing these deficiencies, during FY 2007, the auditors noted that similar inadequacies still exist.

Two of the most significant deficiencies involve the financial statement preparation process and NASA's internal controls over property, plant, and equipment and materials (PP&E). NASA's financial statement preparation process contains deficiencies affecting NASA's ability to effectively accumulate, assemble, and analyze information to timely develop its financial statements on a routine and recurring basis. Consistent with last year's audit report, NASA's ongoing PP&E weakness is a result of NASA relying primarily on a retrospective review of disbursements to determine amounts that should be capitalized with a heavy dependence on contractors to identify assets created at a contractor's location.

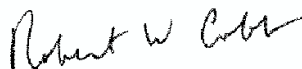
We have again included IT Security as a most serious management and performance challenge because our work and that of the Agency continues to report that significant weaknesses persist and many IT security challenges remain. Significant management and operational and technical control weaknesses continue to impact the Agency's IT Security Program and threaten the confidentiality, integrity, and availability of NASA information and its systems. That threat is tangible in that the Agency continues to be a target for criminal computer intrusions. For example, NASA OIG recently investigated a series of unlawful computer intrusions into NASA's Earth Observation System networks. Aside from the operational impact to the Agency's mission, such as the temporary suspension of automated processes, these intrusions cost NASA \$1.5 million for incident mitigation and clean-up costs alone.

Significant challenges include establishing an IT security internal control program; enhancing intrusion detection and computer forensics with incident management analysis; implementing improved NASA network security monitoring capabilities; and managing IT asset and Internet protocol addresses. Although these challenges are significant, NASA has taken tremendous steps in FY 2007 to bolster its IT security defenses. Despite the progress NASA has made in improving its IT Security Program, IT security is still a most serious management and performance challenge and is recognized by the Agency as a material weakness.

Weaknesses in NASA's acquisition and contracting processes pose significant challenges to NASA's ability to make informed investment decisions. GAO reported that NASA still lacks a modern, fully implemented integrated financial management system to provide accurate and reliable information on contract spending, has undisciplined

cost-estimating processes, and lacks the ability to obtain information needed to assess contract progress. Audits and investigations completed by OIG and GAO in FY 2007 also continued to reveal systemic problems in areas such as knowledge-based acquisitions and procurement process abuses. Challenges to the Agency include implementation of changes to its acquisition approach and preventing and deterring procurement fraud.

In FY 2008, 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, and abuse.

A handwritten signature in cursive script that reads "Robert W. Cobb".

Robert W. Cobb

Enclosure

NASA's Most Serious Management and Performance Challenges

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

NASA's challenge in transitioning from the Space Shuttle to the next generation of space vehicles is multifaceted, as NASA must balance the mission, equipment, facility, and human capital needs of the Space Shuttle Program (SSP) with the needs of the Constellation Systems Program¹ without compromising the operations of either. The projected 5-year gap between the last expected flight of the Space Shuttle in 2010 and the first projected flight of the Crew Exploration Vehicle (CEV) in 2015 will challenge NASA's ability to retain certain employee skill sets, efficiently utilize its infrastructure and suppliers, and adequately support the activities of the International Space Station (ISS). NASA has not experienced a challenge of this magnitude since the end of the Apollo Program and the beginning of the shuttle program.

To manage the transition effort, NASA has taken steps to establish a governance structure and develop a transition plan. The transition is governed by representatives from the Space Operations Mission Directorate (SOMD), the Exploration Systems Mission Directorate (ESMD), and NASA's Mission Support Offices. SOMD is responsible for operating the SSP until its retirement in 2010 and for managing the completion and use of the ISS. ESMD is responsible for the Constellation Systems Program. The Mission Support offices are responsible for providing the institutional capabilities needed to support the transition effort. The transition's governing board's responsibilities include evaluating transition decisions to ensure that those decisions promote efficiencies and synergies between the human space flight programs; ensuring that existing infrastructure and resources evolve to support future programs; and ensuring that strategies, decision-making, priorities, budgets, schedules, and top-level requirements are coordinated across NASA.

In addition to establishing the governance structure, NASA finalized its "Human Space Flight Transition Plan," which details how NASA will manage the transition activities, to include acquisition, budget, data and records management, environmental management, human capital, information technology, property, and transition metrics. Subsequent to finalizing the plan, the Agency took action to address findings and recommendations from our report, "NASA's Plan for Space Shuttle Transition Could Be Improved by Following Project Management Guidelines," January 9, 2007, and GAO reports concerning the transition. Those actions have improved NASA's plans for the overall transition and its various component parts, such as human capital, property, and cost.

With the governance structure and initial transition plan in place, NASA can concentrate on managing the transition through the 5-year gap period (2010–2015) between the last expected flight of the Space Shuttle and the first projected flight of the CEV. During FY 2007, the

¹ The Constellation Systems Program is responsible for developing the next-generation space vehicles and the related exploration architecture systems.

OIG, and GAO and other external entities including Congress, have focused on certain aspects of the transition effort, specifically, the effects of the period between last SSP flight and first CEV flight, on NASA's workforce and the sustainment of the ISS. Workforce issues include maintaining the critical skills now present in the Space Shuttle workforce throughout the remaining Shuttle flights while placing additional emphasis on defining the skill sets needed by the Constellation Program, especially those that will be needed at Kennedy Space Center. Although the workforce at other NASA Centers are engaged in development and production activities for the new vehicles, Kennedy personnel's primary focus is launch and maintenance. Skills related to these activities are more likely to deteriorate from lack of use—i.e., the gap period effect. Therefore, the Constellation Program should adequately define its needed skill sets and take the steps necessary to retain the workforce it will need.

Sustaining the ISS during the gap period is crucial to realizing the ISS research potential and protecting the extensive United States and foreign investment in the ISS. NASA plans to rely on international partners and commercial providers during the gap period to provide the logistics support and crew rotation necessary to operate the ISS. However, the capabilities, schedules, and funding requirements for NASA, its international partners, and commercial cargo vehicles are not yet firm enough to ensure that the ISS mission objectives can be fulfilled. If NASA does not commit sufficient resources to ensuring that logistics support to the ISS can be realized after the final flight of the Space Shuttle, that lack of support will seriously decrease the ISS's utility to the United States.

The Agency continues to acknowledge the difficulty that it faces in managing the transition effort. It has commissioned outside studies to provide independent assessments of some of the transition issues, to include the workforce concerns. We are also reviewing the development of next-generation space vehicles and supporting equipment. In FY 2007, we initiated an audit of the acquisition of the CEV Project and the Constellation Space Suit System, focusing on the development of technical and safety requirements and the achievement of project milestones.

The Agency has taken the requisite first steps to achieve a successful transition by enhancing its knowledge base, engaging a management team, and developing a transition plan. NASA should now concentrate its efforts on ensuring that the transition plans can be successfully executed and that any unexpected problems can be resolved. If not, the Agency risks its ability to move forward and timely meet its future goals of human space flight to the Moon and beyond.

Managing Risk to People, Equipment, and Mission

NASA programs are constantly challenged by risks introduced by fiscal and schedule tightening that result from internal weaknesses such as failing to adequately identify requirements prior to program execution and not adequately overseeing contractor performance. NASA programs are also challenged by risks associated with the reprioritization of resources to meet continually evolving demands. In addition, NASA's role as the Nation's leader in space and aeronautics research and development adds obstacles to its risk management program because risk is inherent in crossing the thresholds of technology.

In executing the President's Vision, NASA will use the Space Shuttle to complete the ISS and then retire the Shuttle in 2010 while simultaneously developing new space vehicles that can travel beyond low-Earth orbit to the Moon and beyond. Aside from the tremendous technical challenges associated with these enterprises, accomplishment of those missions is susceptible to budgetary constraints imposed through the appropriation process. The NASA Administrator acknowledges this risk in his statement that "All of our programs proceed in a 'go-as-we-can-afford-to-pay' manner; so if we receive less funding than requested, we will adjust our pace." The implications associated with this budgetary reality add ever-increasing risk to an organization responsible for taking the Nation's lead in space and aeronautics research and development and whose programs are designed to operate over several decades.

Both internal and external influences continue to have an impact on funding for mission directorates, programs, and projects. Funding for the Science Mission Directorate (SMD), for example, continues to be impacted by competing priorities internal and external to NASA. In a statement before the Committee on Commerce, Science and Transportation Subcommittee on Space, Aeronautics and Related Sciences, United States Senate, the Administrator relied heavily on the results of the Decadal Survey of the National Academy of Sciences to secure schedule-assurance funding for several Earth Science projects. For example, the Administrator stated that the SMD request for FY 2008 "includes additional funding for the Global Precipitation Measurement (GPM) mission to improve schedule assurance in response to the high priority placed on GPM in the Decadal Survey." This mission was first proposed in FY 2001 but had never been a high enough priority to have funding made available to move GPM out of the formulation phase.

Budget constraints and the emphasis on implementing the President's Vision and the Decadal Survey priorities also impact the Aeronautics Research Mission Directorate. Affected is its ability to effectively implement the tenets of the National Aeronautics Research Development Policy, signed by the President on December 20, 2006, and its ability to effectively carry out its responsibilities in the development of the Next-Generation Airspace Transportation System. The National Research Council also acknowledged this impact in its report *Aeronautics Innovation, NASA's Challenges and Opportunities*. The report references risks to NASA missions in that, "despite strong private-sector support for a broad and robust federal government role in civil aeronautics technology development, Congress and recent administrations have not come to terms on what are widely regarded as nationally important NASA aeronautics missions and the level of resources needed to address them effectively and in a timely fashion."

Other challenges NASA faces in managing risk include its International cooperation arrangements and commercial partnerships. The President's Vision directs NASA to pursue opportunities for international partnership in support of the Nation's exploration goals. To address this Agency objective, each of NASA's Mission Directorates is involved with international cooperation at some level. NASA also plans to create and expand existing partnerships with U.S. private industry to develop and implement the Nation's new exploration systems, infrastructure, and technologies. Although international and commercial partnerships are key to implementing the President's Vision, such partnerships involve risks including changes in U.S. foreign relations policy, changes in the global economy, integration and compatibility problems with NASA systems, and sustaining long-term commitments with

those partners. Changes in any of these contingencies could ultimately impact mission objectives. NASA will need to take the appropriate steps to sufficiently mitigate those risks.

NASA has also contributed to its own risk management challenges. For example, NASA's approach to developing the new space vehicles involves the participation of nine Agency Centers in the development process. This approach, while ensuring that each of the Centers maintains a robust working environment, could increase the risks associated with product and process integration, as program and project managers must ensure that although work is performed at multiple geographic locations that the final product can be successfully integrated and is consistent with the architectural design.

In addition, while work progresses on the development process, NASA must also focus on the safe and successful completion of the remaining Shuttle flights. Foam liberation continues to challenge the Space Shuttle Program, as the various problems with foam have been difficult to predict and resolve from a holistic perspective. Each of the remaining shuttle flights may encounter risks to mission completion because of different types of foam liberation incidents requiring different mitigation procedures. Lastly, although it remains questionable whether the alleged incidents of astronaut alcohol use in the immediate preflight period of the Space Shuttle missions were based on fact, the allegations alone point to continued challenges—perceived or actual—to NASA's safety culture.

With the Constellation Program, NASA has a unique opportunity to leverage the lessons learned from the past concerning risk, risk management, and its safety culture. By virtue of its design, the Constellation Program may avoid design risk issues that threaten the SSP but important risk and safety decisions still need to be made. The key will be to ensure that the process of making those risk and safety decisions is open, honest, and impartial and based on a continuous risk management process.

For the next fiscal year, the OIG plans to dedicate considerable resources to reviewing the Agency's risk management efforts. Our focus will include monitoring NASA's actions to address the foam issue, following up on the Agency's actions taken in response to reports on astronaut health and preflight use of alcohol² and examining external influences to NASA's development and accomplishment of specific mission priorities.

Financial Management

Since 2003, NASA has not been able to produce auditable financial statements or provide sufficient evidence to support statements throughout the fiscal year. NASA received a disclaimer of opinion on its financial statements from Independent Public Accountant audits by PricewaterhouseCoopers (PwC) in FY 2003 and by Ernst & Young (E&Y) in FY 2004 through FY 2007. These audit reports identified instances of noncompliance with generally

² The review panel report "Astronaut Health Care System Review Committee Report" (undated) and the August 28, 2007, NASA Office of Safety and Mission Assurance report "Space Flight Safety Review (Alcohol Use in the Preflight Period)."

accepted accounting principles, reportable conditions,³ material weaknesses in internal controls, 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. As shown in the following table, while NASA has made progress in addressing deficiencies, internal control weaknesses still exist. The two remaining material weaknesses involve NASA’s financial statement preparation process and internal controls over property, plant, and equipment and materials (PP&E).

Internal Control Deficiencies						
Fiscal Year	2007	2006	2005	2004	2003	
Independent Public Accountant	E&Y	E&Y	E&Y	E&Y	PwC	
Audit Opinion	Disclaimer	Disclaimer	Disclaimer	Disclaimer	Disclaimer	
Internal Control Deficiencies	General Controls Environment ^a	—	—	—	material weakness	reportable condition
	Property, Plant, and Equipment and Materials	material weakness	material weakness	material weakness	material weakness	material weakness
	Financial Statement Preparation Process and Oversight	material weakness	material weakness	material weakness	material weakness	material weakness
	Fund Balance with Treasury ^b	—	—	material weakness	material weakness	material weakness
	Audit Trail and Documentation to Support Financial Statements ^c	—	—	—	—	material weakness
	Environmental Liability Estimation ^d	—	—	reportable condition	reportable condition	—
^a The General Controls Environment weakness had mostly been resolved for FY 2005. The segregation of duties component of this weakness was included in the Financial Statement Preparation Process and Oversight weakness for FYs 2005–2007. ^b The Fund Balance with Treasury reconciliations weakness cited in FY 2005 had mostly been resolved; 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. This deficiency was resolved in FY 2007. ^c The weakness on Audit Trail cited in FY 2003 continued to exist in subsequent years (FYs 2004–2007); however, it was included in the overall Financial Statement Preparation Process and Oversight weakness. ^d The deficiency cited for Environmental Liability Estimation had mostly been resolved for 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 and 2007.						

During the FY 2007 audit, E&Y noted that NASA’s financial statement preparation process contains deficiencies affecting NASA’s ability to effectively accumulate, assemble, and analyze information to timely develop its financial statements on a routine and recurring basis. For example, NASA personnel were unable to adequately describe how balances reflected in the statements were derived and unable to provide reasons for unusual activity and balances; also the review process missed mistakes and errors in the analyses. All of this

³ The term “significant deficiency” replaced “reportable condition,” effective for FY 2007 reporting, with the issuance of Statement on Auditing Standards No. 112, “Communicating Internal Control Related Matters Identified in an Audit.”

suggests deficiencies in aspects of an effective supervision and review process and that NASA's review process may not be fully effective. Although processes continue to be improved, other issues such as data integrity, systems that are not fully integrated, evolving account reconciliation, and periodic analysis processes directly affect and continue to provide challenges to the development of auditable financial statements.

Consistent with the FY 2006 audit report, NASA's ongoing PP&E weakness is a result of not having a process to determine at the point of budget formulation, obligation recognition, contract development, accounts payable recognition, or disbursement, the value of property NASA expects to buy, has contracted for, or has purchased. NASA relies primarily on a retrospective review of disbursements to determine amounts that should be capitalized and continues to depend heavily on contractors to identify any assets created at a contractor's location. The retrospective review and dependence on contractor reporting increases the risk that related costs will not be properly captured and capitalized. Beginning in FY 2008, NASA plans to have sufficient controls in place to identify, within the Core Financial module, capital acquisitions from project inception through the use of internal checklists, system identifiers, revised contractor cost reporting mechanisms, and invoicing requirements. NASA also plans to implement the Integrated Asset Management - PP&E module project to correct some of the property deficiencies cited by NASA's financial statement auditors.

During FY 2007, NASA changed its accounting treatment of costs associated with space exploration projects. Treatment changed from capitalizing costs of equipment acquired or constructed for a particular research and development project and having no alternative future uses to recognizing these costs as research and development expenses in the period incurred. The cumulative effect of this change in accounting principle was a decrease in the PP&E balance by approximately \$12.7 billion. Even with the significantly decreased PP&E balance, NASA still faces challenges in addressing the question of whether certain land-based assets categorized with the space exploration projects are so unique that the remaining technology and hardware are of no future use and cannot be salvaged or used in other research and development projects.

Environmental liability estimation was not cited as a significant deficiency in the FYs 2006 and 2007 audits, but NASA still has not validated the software program that contains the parametric cost-estimating models used to estimate a portion of its unfunded environmental liability estimate. NASA also has not established a process to identify and record the clean-up costs of removing, containing, and/or disposing of hazardous waste from its PP&E. The amount could be substantial given the extent of NASA's property and the uses to which it has served. In FY 2008, NASA plans to develop a workplan and implement procedures to identify and record these costs in compliance with Federal accounting standards.

Ensuring the Agency's financial systems meet the requirements for Federal financial management systems continues to be a serious challenge. During the FY 2007 audit, NASA's management continued to identify certain transactions that were being posted incorrectly due to improper configuration or design within the Core Financial module. In addition, the auditors noted certain data element fields were either missing information or the information was inaccurate.

Although the inability of the Agency's financial management and business systems to provide accurate and timely financial data has troubled NASA for several years, recent progress in correcting this deficiency should be noted. In November 2006, NASA implemented the Systems, Applications, and Products (SAP) Version Update (SVU) to the Core Financial module to improve NASA's ability to enhance its financial tracking and reporting capabilities. Some of the enhancements included a redesign of funds management and further automation of adjustment accounting entries. Since the completion of the SVU rollout, however challenges in system processing, configuration, and capabilities have surfaced and system version limitations have required the implementation of compensating controls. As of September 2007, the SVU Project Office was still stabilizing the SVU and deploying system patches to resolve known issues.

The Agency also recently performed a gap analysis to determine where NASA's financial management and business systems were not meeting the needs of NASA's mission projects. Because of the gap analysis, steps are being taken to translate gaps into an integrated set of business system requirements that will be compiled into an Agency Business Concept of Operations. Once identified, however, those requirements will compete for financial resources against other mission requirements and the available budget.

The Agency has also made recent progress with regard to internal controls. NASA recently established the Office of Internal Controls and Management Systems (OICMS) to assist the Agency in integrating both financial, institutional, and program-related internal control activities and improving management's efficiency and level of oversight. Since its establishment, OICMS has updated or is in the process of updating various guidance and policy documents; developed oversight roles and responsibilities for the Senior Assessment Team (SAT) and the Operations Management Council (OMC); and proposed a revised Statement of Assurance process for FY 2007, which was endorsed by the OMC.

Some of the measures implemented by OICMS were a direct result of our "Audit of NASA's Compliance with Federal Internal Control Reporting Requirements" (IG-07-025, August 14, 2007). During the audit, we found that NASA's FY 2006 guidance for assessing and reporting on internal controls, and similar guidance being drafted for FY 2007, was incomplete or lacked sufficient clarification and was not distributed in a timely manner for either year. In addition, we found that the tools (i.e., training and communication) for implementing the guidance were ineffective. Further, we found that there was not a clear audit trail of documentation supporting the FY 2006 statements of assurance submitted by NASA offices and Centers, which were the basis for NASA's Statement of Assurance signed by the Administrator.

Although much progress has been made in developing and maintaining an effective Internal Control Program, the Agency will likely face implementation challenges as it focuses on identifying, assessing and reporting on programmatic internal controls. Challenges include obtaining buy-in from Agency officials on the importance of assessing and reporting on program-related internal controls and ensuring that these officials obtain a clear understanding of how internal controls can directly influence their ability to effectively use resources and improve program and project success. The Agency's continued emphasis on identifying,

assessing, and addressing issues related to internal controls should further link management's objectives with mission success.

Information Technology (IT) Security

Our criminal investigative efforts over the past 5 years confirm that the threats to NASA's information are broad in scope, sophisticated, and sustained. Even more troubling is that the threats appear to evolve along with new technologies and range from low-end hacking to complex attacks aimed at some of NASA's most sensitive data. In addition, internal and external audits and reviews of the Agency's IT security continue to identify systemic management and technical and operational control weaknesses that impact the Agency's IT Security Program and threaten the confidentiality, integrity and availability of NASA information and its systems. The results of those reviews reflect significant challenges; however, NASA has taken the initiative to identify significant internal control weaknesses and taken tremendous steps to bolster its IT security defenses. Despite the progress that NASA has made in improving its IT Security Program for FY 2007, IT security is still a most serious management and performance challenge and is recognized by the Agency as a material weakness.

In January 2007, the Agency completed a comprehensive security review of the NASA IT Security Program. The IT security review (1) assessed Headquarters and Center implementation of existing requirements, (2) evaluated the effectiveness of the Agency's organizational structure, (3) verified the accuracy of incident and status reports, and (4) evaluated the effectiveness of policy enforcement efforts. The review identified significant challenges in implementing and maintaining a comprehensive IT Security Program across a large array of networks and information systems. Significant challenges include establishing an IT security internal control program; enhancing intrusion detection and computer forensics with incident management analysis; implementing improved NASA network security monitoring capabilities; and managing IT asset and Internet protocol address.

The Agency's IT security review identified challenges similar to those that the OIG has identified in previous audits and reviews. For example, NASA cited its current IT organizational reporting structure as a management control deficiency. NASA reported that the organizational structure and roles and responsibilities of its IT personnel varied by site. The fragmentation of IT resources and lack of clearly documented roles and responsibilities contributed to the Agency's inability to hold individuals accountable for implementing and complying with NASA policies, procedures, and standards and did not promote timely and consistent communication and reporting. The Agency attributed the lack of compliance to many causes including a lack of available, knowledgeable, and trained personnel to implement those policies. These operational control weaknesses resulted in the implementation of key IT security functions being managed on an individual-by-individual basis and an inconsistent execution of compensating technical controls such as patch management and incident response.

The review resulted in recommendations that the NASA Office of the Chief Information Officer (OCIO) is aggressively addressing, in accordance with OCIO's March 23, 2007, corrective action plan. Noteworthy examples of corrective actions include over 90 percent of the Agency's systems obtaining compliance with OMB guidance by October 1, 2007; establishing a working group to design and develop requirements for an Incident Response Capability system; and the issuance of supplemental guidance to further define external systems and ensure consistent implementation of IT security policies and procedures.

In FY 2007, our audit of the incident detection and response process and the results of the Agency's internal review found similar systemic weaknesses. In our audit, "Controls over the Detection, Response, and Reporting of Network Security Incidents Needed Improvement at Four NASA Centers Reviewed" (IG-07-014, June 19, 2007), we reported that the controls in place at the four Centers we visited did not provide reasonable assurance that network security incidents were detected, resolved, and reported in a timely manner. NASA's internal review also identified areas where the incident detection and response process could be improved. NASA plans to more clearly define the roles for incident response, consolidate the management of incident detection and response capabilities to more effectively respond to incidents, and ensure that NASA implements appropriate prevention measures.

Other similar issues identified during our FY 2007 audits and reviews included deficiencies related to access to sensitive information and configuration management. In addition, several NASA Centers have experienced IT security incidents, which the OIG is investigating. The cumulative effect of these internal control weaknesses and those reported by the Agency led to the continued reporting of NASA's IT security as a material weakness, adversely affecting Agency resources for, and support to, NASA's mission. However, continued reporting of IT security as a material weakness allows for management's continued focus and strategic resource allocation to fully address the IT Security Program's shortcomings. During FY 2008, we will continue to work with the OCIO to identify and successfully mitigate known deficiencies in an effort to potentially downgrade IT security as a material weakness in the near future.

Acquisition Processes and Contract Management

Given that NASA expends most of its budget through contracts and other procurement vehicles, weaknesses in NASA's acquisition and contracting processes pose significant challenges to the Agency's ability to make informed investment decisions. GAO first identified NASA's contract management as a high-risk area in 1990 and reiterated that assessment in 2005 and 2007, reporting that NASA lacked a modern, fully implemented, integrated financial management system to provide accurate and reliable information on contract spending; that NASA used undisciplined cost estimating processes in project development; and that NASA project managers were unable to obtain information needed to assess contract progress. Although GAO has recently reported on NASA's progress in mitigating the deficiency, OIG and GAO audits and investigations continue to reveal systemic problems in areas such as knowledge-based acquisition and procurement process abuses.

In the most recent update to its high-risk series, GAO credited NASA with developing its draft corrective action plan, "NASA Plan for Improvement in the GAO High Risk Area of Contract Management," June 2007. NASA finalized that Plan in October 2007, and GAO is currently satisfied that the Plan targets problems and issues that their reports have found are contributing to high risk in contract management. The overall objective of the Corrective Action Plan (CAP) is to develop an Agency-wide coordinated approach to improving NASA's program/project management, particularly on how best to assure the mitigation of potential issues in acquisition decisions and better monitor contractor performance. NASA has developed initial metrics to track results that indicate the impact of the initiatives encompassed in the CAP. The seven initiatives included in the CAP involve improving (1) program/project requirements and implementation practices, (2) the Agency's strategic acquisition approach, (3) contractor cost performance monitoring, (4) project management training and development, (5) life-cycle cost/schedule management processes; (6) IEMP processes, and (7) procurement processes and policies.

GAO cited steps that NASA needs to take in order to improve contract management and program oversight. The CAP's initiatives encompass those steps. One step is to develop an integrated financial management system that provides cost information that program managers and cost estimators can use to develop credible estimates and to compare budgeted and actual cost with the work performed on a contract. A second step is to ensure that NASA obtains from its contractors the financial data and performance information needed to assess progress on its contracts. A third step is to develop the full complement of analytical tools and trained staff needed to perform cost analyses, including earned value management, which will alert program managers of potential cost overruns and schedule delays and enable them to take corrective action to mitigate the problems.

To further reduce the risk of cost and schedule runs and performance delays, NASA is also challenged to fully implement a knowledge-based acquisition approach. NASA revised its acquisition policy in 2005 and again in 2007 in response to multiple GAO reports that criticized NASA's approach to acquisition. Specifically, GAO stated that NASA's acquisition framework did not provide the information needed to make major investment decisions, which contributed to NASA's difficulties in meeting cost, schedule, and performance objectives for its programs and projects. To address those concerns, NASA revised its acquisition policy to require requirements validation, realistic cost and schedule estimates, and technology maturation before design finalization; major decision reviews between each life-cycle phase; and additional oversight from activities independent of the program and/or project.

The policy revisions were a positive step in improving NASA's ability to successfully complete its programs and projects within cost, schedule, and performance parameters. However, implementation of that policy has created its own challenges because it fundamentally changed NASA's approach to acquisition. Personnel within the Exploration Systems Mission Directorate (ESMD), who are responsible for managing the new space vehicles, are having to balance the need to timely develop the new vehicles with the discipline necessary to follow and comply with the revised guidance. In addition, ESMD has had to adjust to the increased level of oversight and the additional effort necessary to respond to the concerns of the oversight activities. NASA has a unique opportunity to improve its processes

concurrently with the acquisition of the new space vehicles. However, successful implementation of those processes will depend on management's commitment to change and ability to encourage compliance by all personnel involved in the acquisition process.

Over the past year, audits and investigations have also continued to reveal systemic procurement process abuses by NASA employees and contractors. Systemic process abuses ranged from inadequate internal controls and noncompliance with regulatory and program guidance to actual fraud and misuse of Government funds. We reported in "Internal Controls to Detect and Prevent Unauthorized and Potentially Fraudulent Purchase Card Transactions at Four NASA Centers Were Not Always Followed" (IG-07-012, August 29, 2007), that internal controls designed to detect and prevent unauthorized and potentially fraudulent transactions were not always followed. Of the 1,749 transactions we reviewed, 186 transactions were questioned as being a potential misuse of Government funds as they involved missing supporting documentation, unauthorized charges that were not disputed, or prohibited items that were purchased. Those transactions were referred to our Office of Investigations. Because effective and efficient procurement practices are critical to NASA's success in achieving its overall mission, we made recommendations to the Agency to improve its internal control process, one of which was that NASA should establish policies and procedures to hold employees accountable for not complying with regulatory and program guidance. The Agency concurred with our recommendations or the intent of the recommendations, and all have been closed by this office since appropriate corrective action has been taken to address them. In our efforts to detect and prevent fraud, our investigations have also identified systemic problems with contractors. Recent examples include contractors submitting fraudulent invoices, which resulted in prison sentences and millions of dollars in restitution being paid to NASA.

During the past few years, the OIG has collaborated closely with the Agency to promote NASA's implementation of a new Agency-wide Acquisition Integrity Program (AIP). The program is designed to enhance NASA's internal control framework for ensuring integrity in its contracts, promoting competition in contracting, and identifying and addressing wrongdoing by contractors. As part of this, a remedy coordination official will ensure that there is an Agency-wide approach to NASA's administration of civil, administrative, and contractual remedies resulting from investigations, audits, or other examinations related to procurement activities. The program provides NASA with a more structured and thoughtful approach for administering contract remedies, sharing best practices, improving internal controls, and raising employee awareness of procurement fraud indicators.

AIP training is being introduced in tiers, with all NASA employees being designated to receive it. In March 2007, the NASA Office of General Counsel and the OIG started providing AIP training to NASA senior management and senior program and project managers. The OIG introduced NASA managers to the program by providing information on our responsibilities related to preventing fraud, waste, and providing case examples of recent activity. During FY 2008, the OIG will continue its collaboration by providing the Agency with our input into the training for NASA's attorneys, contracting officers, and technical representatives. This training reinforces NASA's commitment to fighting fraud, waste, and abuse and educates NASA employees about fraud indicators and how to respond.