

**TESTIMONY**

# Key Issues and Challenges Facing NASA: Views of Agency's Watchdogs

*Congressional testimony before the U.S. House of Representatives, Committee on Science and Technology, Subcommittee on Space & Aeronautics (February 3, 2010)*

## BY INSPECTOR GENERAL PAUL K. MARTIN

Chairwoman Giffords, Ranking Member Olson, and Members of the Subcommittee: Thank you for the opportunity to discuss the key issues and challenges facing NASA. As requested, this statement describes the Office of Inspector General's observations based on findings and recommendations from our recent oversight work, particularly our report on "NASA's Most Serious Management and Performance Challenges," which we provided to the Administrator and Congress in November 2009. Our report, which was included in the Agency's Performance and Accountability Report for fiscal year 2009, is available to the public on the OIG's Web site.

Based on our audit and investigative work, we identified five areas that we believe constitute the most serious management and performance challenges facing NASA. They are:

- Transitioning from the Space Shuttle to the Next Generation of Space Vehicles
- Managing Risk to People, Equipment, and Mission
- Financial Management
- Acquisition and Contracting Processes
- Information Technology Security

In determining whether to identify an issue as a "top management and performance challenge," we consider its significance in relation to NASA's mission; its susceptibility to fraud, waste, and abuse;



whether the underlying problems are systemic; and the agency's progress in addressing the issue. Some of the challenges, such as financial management, acquisition and contracting processes, and information technology security, have confronted agency leadership for most of the past decade.

Through various initiatives, including implementing recommendations made by the OIG and other oversight bodies such as the Government Accountability Office and the Aerospace Safety Advisory Panel, NASA is working to address these and other challenges and to improve agency operations. For example, NASA has implemented a variety of corrective actions over the last several years to address long-standing weaknesses in its financial management processes and

systems, reduce vulnerabilities in information technology security, and improve acquisition and contracting practices. However, NASA needs to do more to address these and other critical challenges.

The remainder of this statement provides more detail on NASA's five major management and performance challenges identified by the OIG.

## TRANSITIONING FROM THE SPACE SHUTTLE TO THE NEXT GENERATION OF SPACE VEHICLES

A key challenge for NASA is maintaining the critical skills and capabilities required to fly the space shuttle safely until its retirement while transitioning to the next generation of space vehicles. In 2004, the President's Vision for U.S. Space Explo-

ration caused a substantive reorganization of NASA's strategic priorities, established a timeline for the retirement of the space shuttle, established the completion date for the International Space Station, and set the human spaceflight goals of returning to the Moon and reaching Mars. However, since that time fiscal constraints and technical challenges have hampered NASA's efforts to implement the vision effectively.

NASA continues to fund and plan for completion of the five remaining Space Shuttle flights by September 30, 2010. However, we have doubts that NASA will be able to keep to this aggressive and ambitious flight schedule. Based on calculations by the OIG, historical flight rates, the presidentially directed Review of U.S. Human Space Flight Plans Committee (the Augustine Committee), and internal NASA evaluations, NASA is not likely to meet its September 2010 timetable, and it will most likely take until the second quarter of FY 2011 to complete the last of the planned space shuttle flights. Importantly, any delay in this timetable has ramifications

far beyond scheduling, given that NASA spends approximately \$200 million a month to sustain the Shuttle Program.

At the request of Congress and the Administration, NASA has developed options for extending Shuttle operations and closing the gap between its planned retirement in 2010 and the planned first piloted space flight of the Constellation Program's Orion crew exploration vehicle in 2015. While technically feasible, each option involves additional shuttle flights and results in a higher cumulative safety risk associated with increased exposure to debris and potential vehicle failures. Moreover, NASA would need additional funding to avoid "borrowing" from the development of the next generation of space vehicles and other NASA programs to pay for more shuttle missions.

If the shuttle's flight schedule is extended beyond the five missions currently planned, NASA will need to re-evaluate not only funding issues, but also the sustainability of the shuttle's workforce and infrastructure, much of which has been in wind-down mode since 2009. In 2003, the Columbia Accident

Investigation Board recommended that NASA complete a recertification at the material, component, system, and subsystem levels before operating the shuttle beyond 2010. In its recently released annual report, the ASAP stated that it does not support extending the shuttle program significantly beyond its current manifest. I will leave to ASAP Chairman Joseph Dyer any additional comments he cares to offer on the potential safety implications of extending the shuttle program beyond its currently scheduled manifest.

The President's FY 2011 budget, released on Monday, set out the administration's blueprint for NASA's future. Of course, this subcommittee and other committees of Congress will weigh in and help shape NASA's future direction. Amid much uncertainty, one thing is clear: NASA will need a sustained level of funding to enable successful execution of whatever future plan is ultimately adopted.

### MANAGING RISK TO PEOPLE, EQUIPMENT, AND MISSION

NASA program and project managers face a variety of challenges associated with risks introduced by fiscal constraints, schedule demands, and changing priorities. To meet these challenges, NASA program and project managers must adhere to the fundamentals of program and project management, fully implement acquisition strategies that share risks and rewards with contractors, and effectively use earned value management systems to help agency managers identify and mitigate risks.

In the past year, the OIG dedicated considerable resources to reviewing the agency's risk management efforts at program and project levels. For example, we identified opportunities to improve the risk management processes in the Landsat Program and Orion Project. Specifically, we found that the Landsat



Data Continuity Mission was facing a cost increase and possible launch schedule delays because baseline requirements were not finalized prior to contract award.

In reviewing the Orion Project, we found that the Project Office conducted a premature life-cycle review. Instead of delaying the life-cycle review until the revised vehicle configuration was developed, the Orion project office proceeded with the review of a vehicle configuration that was under revision.

Technical issues continue to add risk to NASA projects and challenge mission success. For example:

- The Stratospheric Observatory for Infrared Astronomy Program recently resolved technological challenges with the aircraft's movable door that covers the opening to the telescope, challenges that had caused delays in flight testing.
- The Mars Science Lab suffered a major setback due to technical challenges that resulted in a missed launch opportunity in 2009, a \$400 million cost increase, and a 2-year schedule delay.
- The Orbiting Carbon Observatory, a satellite important to monitoring and understanding the Earth's changing climate, suffered an undetermined technical failure on launch, resulting in the loss of the \$209 million satellite and leaving a gap in NASA's ability to measure carbon dioxide in the atmosphere and its role in global warming.

## FINANCIAL MANAGEMENT

For most of the past decade, the OIG has identified the need to improve financial management at NASA as one of the Agency's most serious management and performance challenges. In early December 2009, when I testified on this issue before this Subcommittee, I noted that while NASA has successfully implement-

ed a variety of corrective actions over the years to address long-standing weaknesses, several challenges remain.

For example, in its most recent report the independent public accounting firm Ernst & Young disclaimed an opinion on NASA's financial statements for FY 2009, noting that it was unable to obtain sufficient evidentiary support for the amounts presented in the Agency's financial statements. This disclaimer resulted primarily because of continued weaknesses in NASA's internal controls over accounting for legacy assets – specifically, the Space Shuttle and International Space Station.

As we discussed in detail at the December hearing, E&Y identified three significant deficiencies in internal controls with one considered a material weakness. Specifically, E&Y reported a material weakness in NASA's controls for assuring that the financial statements fairly state the value of legacy property, plant, and equipment and materials. E&Y's identification of internal controls over legacy assets as a material weakness means there was a reasonable possibility that the controls were not sufficient to prevent a material misstatement in the financial statements. The other two internal control deficiencies cited by E&Y involved NASA's processes for estimating environmental liabilities and its compliance with the *Federal Financial Management Improvement Act of 1996*.

E&Y's report contained specific recommendations intended to assist NASA in remediating these weaknesses during FY 2010, to include implementing guidance allowing the use of estimates in establishing the value of legacy assets. Since the December hearing, OIG and E&Y staff have met with staff in NASA's Office of the Chief Financial Officer to discuss the Agency's efforts to address identified weaknesses in internal controls.

While we cannot predict the

success of NASA's efforts, I am hopeful that through effective implementation of E&Y's most recent recommendations and a continued focus on its ongoing monitoring and remediation efforts, the agency can correct existing weaknesses in financial management during FY 2010 to the point that E&Y can render an opinion. We will continue to work closely with NASA managers throughout the fiscal year in an attempt to achieve that goal.

## ACQUISITION AND CONTRACTING PROCESSES

Systemic weaknesses in NASA's acquisition and contracting processes represent another longstanding management challenge for the agency. In our November report addressing NASA's key challenges, we specifically note acquisition and contracting challenges in relation to cost estimating, acquisition processes, contract management, and ethical standards.

In recent reviews of several NASA programs, the OIG found that NASA still lacks the disciplined cost-estimating processes and financial and performance management systems needed to effectively establish priorities, quantify risks, and manage program costs. For example, in our review of the SOFIA Program, which is now 10 years behind schedule with costs more than 200 percent over initial estimates, we found that the program had not developed an independent cost estimate or implemented an earned value management plan to monitor and control program costs. Given that NASA programs and projects have historically experienced cost overruns, improvements in cost estimating using detailed, empirical data to explain program decisions could help minimize the risk of cost overruns.

GAO – which has done a lot of oversight work in this area – first identified NASA's contract management as a high-risk area in 1990, citing NASA's



undisciplined cost-estimating processes, a lack of information needed to assess contract progress, and persistent cost growth and schedule slippage in many of its major projects. In its most recent high-risk update, GAO reported improvements in NASA's processes, including its plan for addressing systemic weaknesses. I will leave it to Cristina Chaplain from GAO to provide further details on their work.

During 2009, the OIG also noted NASA's plan for addressing systemic weaknesses and improving its acquisition and contract management processes. However, our audits and investigations continue to identify weaknesses such as those we found in contracts under NASA's Small Business Innovation Research Program that bring into question the effectiveness of the program's internal controls. Given that NASA spends approximately 90 percent of its \$19 billion budget on contracts and grants, it is imperative that NASA employees comply with applicable ethics laws and regulations. The scope of this ongoing challenge is underscored by the large amount of interaction between NASA employees and individuals in the private sector, both in industry and academia.

As an illustration of the challenge, NASA directives require that Standing Review Board members be independent to ensure that the boards can provide an impartial opinion of a project's potential success. Our 2009 review of membership for all Constellation Program SRBs found that 21 of the 66 non-Federal board members were employees or consultants of a NASA contractor with an interest in or contract with either the Constellation Program or one of its constituent projects.

Our review concluded that NASA's procedures for determining the independence of SRB members were inadequate. Specifically, NASA did not organize the SRBs in accordance with the Federal Advisory Committee Act

requirements even though they met the definition of a FACA committee. As a result, NASA did not use the more stringent ethics review process associated with the establishment of FACA committees. Instead, NASA used a process that was lacking in both rigor and accuracy for determining the independence of SRB members. During our review, NASA suspended the activities of its Constellation Program SRBs while it addressed the FACA and conflict of interest compliance issues we disclosed.

Given the large amount of money at stake in NASA projects, the OIG's Office of Investigations has made procurement fraud and ethics a high priority. Within the past year, several OIG investigations led to criminal indictments and convictions. For example:

- A former NASA Chief of Staff was convicted on conflict of interest and false statement charges stemming from his steering of earmarked funds to a client of his private consulting company.
- A NASA SBIR contractor submitted false financial reports and improperly claimed family members on the company payroll.
- An individual working on Intergovernmental Personnel Act agreements pled guilty to conspiracy to defraud and tax evasion for payments he received from NASA and other federal agencies.
- A senior NASA scientist steered contracts to a company operated by his spouse.

These cases illustrate the types of criminal offenses the OIG pursues to help guard against waste, fraud, abuse, and misconduct. Moving forward, the OIG will continue to work with NASA ethics officials and the agency's Acquisition Integrity Program to address these issues proactively through comprehensive training while at the same time conducting vigorous investigations and enforcement.

## INFORMATION TECHNOLOGY SECURITY

NASA continues to face significant challenges in developing, documenting, and implementing an agency-wide program to secure its information and information technology systems. Recent breaches of NASA computer systems have resulted in the theft of sensitive data related to agency programs, which adversely affected NASA's mission and resulted in millions of dollars in losses. Over the last several years, NASA implemented a series of technical solutions that have incrementally improved the agency's overarching IT infrastructure and management practices. However, IT security remains a key management challenge. During FYs 2008 and 2009, the agency reported making progress on two key management initiatives related to IT security. First, NASA implemented the Cyber Threat Analysis Program to proactively detect and handle intrusions into NASA's cyber assets. The program includes threat analysis, identification, and reporting as well as advanced data forensics. Second, NASA initiated the Security Operations Center project to consolidate agency security operations and incident response capabilities. The SOC, scheduled to be fully operational in late FY 2010, will provide the agency with the capability to perform real-time monitoring of its computer networks and systems.

Similarly, NASA has shown progress in improving IT security as judged by our annual Federal Information Security Management Act audits. For example, in our FY 2009 FISMA audit we found that 89 percent of the 29 NASA IT systems we reviewed were certified and accredited as required. However, only 50 percent of the systems met FISMA requirements for annual contingency plan testing and only 25 percent had their security controls tested within the last year as required.

NASA is a prime target for sophisticated cyber attacks as new phishing techniques and malware programs become more advanced and destructive. In a recent incident, for example, intruders were able to steal large amounts of NASA research data, including information protected under the International Traffic in Arms Regulations. The foreign-based intruders initially compromised a single user's account but gained access to a great deal of data across a number of NASA programs because of poorly implemented access controls. This incident remains under investigation by our Computer Crimes Division, a group of highly skilled special agents and forensic technicians with advanced training in cybercrime investigations.

Our cybercrime investigations have resulted in criminal convictions or disruptions in the operations of internationally based cyber-intruders who are highly adaptive in avoiding detection. For example, a group of Romanian hackers, the so-called "White Hat Gang," penetrated and damaged a number of NASA systems integral to the Global Earth Observation System. Our agents and technicians eventually tracked one perpetrator to Arad, Romania, where local officials held him accountable in the Romanian Judicial System. Similarly, we have had investigative success against cyber-criminals from Nigeria, Portugal, Slovenia, Italy, Venezuela, and Sweden.

Finally, recommendations from our cybercrime investigations have also identified opportunities to enhance NASA's incident response training, internal coordination, and centralized command and control, leading to systemic improvements in NASA IT security. Significantly, NASA's decision to establish a Security Operations Center for centralized management of intrusion detection, response, reporting, and damage assessment was partially based on OIG recommendations supported by over four years of investigative and audit analyses.

## CONCLUSION

We have a number of ongoing or planned reviews that address the key challenges facing NASA. For example, we are assessing critical components of NASA's efforts to transition from the space shuttle to the next generation of space vehicles. Specific areas of focus include NASA's plans for completing the remaining shuttle flights, disposing of shuttle program equipment, and estimating costs for transition and retirement activities.

In addition, we are nearing the completion of fieldwork for our reviews of the James Webb Space Telescope and the Tracking and Data Relay Satellite System. We are also conducting a review of NASA's acquisition strategy for obtaining launch services when the current contract expires in June 2010.

We continue to work with NASA to improve its financial management through both the annual audit of the agency's financial statements and our monitoring NASA's use of the \$1 billion received under the American Recovery and Reinvestment Act of 2009.

In the area of acquisition and contracting, our investigative work continues to identify fraud, waste, and abuse by participants in NASA's SBIR Program. Consequently, we opened a comprehensive audit of NASA's management of the SBIR Program that will examine the sufficiency and implementation of the program's internal controls.

Finally, we are continuing to assess NASA's IT security and the agency's efforts to ensure the availability, confidentiality, and integrity of mission and mission support networks and systems.

We look forward to continuing our work with NASA leadership, this subcommittee, and other congressional committees as we seek to help the agency address its top management and performance challenges. ✎



Paul K. Martin

**Paul K. Martin** was confirmed by the U.S. Senate as NASA inspector general on November 20, 2009. Prior to coming to NASA, Mr. Martin served as the deputy inspector general at the Department of Justice for six years.

From 2001 to 2003, he served as counselor to the inspector general, and previously as special counsel to the inspector general from 1998 to 2001. Prior to joining DOJ's Office of the Inspector General, Mr. Martin spent 13 years at the U.S. Sentencing Commission, originally as a special assistant to the staff director when the Commission was formed in 1985, and later served as the agency's deputy staff director.

Mr. Martin began his career as a reporter with the Greenville News in Greenville, S.C. He holds a bachelor's degree in journalism from Pennsylvania State University and a Juris Doctorate from Georgetown University Law Center.