Office of Inspector General December 1, 1999

The Honorable Richard K. Armey
House Majority Leader
House of Representative
Washington, DC 20515-6502

Dear Mr. Armey:

Enclosed is my response to your request dated September 22, 1999, concerning what the Office of Inspector General perceives to be the 10 most serious management challenges for NASA.

The Agency's three-part mission encompassing scientific research, space exploration, and technology development and transfer continue to pose bold challenges for NASA's civil service and contractor workforces. NASA is reengineering its ways of doing business to ensure the safe operation of all programs and maximize the effectiveness of technology innovation, while adjusting to budgetary and personnel constraints. The NASA Administrator established safety as the Agency's number one value. We agree that safety must be a significant priority if the Agency is to successfully achieve its missions, and we will support that priority by performing a number of audits and reviews on safety-related issues. Information technology (IT) is a key tool of a scientific and technological organization such as NASA. The Agency's ability to remain free from unauthorized access of its network becomes more critical as the Agency becomes ever more reliant on cyber-communications. We will focus our work to help assure the security and integrity of NASA's computer and communications systems. We will also continue our focus on procurement issues and technology transfer. We believe there are efficiencies from outsourcing aspects of IT. However, outsourcing brings with it considerable risks unless the Agency carefully provides for establishing internal controls after analyzing questions such as:

- Who/what entities have ownership interests in the service provider? Is the provider owned by foreign interests?
- What is the security posture of the provider? Are they compromised by organized groups/hostile entities?
- What is the process contractors use to provide security screening for potential employees being considered for employment under these contracts?
- Does NASA have contract oversight clauses and an oversight apparatus in place?

Our assessment of the Agency's current position on these matters and the other serious management challenges facing the Agency, as well as a listing of our planned and prior work addressing these challenges are provided in the enclosure.

In the enclosure, we have briefly summarized the Agency's response to some of our reports as examples of NASA's position on our recommendations. In general, NASA management has concurred with the majority of our recommendations and has taken or planned appropriate corrective actions.

Should you have any questions or need additional information, please call me on (202) 358-1220. We look forward to working with you and your staff.

Sincerely,

[original signed by]

Roberta L. Gross
Inspector General

Enclosure

bcc:
L/E. Heffernan
IG, AIGA, AIGI, AIGIAIA Chrons
W/L. Ball
W/P. Iler
A separate letter to the following:
The Honorable Fred Thompson, Chairman
Senate Governmental Affairs Committee

The Honorable Pete Domenici, Chairman
Senate Budget Committee

The Honorable Dan Burton, Chairman
House Committee on Government Reform
and Oversight

The Honorable John Kasich, Chairman
House Budget Committee

Enclosure

NASA's Top 10 Management Challenges

Under the authority of the Inspector General Act, the OIG's mission is to conduct and supervise independent audits, investigations, inspections, and other reviews to promote economy, efficiency, and effectiveness and prevent and detect criminal fraud, waste, and mismanagement. During our assessments of NASA's efforts to achieve its scientific and technology goals, we have identified the following ten management challenges, as the Agency's most significant vulnerabilities.

1. Safety and Mission Assurance
2. International Space Station
3. Information Technology
4. Procurement
5. Fiscal Management
6. Program and Project Management
7. Launch Vehicles
8. Research and Technology Demonstration/Application
9. International Agreements
10. Environmental Management

We modified our list of the top ten management challenges from those identified in previous years due to a number of factors including completion of corrective actions by the Agency, budget reductions, implementation of leading edge technology, and the continued commercialization of the aerospace industry. The Year 2000 Problem issue as a single, focused challenge was eliminated from our list of management challenges. NASA's efforts to identify vulnerable systems and plan and implement corrective actions has progressed far enough to warrant removal of this issue as a separate, significant management challenge. However, we will continue to monitor the Agency's efforts in addressing the related Y2K problems that will present themselves in the next several years. The Integrated Financial Management Project (IFMP) issue is a continuing challenge for NASA. However, we have identified other related financial management issues that have been combined with IFMP under the Fiscal Management challenge. The Earth Science challenge has been expanded into a broader category titled Program and Project Management due to the Agency's efforts to modify its management process for all programs and projects, implement earned value management, and update the NASA Federal Acquisition Regulation Supplement. Finally, Research Technology Demonstration/Application was added as a new management challenge area due to the importance of ensuring that NASA-developed technology is effectively transferred to U.S. industry to improve its competitive position.

The NASA OIG has a positive role in helping the Agency achieve its goals. We believe our planned projects for FY 2000 address NASA's top ten challenges and will assist NASA's missions in the new millennium. In addition, our review of the Agency's implementation of Government Performance and Results Act (GPRA) requirements cuts across all challenge

areas. Our GPRA work will assess, on a selective basis, the metrics NASA developed to measure the success of its programs and how well the Agency is measuring its performance. The planned work shown in the following tables are the assignments identified in our FY 2000 workplan. However, this workplan is a flexible, evolving document. Due to emerging priorities and issues, some planned assignments may be delayed while new reviews not listed may be initiated. Current information on our planning and details related to specific workplan project objectives are provided to our customers and will be updated as needed on the NASA OIG homepage. http://www.hq.nasa.gov/office/oig/hq

NASA's Top 10 Management Challenges

1. Safety and Mission Assurance.

The NASA Administrator has stated that the Agency's number one core value is safety. NASA has begun an Agency Safety Initiative (ASI) with a goal of making the Agency the nation's leader in the safety and occupational health of its workforce and the safety of the products and services it provides. The ASI's four Core Process Requirements are to promote and ensure safety for (1) the public, (2) astronauts and pilots, (3) employees on the ground, and (4) high-value equipment and property. Space exploration involves risk, including the risk of failure. Without risk, there can be little discovery, and discovery is NASA's principal mission. To maximize the likelihood of success, NASA must become an informed risk taker by identifying, understanding, and managing risk as part of all activities.

The Aerospace Safety Advisory Panel (ASAP) also continuously reviews NASA's safety processes and procedures. In their 1998 Annual Report, the ASAP made recommendations to NASA to help improve safety. The ASAP report highlighted concerns with the potential effects on safety of workforce reductions and the continued transition of Space Shuttle functions to the Space Flight Operations Contract. Overall, the ASAP concluded that although safety is well served for the present, the picture is not as clear for the future. The ASAP expressed particular concern with NASA's aging workforce and the Agency's inability to adequately plan for its succession because of hiring constraints. The report also states that the Space Shuttle and International Space Station (ISS) programs have been limited in their ability to plan for the future. For example, the ASAP expressed concern that beneficial and mandatory safety and operational upgrades for the Space Shuttle are being delayed because of a lack of funding.

Audits and reviews performed by the NASA Office of Inspector General (OIG) and other organizations support our reporting of Safety and Mission Assurance as a significant area of management concern. For example, a fiscal year 1999 audit of NASA's Safety Program Management identified issues that could affect Goddard Space Flight Center's (Goddard) overall safety, and also its preparation for obtaining certification under the Department of Labor's Occupational Safety and Health Administration Voluntary Protection Program. The audit showed that (1) the Center's various safety offices are not combined into one organization with a full-time director, (2) the mishap reporting process does not ensure that the causes of all mishaps are properly addressed and that all mishaps and related information are adequately reported, and (3) various contractors' safety records were not being evaluated prior to contract award. With respect to combining the Center's various safety offices into one organization, Goddard has taken the initiative to consolidate and elevate leadership of safety through the formation of a high-level Safety, Health, and Environmental Council and through complementing management processes. The Center chose this approach rather than an approach that reorganizes safety operations into a single organization. We plan to evaluate the issues identified

during this audit, particularly contractor safety, in greater detail from a NASA-wide standpoint in future audits.

One of NASA's efforts in the Mission Assurance area involves Presidential Decision Directive (PDD) 63. The Administration issued PDD 63 in March 1998. The directive calls for a national effort to assure the security of the nation's critical infrastructures. Advances in Information Technology (IT) have caused critical infrastructures (such as telecommunications, transportation, and essential Government services) to become increasingly automated and inter-linked, and have created new vulnerabilities to equipment failures, human error, weather, and physical and cyber attacks. Non-traditional attacks on the U.S. infrastructure and information systems may be capable of significantly harming the economy and Government operations. Through PDD 63, the President intends that the U.S. take all necessary measures to swiftly eliminate any significant vulnerability to both physical and cyber attacks on the nation's critical infrastructures including, especially, cyber systems. By May 22, 2000, the U.S. shall have achieved an initial operating capability. By May 22, 2003, it shall have achieved and shall maintain the ability to protect it's critical infrastructures from intentional acts that would significantly diminish the abilities of Federal agencies to perform essential national security missions and to ensure the general public health and safety.

As one of 20 agencies subject to PDD 63, NASA has prepared a draft Critical Infrastructure Protection Plan that establishes security requirements for all NASA critical infrastructure including physical and information assets. Although we will initiate an audit of the Agency's PDD 63 program in 2000, prior reviews have shown weaknesses in information asset protection. For example, in FY 1999 our Information Assurance Audit Team reviewed NASA's ability to sustain continuity of operations in the event its mission critical IT systems were subjected to disaster situations. Various organizations, including NASA, the Office of Management and Budget (OMB), and the National Institute of Standards and Technology, require that disaster recovery plans and capabilities be in place for mission critical systems. For many of the systems reviewed (including those supporting the Shuttle Program), we found that NASA was not prepared to invoke contingency procedures in a manner that would satisfy Agency processing requirements. Specifically, arrangements for extended backup operations at alternative sites had not been made, disaster recovery plans and procedures had not been adequately developed and documented, and personnel were not adequately trained on how to invoke the disaster recovery plans.

In addition, the U.S. General Accounting Office (GAO) recently reported that some of NASA's mission-critical systems at one NASA field center were vulnerable to unauthorized access. Although some systems they targeted had effective security mechanisms, they were able to successfully penetrate others, including one responsible for calculating detailed positioning data for Earth-orbiting spacecraft and another that processes and distributes the scientific data received from these spacecraft. Someone gaining such unauthorized access could

have disrupted NASA's ongoing command and control operations and stolen, modified, or destroyed system software and data. GAO concluded that many of NASA's mission-critical systems are vulnerable to unauthorized access and sabotage and their data to theft, modification, and destruction. GAO cited NASA's ineffective and inconsistent management of Information Technology Security (ITS) throughout the Agency as a major contributing factor in their ability to penetrate these systems. They recommended that NASA implement an effective Agency-wide security program to include improvements in five categories: assessing risks and evaluating needs, implementing policies and controls, monitoring compliance with policy and effectiveness of controls, providing computer security training, and coordinating responses to security incidents.

NASA also needs to assure that flight test of launch vehicles, particularly experimental vehicles, is conducted in the safest manner, and that all necessary precautions are taken. An OIG assessment of NASA's Flight Termination Systems (FTS) concluded that the majority of NASA's FTS do not provide adequate safeguards to ensure only authorized command of NASA launch vehicles and do not comply with national policy. With the expanded use of autonomous flight control, the FTS is quickly becoming the sole means of controlling a vehicle from the ground. This, coupled with the emergence of launch vehicles such as the X-33 and X-34 with flight paths that take them beyond the traditional range boundaries, makes it even more critical that the FTS meets the highest degree of assurance to ensure mission success and public safety. NASA should mitigate risk through the use of a secure FTS or choose alternatives based on a thorough risk assessment. The case-by-case decision to accept risk using a non-secure FTS should be made by a single, high-level NASA official responsible for the safe conduct of launch operations.

OIG reviews have also identified software development and the delegation of quality control functions as conditions that either have or could contribute to problems with the success of major NASA programs. For example, software development problems contributed to a launch delay on the Chandra X-ray Observatory. Chandra is the third of NASA's four "Great Observatories" intended to observe the universe in the four electromagnetic spectrum regions. In November 1997, Chandra's prime contractor informed NASA that the August 1998 launch date would not be met. An audit evaluated NASA's response to the launch delay, including procurement and contract administration functions. The audit showed that Chandra's launch delay was caused by problems in software development and inadequate time scheduled for integration and test activities for the observatory's flight and ground software. Although software development was identified as a high risk, the observatory's Risk Management Plan was not updated because it was not required by NASA policy. Further, NASA did not assign personnel with software expertise at the contractor's production plant.

There are also numerous software development issues surrounding the ISS. As part of a previous assessment of automated information security for the ISS, the OIG identified potential

issues concerning the usability and effectiveness of the portable computer system which is the primary command and control interface for the ISS crew members. We are currently assessing the validity of these issues.

Potential problems with delegated quality control functions were identified during an audit of NASA's two Earth Observing System (EOS) spacecraft designated as PM-1 and CHEM-1. These spacecraft are central to NASA's Earth Science Enterprise, a long-term study of the Earth and its processes. The PM-1 spacecraft is scheduled for launch in 2000 and the CHEM-1 spacecraft in 2002. The audit identified that program management for the spacecraft can be improved in the area of quality control. Specifically, NASA did not have assurance that the Defense Contract Management Command (DCMC) was performing required quality assurance services. Further, DCMC did not finalize and submit its Agency Quality Assurance Plan for the contract in a timely manner. Although the plan has now been submitted, NASA has not formally approved it. Finally, DCMC has not submitted required status reports to the NASA Flight Assurance Manager at Goddard. The information is necessary to ensure that quality assurance issues are addressed in a timely manner.

NASA management has undertaken several initiatives to address the challenges presented in the safety and mission assurance area. The NASA Administrator has on numerous occasions, reaffirmed safety and health as NASA's highest core value and emphasized the importance of every NASA employee's involvement in support of the Agency Safety Initiative (ASI). The Administrator's commitment is further emphasized through one of the four Core Process Requirements (CPR's) of the ASI which is management commitment and employee involvement. Among the other initiatives resulting from the ASI is the Performance Evaluation Profile (PEP) which will be taken by every NASA and contractor employee. The PEP will provide a comparative analysis of the actual and intended safety programs. NASA has also initiated third-party certification of its safety program from the Occupational Safety and Health Administration's, Voluntary Protection Program (VPP). To date, the Langley Research Center and Johnson Space Center have both been VPP certified.

Other actions taken by management to improve safety and mission assurance include a risk-based acquisition management initiative to refocus on risk as a core acquisition concern. Part of this initiative has resulted in a proposed change to the NASA FAR Supplement to emphasize considerations of risk management, including safety, security, and health, within the acquisition process. The proposed rule addresses risk management within the context of acquisition planning, selecting sources, choosing contract type, structuring award fee incentives, administering contracts, and conducting contractor surveillance.

Future Challenges Keys to ensuring safety in future NASA operations include:

- Assuring appropriate level of training for staff who conduct safety reviews and evaluations.

NASA's Top 10 Management Challenges

- Maintaining adequate safety reporting systems.
- Ensuring Agency and contractor compliance with safety standards and regulations.
- Ensuring product safety and reliability.
- Developing appropriate safety planning mechanisms, including NASA's self-assessment of plans to safeguard the Agency's cyber infrastructure assets consistent with the requirements of Presidential Decision Directive 63 (PDD-63).
- Ensuring the ISS maintains crew safety.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 1A. Prior work is listed in Table 1B. The results column in Table 1B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 1A – Safety and Mission Assurance Planned Work

Program Area	***Project***	***Focus***
Audits	NASA Safety Program Management (Carryover) A9900301	Evaluating the adequacy of NASA's safety program reviews. Formal evaluations by NASA of its safety program are required annually.
Audits	NASA Safety Reporting System (NSRS)	Determining whether NSRS is an effective tool for surfacing and resolving safety concerns.
Audits	Safety and Mission Success Planning/Risk Assessment	Evaluating NASA programs' and projects' compliance with risk and safety assessment requirements.
Audits	Flight Range Safety for NASA-Sponsored Tests (X-33, 34)	Evaluating the adequacy of safety planning for flight tests conducted at non-NASA locations. In particular assessing, flight range safety issues associated with the X-33 and X-34 flight test programs.
Audits	Data Reliability of the Quantitative Risk Assessment System (QRAS)	Determining whether QRAS data is accurate and reliable, and assessing how Space Shuttle managers use the data in making program decisions.
Audits	Safety Reviews of Selected NASA Contractors	Determining whether contractor safety programs are being adequately assessed, contracts contain appropriate safety clauses, and NASA ensures compliance with the clauses.
Audits	Effectiveness of Flight Readiness Review Process for the Space Shuttle	Evaluating the effectiveness of the Flight Readiness Review process for balance of safety requirements and streamlining, identifying anomalies for resolution, and resolving anomalies.
Audits	Aviation Safety Program	Determining whether overall program management is effectively coordinating with partner agencies and is using metrics to determine accomplishments.
Audits	Aerospace Test Facilities	Determining whether NASA protects its national assets through a program that adequately maintains aerospace test facilities and ensures that facilities are reliable and free from significant safety problems.

(Continued)

NASA's Top 10 Management Challenges

Table 1A – Safety and Mission Assurance Planned Work (Continuation)

Program Area	***Project***	***Focus***
Inspections	Follow-up Assessment on 1997 Inspection of the NASA Aerospace Safety Advisory Panel (ASAP) (Carryover) G-99-020	Determining the status of corrective actions taken by NASA management in response to our prior ASAP report recommendations.
Inspections	NASA Badging Program and Physical Access (Carryover) Wallops Flight Facility G-99-014 Marshall Space Flight Center (MSFC) G-99-001	Determining whether NASA Centers comply with Federal and NASA badging and physical access control guidelines. (Additional locations may be reviewed during FY 2000)
Inspections	Mothballed/Abandoned NASA Facilities	Determining whether facilities are abandoned in accordance with NASA guidelines and property contained in abandoned facilities is properly discarded.
Inspections	NASA Medical Facilities	Determining the adequacy of internal controls to prevent excessive dispensing or loss of controlled substances.
Inspections	Safety Clearance Procedures	Determining whether an effective safety clearance procedure using a proper Occupational Safety and Health Administration (OSHA) lockout procedure has been established and administered. A determination will also be made as to whether personnel are properly trained in safety clearance procedures.
Inspections	Satellite Failures/Malfunctions	Determining whether NASA has identified systemic reasons for recent satellite failures and malfunctions and has taken appropriate, corrective actions to decrease the risk of future occurrences.
Inspections	Health Reports by Flight Crews (ISS and Shuttle)	Determining whether appropriate reporting mechanisms are in place for adequate communication between flight crews, principal investigators performing experiments, and medical officers monitoring crews to ensure: a) accurate science and b) crew safety and health.
Inspections	Construction Inspections	Determining whether inspections are conducted and documented and how problems identified during the inspections are resolved.

NASA's Top 10 Management Challenges

Table 1B – Safety and Mission Assurance Prior Work

Program Area	***Reports***	***Results***
Audits	Safety Considerations at Goddard Space Flight Center (GSFC) (IG-99-047)	GSFC was making plans to implement the requirements of the Agency Safety Initiative and to achieve certification under the OSHA Voluntary Protection Program. However, GSFC's various safety offices were not combined into one organization with a full-time director; the mishap reporting process did not ensure that the causes of all mishaps were properly addressed and that all mishaps and related information were adequately reported; and contractor safety records were not evaluated prior to contract award, as required by the NASA Safety Manual. We made five recommendations for improvement. GSFC management concurred with each recommendation and has planned or initiated responsive actions.*
Audits	X-38/Crew Return Vehicle (CRV) Operational Testing (IG-99-036)	The United States has agreed to provide a CRV for the ISS. NASA's planned human-rating process for the CRV did not include an operational test. We recommended that management revise the Project Plan to provide for the contingency of CRV operational testing and include CRV operational testing in the Space Station Program Risk Management System as a primary risk. Management concurred and initiated responsive corrective actions.*
Audits	Space Station Configuration Management (IG-98-032)	Functional and configuration audit processes for the Space Station program were effective in meeting program needs.
Audits	Space Station Spares Availability (M-IG-98-002)	NASA management agreed to continue monitoring spares availability and to take actions needed to provide support for development and utilization of the Space Station.
Audits	Space Station Quality Assurance (A-HA-97-058)	We found no significant systemic weaknesses during our survey work at Space Station prime contractor facilities in Huntsville, Alabama.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 1B – Safety and Mission Assurance Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Russian Participation in the International Space Station (A-HA-97-057)	NASA controls of Russian deliverables and payments appear adequate. While planned Russian contributions may not meet NASA's revised Space Station schedule, Russian funding problems are widely known.
Audits	Major Shuttle Hardware and Software Procurements (A-HA-97-033)	NASA is implementing Shuttle upgrades that improve safety, support the program manifest, improve mission supportability, and reduce costs. Also, the program budgeted sufficient funds for Phases I and II upgrades. However, NASA cannot implement major Phases III and IV upgrades unless Congress approves additional funding or the transfer of funds from other NASA programs.
Inspections	Assessment of Flight Termination Systems (FTS) (G-98-011) (Security Classified – Confidential)	To reach flight termination decisions, NASA uses various systems commonly referred to as FTS. In addition to other potential improvements, the Agency should use appropriate risk-based assessments to reach decisions on whether to use secure FTS's. We made recommendations to enhance program security and to address the Agency's top priority—safety. NASA management concurred with two report recommendations and recently agreed to reconsider concurring with the remaining four recommendations. This report is classified with limited distribution; it is not generally releasable to the public.*
Inspections	X-33 Program Security Assessment (G-98-009)	Assessment of the security for the X-33 prototype reusable launch vehicle (RLV) revealed areas for improvement.*
Inspections	Shuttle-Mir Rendezvous and Docking Missions and International Space Station Operational Task Forces (G-98-003)	Task Force should expand the breadth of expertise of its membership and include members free of potential conflicts or perceived biases because of overly close association with NASA. Perception of bias may discourage reporting of safety concerns to the Task Forces.

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* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 1B – Safety and Mission Assurance Prior Work (Continuation)

Program Area	***Reports***	***Results***
Inspections	Timing of Independent Team Meetings and Communications for Shuttle-Mir and International Space Station Missions (G-98-002)	Fact gathering and recommendations to the Administrator on flight-related issues needed to occur earlier in the process to maximize usefulness.
Inspections	Letter to Congressman James Sensenbrenner on NASA's Participation in the Russian Mir Space Program (August 29, 1997)	We reported Shuttle-Mir safety challenges including: fire, decompression, and loss of attitude control. Oversight into Mir operations was limited because of NASA's "guest" status rather than partner status. Also, Russia did not provide timely information, and ground support communication was inadequate. Safety impact of stress resulted from conditions aboard the Mir (high levels of potentially toxic substances, high temperatures, demands on time for maintenance activities, and lack of communication).
Inspections	Modifications to NASA Safety Reporting System (Management Memorandum, G-98-018)	We recommended process changes and technical modifications to upgrade and modernize the NASA Safety Reporting System.
Inspections	Comments on the Lewis Spacecraft Mishap Investigation Board Report (Management Memorandum, G-98-020)	The Lewis Spacecraft Mishap Investigation Board report needed improvement. The process could be improved by avoiding Board membership for individuals, which gives the appearance of bias or conflict of interest; increasing range of expertise of Board; and expanding scope of interviews.

NASA's Top 10 Management Challenges

2. International Space Station (ISS).

OIG reviews have found significant concerns related to ISS cost, contingency planning, and the Crew Return Vehicle (CRV). ISS contracts continue to experience significant cost growth, and the cost to operate the ISS after assembly is uncertain. In March 1999, Boeing, the prime contractor, announced that actual and projected cost overruns on the ISS prime contract had grown by $203 million, from $783 million to $986 million. This was the third major increase in reported overruns within 2 years, for a total increase of $708 million.

Boeing has provided unrealistically low estimates of projected cost overruns on the ISS prime contract from October 1998 through February 1999. Boeing officials communicated to NASA management higher estimates for the overrun and specific areas of program risk that warranted increasing the estimate. Boeing did not revise its $783 million estimate of the variance at completion included in its monthly performance reports until late March 1999. Also, in March 1999, Boeing resumed the improper practice of reporting negative management reserve, which we had reported earlier. As a result, Boeing temporarily received incentive fees above the amount earned based on actual cost performance and benefited from the time value of money resulting from the unearned incentive fees.

The ISS Program Office has a fundamentally sound process for assessing contractor performance, identifying risk, and reporting on its assessment of cost and schedule information to senior NASA management. However, the Program Office did not challenge Boeing's estimate despite continued degradation in cost performance and did not reject Boeing's variance at completion when the Program Office determined it to be unrealistic. Also, the Program Office had not sufficiently emphasized estimates of the variance at completion in monthly Station Development and Operations Meetings and had not conducted periodic independent assessments of the estimate at completion. Further, the variance at completion being funded by the Program Office is substantially below recent Government and Boeing analyses.

In April 1999, the GAO testified that the non-prime portion of the Program's development budget increased from $8.5 billion in 1994 to $12.4 billion by April 1999. GAO also reported in August 1999 that NASA's $13 billion cost estimate to operate the ISS from 2005 to 2014 is uncertain because the estimate does not consider full cost accounting, end of mission costs, or the potential cost of Russia being unable to fulfill its obligations.

Our recent report on Space Station Contingency Planning for International Partners disclosed that the partners did not include or clearly identify several critical elements for effective risk management, as required by Agency guidance. Specifically, the plan did not contain cost and schedule impacts and did not clearly identify mitigation measures and primary consequences of the contingencies. Further, the Program Office did not have a process that ensured the contingency plan was kept current. The Program plan did not include some actions being taken

to prevent further Russian delays. Also, the contingency plan did not address the Year 2000 date conversion problem. Until the Program contingency plan is complete, NASA cannot fully reduce ISS risks through advance planning and the establishment of response plans. Further, without estimated costs, the Agency, the Administration, and the Congress cannot adequately assess the feasibility of proposed responses or determine budgetary impact. Management concurred with the report's recommendations or proposed alternative, responsive actions.

Another significant concern related to the ISS that we recently reported is that NASA has made no provision for an operational test of the CRV to determine its safety for human space flight. Instead, the Agency plans to human rate the CRV based on a space flight test of the X-38, certification by the CRV production contractor, and ground tests. Although three independent review groups have expressed concerns about human rating the CRV without operational testing, NASA has not planned or provided for this testing. NASA prefers to make a decision on CRV operational testing following the X-38 space flight test. While NASA plans to conduct an X-38 space flight test and other risk mitigation activities, the criticality of the CRV to the safety of ISS crewmembers requires immediate contingency planning for CRV operational testing.

Future Challenges The keys to continued Space Station assembly and operation are:

- Managing the political, financial, technical, and safety challenges presented by an international partnership.
- Developing contingency plans to mitigate the impact of partners' inability to meet delivery schedules.
- Overcoming technical challenges inherent in manufacturing, assembling, and testing complex hardware and software components provided by different nations and integrated in space.
- Safely maintaining, upgrading, and operating a structure as complicated as the Space Station.
- Maximizing the beneficial use of the Space Station for scientific research and technology development.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 2A. Prior work is listed in Table 2B. The results column in Table 2B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 2A - International Space Station Planned Work

Program Area	***Assignment***	***Focus***
Audits	X-38/Crew Return Vehicle (CRV) (Carryover) A9900201	Evaluating the X-38/CRV project management to ensure that the project will result in a safer, better way to return crew members from the ISS.
Audits	Spare Parts Quality Assurance (Carryover) A9900700	Assessing the process by which NASA assures the quality of spare parts for the Space Station and Space Shuttle.
Audits	Performance Management of the Space Station Contract (Carryover) A9904200	Evaluating the performance management of the Space Station prime contract with The Boeing Company at the request of the NASA Administrator.
Audits	Spare Parts Costs (Carryover) A9907300	Evaluating the process for acquiring spare parts for the Space Station and Space Shuttle and assessing the prices of parts for fairness and reasonableness.
Audits	Technology Upgrades on the International Space Station	Determining whether the potential risks of using obsolete computer hardware and software on the Space Station are significant enough to require upgrading the ISS hardware and software before further assembly due to possible integration, performance, and safety problems in the future.
Audits	Management of Space Station Program Changes and Reserves	Determining whether NASA is effectively managing ISS Program changes and whether financial reserves are adequate to ensure the ISS is successfully developed and operated.
Audits	Acquisition of Space Station Propulsion Modules	Determining whether NASA has developed a cost-effective, acquisition strategy for long-term, propulsion capability for the ISS.
Audits	Government Furnished Equipment (GFE) for Space Station	Determining whether the ISS Program Office has assessed the cost-benefit of using GFE rather than contractor-furnished equipment and whether acceptance testing is adequate to ensure the GFE conforms to quality requirements.
Inspections	International Space Station Customer Support	Determining whether researchers are satisfied with the procedures for manifesting experiments on the ISS and whether researchers have an effective voice in developing policies and procedures related to research on the ISS.

NASA's Top 10 Management Challenges

Table 2B - International Space Station Prior Work

Program Area	***Reports***	***Results***
Audits	Space Station Contingency Planning for International Partners (IG-99-009)	The Space Station Program Office had not developed an integrated and comprehensive plan to address risks to the assembly of the Space Station because of possible delay or default by international partners. In addition, the contingency plan did not contain or clearly identify several critical elements for effective risk management. Specifically, the plan did not contain cost and schedule impacts and did not clearly identify risk mitigation measures and the primary consequences of the contingencies. We recommended that management establish (1) procedures to ensure the contingency plan complies with Agency guidance for effective risk management and (2) a process to ensure the contingency plan is kept current. Management concurred with both recommendations.*
Audits	Space Station Corrective Action Plans (IG-99-007)	The NASA Space Station contract requires the prime contractor, Boeing, to have an Earned Value Management System (EVMS) which produces an assessment of cost and schedule performance. Boeing prepares a report, which identifies the largest cost and schedule variances, and the corresponding cause, effect, and the corrective action plans that will be taken. However, Boeing's corrective action plans and NASA's oversight of the plans need improvement. We recommended that management (1) ensure surveillance of the EVMS, (2) require the Defense Contract Management Command (DCMC) to prepare required contract administration reports, and (3) improve the quality of corrective action plans. Management concurred with each of the recommendations.*

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* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 2B – International Space Station Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Space Station Change Order Process (IG-97-015)	The Space Station program had about $400 million in undefinitized changes that were more than 180 days old. We recommended that responsibility for timely definitization of contract changes be assigned to a program employee. Management has implemented corrective action.
Audits	Space Station Facilities Requirements (JS-96-006)	A Space Station contractor charged the program $2.9 million annually for idle space. We recommended the contracting officer ensure future costs are reasonable. Management has taken corrective action.
Audits	Space Station Prime Contractor Performance Management (JS-96-004)	Cost overruns totaling $127 million were omitted from the contractor's completion estimate. Consequently, future funding requirements for the ISS were not adequately portrayed. We recommended the contracting officer require the contractor to provide better analysis and reporting of cost data. Management concurred and implemented responsive actions.
Audits	Boeing Indirect Cost Allocations to Space Station Contract (JS-96-001)	NASA reimbursed a contractor for indirect costs (on the Space Station) contract that did not benefit NASA, potentially resulting in $33 million in excess charges over the life of the contract. We recommended the contracting officer ensure an equitable allocation of costs to the contract. Management has taken steps to reduce the allocation.
Inspections	Followup Assessment of Management Alert Issued February 6, 1998, Chartered Flights Between the United States and Russia (G-98-014)	In general, the charter service used by NASA to support the ISS program was not cost-effective compared to commercial air services. We also reported our concerns regarding security, procedures, and adherence to transportation regulations. NASA management concurred with our recommendation to terminate the charter service. The termination will save the Agency approximately $4.0 million in annual costs.

(Continued)

NASA's Top 10 Management Challenges

Table 2B – International Space Station Prior Work (Continuation)

Program Area	***Reports***	***Results***
Inspections	Review of International Space Station Phase I Lessons Learned Activity (G-98-012)	Although the ISS program was late in initiating the lessons learned process, the transfer of knowledge and experience acquired was being adequately addressed. With partial concurrence on our third recommendation, management fully agreed with the two others to enhance the lessons learned process. NASA agreed to assess other sources of lessons learned, including various historical sources and to apply them to the ISS program.
Inspections	Enhancing Compatibility for Long-Duration Space Flight Crews (G-98-005)	To improve safety and mission success of long-duration space flights, NASA needs to identify astronauts best suited for long-duration travel, provide psychological evaluations of astronauts, and improve training. Management partially concurred with our recommendations.

NASA's Top 10 Management Challenges

3. Information Technology (IT).

During FY 1999, our Investigation, Audit, and I&A activities continued to find a fragmented Information Technology Security (ITS) program without clear lines of authority, inadequate policies and guidelines, and ineffective enforcement of existing policies and guidelines. NASA has separate organizations to handle classified and unclassified ITS. We believe this separation has caused confusion, inhibited the implementation of a workable ITS program, and led to duplication of effort. We also believe that confusion surrounding this separation has resulted in the expenditure of significant funds when more secure and less costly solutions were available.

We remain concerned about fragmentation of the ITS mission area components since NASA policies and procedures do not effectively integrate computer and communication security. Generally, NASA addresses these two components separately rather than synergistically under a single ITS program. Most of the Federal Government has adopted the National Security Telecommunications and Information System Security Committee (NSTISSC) definition of Information Systems Security, which has two primary components--computer and communications security. NASA is an observer on the NSTISSC and should follow its issuances.

In addition to fragmenting the ITS mission area components, responsibilities for ITS have been divided among multiple centers. This leads to serious coordination problems and hinders oversight. While the Ames Research Center has primary responsibility for ITS, several functions are performed elsewhere. For example, Kennedy Space Center (Kennedy) handles one component of communication security, while Headquarters performs all other communication security functions. A single individual at these centers performs some of the key functions. However, the extent and complexity of these functions often requires a team of ITS professionals. Chief Information Officers at the Centers do not report to the Agency Chief Information Officer, and their roles and responsibilities are not well defined. When our Computer Crimes Division responds to incidents, our agents are required to contact security officials at multiple locations, none of whom have total visibility into security matters.

Although some improvements have been made to the ITS program, we believe significant improvement cannot be achieved under the current management model. An information security program needs to be formally established, funded, and managed like any other major NASA program. A civil servant information security professional needs to be put in charge with clear lines of authority over Center computer and communications assets (classified and unclassified). Clear policy needs to be developed with a mechanism for certification/accreditation and enforcement.

Our I&A team performed an assessment of NASA's Automated Systems Incident Response Capability (NASIRC) and found that the number and severity of IT incidents has increased

dramatically in recent years. Because NASA relies so heavily on computers and networks, the Agency is vulnerable to attacks that could seriously disrupt vital programs and activities. While NASA has taken many positive steps to enhance computer security and its response to IT attacks, the Agency needs to take additional actions to fully address increasing threats, including delineation of the NASIRC's roles and responsibilities. Our security assessment of NASA's use of Flight Termination Systems (FTS) found that many of NASA's launch vehicles that require an FTS utilize a non-secure system. The non-secure FTS does not provide adequate safeguards to ensure only authorized command and does not comply with national policy. We believe the use of FTS impacts both mission success as well as public safety (see Issue 1).

Audits and Inspections also have noted several concerns. For example:

- Our audit of Data Center General Controls at the Numerical Aerospace Simulation Facility found (1) high risk of undetected, unauthorized changes due to lack of software change management controls and system audit tools; (2) increased risk of system intrusion or compromise due to lack of physical security and access controls, computer security, personnel, and secured terminals; and (3) major risk of data and software loss due to inadequate off-site backup storage site, documentation of access violation attempts, network hook-ups, and comprehensive risk assessments. Management was responsive to our recommendations, and we are planning follow-up work in FY 2000 to assess management's corrective actions.

- Our X-33 Program Security Assessment found that ITS was not adequately addressed and the X-33 Program was in non-compliance with requirements of Appendix III of OMB Circular No. A-130, "Security of Federal Automated Information Resources." Management partially-concurred with our recommendations for corrective action.

- Our recent spot check inspections at Kennedy found that over 81 percent of computer hard drives tested in the property disposal system contained retrievable user data. Seventy-six percent had copyrighted, licensed software installed on the drives. NASA employees relied on contractor technician assertions that information had been removed. Management concurred with our recommendations and agreed to implement corrective actions.

- Two recent audits dealing with outsourcing desktop computers found NASA had not (1) ensured the adequacy or consistency of cost data that centers will use in finalizing their respective outsourcing delivery orders and (2) prepared a Program Commitment Agreement, a program plan, and a risk management process for use in assessing the Agency's readiness in implementing the desktop computer outsourcing process. The Outsourcing Desktop Initiative in NASA (ODIN) Program Office has committed to developing center-specific cost baselines with the full support and participation of the centers. Also, the NASA CIO has completed its ODIN program commitment agreement; is obtaining final signatures on the ODIN program plan; and has incorporated risk and

mitigation strategies in the program plan. Actions taken and to be taken satisfy all applicable recommendations.

The Agency will need to carefully consider and balance the potential benefits of outsourcing against serious disadvantages as it makes future IT decisions.

Year 2000 Date Conversion. The change of date from 1999 to 2000 and beyond, known as the "Y2K" date conversion problem, has the potential to affect the integrity of data and continuity of processing capabilities. In numerous reports to Congress, both the OMB and GAO have identified the importance and risks associated with the Y2K problem, both in terms of complexity and time constraints. In their report to Congress dated February 6, 1997, titled "Getting Federal Computers Ready for 2000," OMB emphasized the risks to Government information systems and the programs they support if systems are not fixed in a timely manner. Congress requires OMB to report to them on a quarterly basis the status of Y2K efforts for Government systems, including cost estimates, strategies, and implementation schedules. In turn, OMB monitors the progress of work at Federal agencies through stringent quarterly reporting requirements. NASA reported to OMB that as of August 15, 1999, virtually all mission-critical systems and most nonmission-critical systems have been addressed. A small number of nonmission-critical systems will be finalized in the fall of 1999.

During 1998, the OIG initiated audits to evaluate NASA's assessment of the problem as well as its efforts to fix and validate changes necessary to make systems compliant. These audits carried forward into 1999. Overall, NASA developed an effective assessment process. We reported the following concerns to NASA proactively during these audits:

- Inadequate support for Y2K cost estimates reported to OMB, primarily attributable to lack of guidance to centers regarding cost models and estimation strategies and the maintenance of supporting documentation;

- Inadequate documentation of work performed on selected mission-critical systems to determine Y2K compliance;

- Inadequate sharing of information on the results of software product compliance testing, which could lead to unnecessary duplication of product evaluation efforts and associated costs;

- Lack of reasonable assurance that production contractors would provide Y2K-compliant data to support NASA's key financial and program management activities;

- Failure to incorporate NASA-directed Y2K requirements into applicable IT operations and maintenance contracts at one center; and

NASA's Top 10 Management Challenges

- Failure by one center to request an exemption for completing system testing that deviated from NASA Y2K testing and certification guidelines and requirements.

With the exception of the cost estimating issue, management concurred with the recommendations or proposed responsive alternative actions. Corrective actions are completed or in process.

Our auditors recently issued a report on renovation and validation phases. We found that NASA guidelines for renovation and validation were generally consistent with GAO guidance for addressing Y2K date conversion problems. We noted general compliance with those guidelines at five of the six locations audited. One center had not progressed sufficiently for us to determine the adequacy of its validation efforts for mission-critical systems. We also issued a report on NASA's contingency planning efforts. We evaluated efforts at four NASA installations to prepare contingency plans that include procedures and timetables for continuing Agency operations in the event critical systems fail due to Y2K problems. We found that the installations reviewed had not incorporated various key elements into their contingency plans and test plans. Finally, we issued a report identifying an opportunity for NASA to improve Y2K program oversight of its grants and cooperative agreements. Specifically, NASA requires major recipients of grants or cooperative agreements to report significant Y2K-related problems, but NASA has not established timeframes for such reporting. Furthermore, NASA does not require major recipients to report on whether their computer systems are Y2K compliant. These conditions limit NASA's ability to determine whether Y2K-related problems exist but have not yet been reported. NASA could receive research results that are adversely affected by Y2K problems.

Future Challenges The keys to an effective Information Technology program include:

- Ensuring data security, integrity, and application controls.
- Protecting operations and communications with spacecraft.
- Monitoring and evaluating the streamlining of operations through outsourcing information technology operations for cost efficiencies, dependency on the vendor for technological direction, vulnerability of strategic information to outsiders, and dependency on the viability of the vendor.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 3A. Prior work is listed in Table 3B. The results column in Table 3B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 3A - Information Technology Planned Work

Program Area	***Assignment***	***Focus***
Audits	Software Quality Assurance (Carryover) A9906600	Determining whether selected software development projects have complied with applicable software quality assurance standards and procedures.
Audits	Windows NT Security and Integrity Controls at Headquarters (Carryover) A9905700	Evaluating whether Headquarters has implemented and configured selected NT servers to provide an appropriate level of logical security and interoperability for associated automated systems.
Audits	Implementation of Security Software at Johnson Space Center's Shuttle Software Production Facility (SSPF) (Carryover) A9905300	Evaluating whether Johnson and the United Space Alliance have appropriately implemented and configured logical security software to protect SSPF systems.
Audits	General Controls at Johnson Space Center's Mission Control Center (Carryover) A9904600	Evaluating the adequacy of physical access, environmental protection, and disaster recovery planning for Johnson's Mission Control Center.
Audits	UNIX Operating System Security at Goddard Space Flight Center (Carryover) A9904000	Determining whether Goddard has implemented and configured the UNIX operating system to provide an appropriate level of security and integrity.
Audits	UNIX Operating System Security at Kennedy Space Center (Carryover) A9903800	Determining whether Kennedy and the United Space Alliance have implemented and configured the UNIX operating system to provide an appropriate level of security and integrity.
Audits	Implementation of the Clinger-Cohen Act (Carryover) A9903400	Examining policies and procedures concerning the duties and responsibilities of the Chief Information Officer relating to information resources management, information technology acquisition including the performance of Information Technology programs, and maintenance of an Information Technology architecture.
Audits	Presidential Decision Directive 63	Evaluating whether NASA has developed and implemented a plan to protect the Agency's cyber assets consistent with the requirements of PDD-63.

(Continued)

NASA's Top 10 Management Challenges

Table 3A - Information Technology Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Certificate Management	Evaluating the adequacy and effectiveness of internal controls established for the Agency's central Certification Authority located at Ames Research Center.
Audits	Information Technology Acquisitions	Determining whether NASA and its contractors are complying with applicable Information Technology acquisition requirements.
Audits	Telecommunications Management	Evaluating whether NASA management controls are adequate regarding the use of telecommunication services, including voice, data, and video information technology.
Audits	Next Generation Internet	Determining whether the Next Generation Internet project objectives, milestones, and performance measures are being achieved.
Audits	Operating System Controls in Major NASA Information Systems	Determining whether the operating system environment has been configured and implemented to provide for an appropriate level of security and integrity.
Audits	Database Controls in Major NASA Information Systems	Determining whether database security and integrity controls have been adequately implemented in the major systems selected for audit.
Audits	Network Controls in Major NASA Information Systems	Determining whether controls in the network environment are adequate to protect against unauthorized access and transmission risks.
Audits	Systems Development – Checkout and Launch Control System	Evaluating control issues associated with: (1) project management, (2) systems' requirements definitions, (3) security architecture and requirements, and (4) testing and implementation of application and system software.
Audits	Use of Commercial-Off-the-Shelf (COTS) Software in Ground Systems	Determining the cost, schedule, and operational impacts of using COTS software in a ground system.
Inspections	Computer Banner Inspection (Carryover) G-99-015	Determining whether the requirement that banners be put on NASA computers is being followed.

(Continued)

NASA's Top 10 Management Challenges

Table 3A - Information Technology Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Inspections	Consolidated Space Operations Contract (CSOC) Security (Carryover) G-99-012	Determining whether the CSOC contractor has anticipated potential threats and risks and has solicited program expertise from appropriate information technology security (ITS) and communications security (COMSEC) experts.
Inspections	Status of Johnson Space Center Station Program Implementation of Communications Security and Automated Information Security (AIS) Measures (Carryover) G-99-010	Determining whether NASA management has accurately identified COMSEC and AIS requirements necessary for mission assurance and safe Space Station operations.
Inspections	Hard Drive 99: Clearing Controlled Information from Excessed Microcomputers (Carryover)	Determining whether computers in the process of being excessed have been cleaned of all data and software.
Inspections	Information Technology Security Staff Qualifications and Experience	Determining the minimum training, qualifications, and experience necessary to perform ITS functions.
Inspections	NASA's Communications Security Program	Determining whether NASA's COMSEC program and its associated organizational structure are adequate to ensure compliance with nationally mandated COMSEC policy.
Inspections	The Jet Propulsion Laboratory's (JPL's) Implementation of NASA's Communications Security Policy	Evaluating JPL's compliance with NASA policy on the application of COMSEC to space systems.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work

Program Area	***Reports***	***Results***
Audits	Year 2000 (Y-2K) Program Oversight of NASA Grants and Cooperative Agreements (IG-99-048)	NASA requires its grant recipients and cooperative agreement partners to report significant Y2K-related problems. However, NASA has not established timeframes for such reporting. Also, the Agency does not require recipients to report on whether recipient computer systems are Y2K compliant. Management agreed to require major recipients to report whether recipient computer systems are Y2K compliant, identify significant Y2K-related problems, and require appropriate remedial actions.*
Audits	Year 2000 Implementation Phase (IG-99-044)	The OMB adopted the GAO contingency planning guide entitled *Year 2000 Computing Crisis: Business Continuity and Contingency Planning* (BCCP), which identifies the key elements that a BCCP plan and a contingency test plan should contain. NASA installations had incorporated only some of the key elements prescribed by the GAO planning guide which reduces NASA's assurance that it can effectively respond to Y2K-related failures. Management agreed to correct the deficiencies.
Audits	Disaster Recovery Planning at Marshall Space Flight Center's Automated Data Processing Consolidation Center (IG-99-043)	The NASA Automated Data Processing Consolidation Center (NACC), at Marshall Space Flight Center (Marshall), is primarily responsible for computer operations, systems reliability, systems software, configuration management, and strategic planning for NASA-wide administrative systems and for several program support systems. An audit showed that while the NACC has implemented a disaster recovery plan that includes most of the necessary provisions for emergency response, extended backup operations, and testing; improvements are needed in the areas of disaster recovery strategy, procedures, and training. The report contained eight recommendations to improve recovery strategies, procedures, and training. We also recommended the development of a user contingency plan. Management concurred with each of the nine recommendations and initiated responsive corrective actions.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Ames Research Center's NAS Facilities Disaster Recovery Plan (IG-99-032)	The Numerical Aerospace Simulation (NAS) Facility does not have a management-approved disaster recovery plan that meets applicable Federal and NASA requirements for emergency response procedures, extended backup operations, and testing. NASA management agreed to implement and maintain a NAS disaster recovery plan that complies with Agency and Federal regulations.*
Audits	Audit of Year 2000 Program Compliance Requirements in NASA Information Technology-Related Contracts (IG-99-022)	NASA guidance required contracting officers to include a clause in Information Technology (IT) solicitations and new contracts addressing Y2K and to modify the statement of work in existing IT operation and maintenance contracts. However, the Jet Propulsion Laboratory (JPL) had not included the NASA-directed requirements in all its existing IT operations and maintenance contracts. Untimely incorporation of the Y2K compliance requirements increases the potential for noncompliant Agency systems on January 1, 2000. Management established a June 30, 1999, target date for JPL to incorporate the Y2K requirements into contracts and agreed to monitored progress. However, corrective action is incomplete and the recommendation remains open.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Audit of Disaster Recovery Planning at Kennedy Space Center (IG-99-017)	Two critical systems at the Kennedy Space Center, the Launch Processing System (LPS) and the Shuttle Processing Data Management System (SPDMS), have appropriate procedures for emergency response and for recovering data and software. However, neither has an extended backup capability to recover from a local disaster, which could cause significant schedule and mission delays for the Shuttle Program. We found that Kennedy management needs to: (1) survey other NASA entities, Government agencies, and commercial enterprises to determine the availability of cost-effective extended backup capabilities for the LPS and SPDMS; (2) develop and implement disaster recovery plans for the LPS and SPDMS that provide for extended backup capability; and (3) ensure that operations can be restored within the maximum acceptable downtime for critical LPS and SPDMS applications. NASA management did not concur with the report's three recommendations. Our recommendations will remain open pending Kennedy management's completion of the most current risk assessment and related corrective actions.*
Audits	NAS Data Center General Controls at Ames Research Center Numerical Aero-Space Simulation Facility (IG-99-010)	NASA had not established an adequate control structure to provide for a reliable computing environment at the Numerical Aerospace Simulation Facility. Major control weaknesses were identified in the areas of (1) physical and logical access; (2) computer security; (3) file retention, backup, and recovery management; (4) software change management; (5) system accounting and file auditing; and (6) risk assessments. Management generally concurred with our recommendations and initiated responsive corrective actions.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Disaster Recovery Planning at the Jet Propulsion Laboratory (IG-99-006)	The Jet Propulsion Laboratory (JPL) provides telecommunications and mission operations support to space exploration missions and other activities. JPL management needs to take several actions to improve its disaster recovery plan including: (1) identifying the applications that support mission-critical functions and the relative criticality of each application, (2) documenting transportation and support arrangements, (3) updating the list of key individuals responsible for contingency operations, and (4) updating the application software listing to show the version and release date and applied vendor fixes. JPL also needs to develop policies and procedures for the restoration of normal operations and include them in the disaster recovery plan. The report included six recommendations to strengthen the disaster recovery plan. Center management agreed to implement actions responsive to the recommendations. While it appears that the actions taken or in process should satisfy our recommendations, the recommendations will remain open pending our receipt and review of appropriate documentation for these actions.*
Audits	Disaster Recovery Planning at Johnson Space Center (IG-99-005)	While a disaster recovery plan is in place, the Shuttle Software Production Facility (SSPF) does not have a strategy or procedures in place for extended backup operations in the event of a disaster, the plan is not tested annually, and SSPF application users have not developed contingency plans. Management concurred with four of the six recommendations and initiated corrective actions. Management decided to accept the risks associated with (1) vendors not supplying backup resources in a timely manner, and (2) not establishing contingency plans for the Flight Equipment Interface Devices.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Year 2000 Program Oversight of NASA's Production Contractors (IG-99-004)	NASA's Y2K Program lacks reasonable assurance that its production contractors will provide Y2K-compliant data to support key financial and program management activities. As a result, NASA risks using noncompliant data that may adversely affect the Agency's control, budgeting, program management, and cost accounting activities. Management generally concurred with the intent of the recommendations and initiated a plan to assess the Y2K status of NASA's major contractors.*
Audits	Data Center Controls at Lewis Research Center (LeRC) (IG-98-039)	The physical access control system used to protect LeRC's Research Analysis Center had not been certified as meeting security requirements. Physical access procedures to the facility were not adequate. LeRC (now Glenn Research Center) has addressed these issues.
Audits	Disaster Recovery Planning at Goddard Space Flight Center (GSFC) (IG-98-036)	The Solar Heliospheric Observatory Mission Operations Center did not have computer contingency capabilities in place in the event of a disaster. Additionally, contingency plans for a data center associated with the Tropical Rainfall Measurement Mission were incomplete. Finally, computer risk assessments did not analyze the potential effects of losses caused by disasters. GSFC agreed to implement corrective actions.
Audits	Information Technology (IT) Capital Planning and Investment Control (IG-98-034)	The NASA IT investment process does not satisfy Clinger-Cohen Act and OMB Circular A-130, *Management of Federal Information Resources*, requirements for post implementation reviews of major, new IT investments. NASA initiated process improvements that should satisfy the IT post implementation review requirements.
Audits	Improving Controls Needed Over NASA's Super-Computing Inventory (IG-98-021)	NASA's Consolidated Supercomputing Management Office (CoSMO) did not have an accurate inventory of NASA's supercomputers and supercomputing time purchased. NASA initiated responsive corrective actions.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Consolidation Decision for Secure Supercomputers (IG-98-020)	Cost-benefit analysis prepared by CoSMO did not adequately support its decision to relocate secure supercomputing from the Langley Research Center (LaRC) to the Naval Oceanographic Office at the Stennis Space Center. The report recommended that the CoSMO Director use only current, accurate, complete, and adequately documented data in its consolidation decisions. NASA concurred with the recommendation.*
Audits	Data Center General Controls at Kennedy Space Center (KSC) (IG-98-018)	Procedures for monitoring unauthorized access attempts to the Shuttle Processing Data Management System were inadequate. KSC took corrective action.
Audits	Data Center General Controls at Jet Propulsion Laboratory (JPL) (IG-98-009)	Computer security implementation plans and reviews had not been developed or conducted for JPL's Institutional Business Systems (IBS) as required by JPL policy. Additionally, physical access controls to the IBS data center were in need of improvement. JPL corrected these deficiencies.
Audits	Data Center General Controls at Goddard Space Flight Center (GSFC) (IG-98-006)	Physical access controls associated with the Hubble Telescope Data Operations Center and the Hubble Telescope Servicing and Maintenance System Facility were inadequate. Additionally, computer risk management plans had not been conducted as required. GSFC corrected these deficiencies.
Audits	Data Center General Controls at Johnson Space Center (JSC) (IG-98-005)	We found that physical access controls to the Shuttle Software Production Facility needed improvement. Additionally, the facility did not have an uninterruptible power supply (UPS) as a defense against power problems. JSC corrected the physical access problem and agreed to conduct a feasibility study and cost/benefit analysis on the UPS.
Audits	Application of OMB Circular A-76 to Desktop Outsourcing (IG-98-001)	NASA had not fully satisfied the cost comparison requirements of OMB Circular A-76, *Performance of Commercial Activities*, relative to the Agency's desktop computer outsourcing initiative. NASA took actions that satisfied the prerequisites for exemption from A-76 cost comparison requirements.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Data Center General Controls at Marshall Space Flight Center (IG-97-039)	We found control weaknesses associated with the mainframe data center's physical security, environmental security, technical standards, computer security administration, and software change management. Based on our recommendations, MSFC corrected the weaknesses.
Audits	Data Center General Controls at Langley Research Center (IG-97-035)	System access privileges were not being removed in a timely manner. Physical access privileges to the data center were not reviewed and revalidated. Computer security plans were not prepared and system security reviews had not been performed. Based on our recommendations, LaRC corrected these problems.
Audits	Physical Security at Ames Research Center Numerical Aerospace Simulation Facility (IG-97-030)	The NAS computing facility did not have adequate backup or contingency procedures to deal with physical access control system failures. ARC corrected the problem.
Audits	Off-Site Use of NASA Computer Resources (IG-97-025)	NASA could improve productivity through increased use of software license agreements permitting NASA employees to install widely used software on their personally owned computers for work-related use. NASA initiated responsive corrective actions.
Inspections	Assessment of the National Aeronautics and Space Administration's Automated Systems Incident Response Capability (NASIRC) (G-99-007) (Sensitive—Limited Distribution)	NASIRC is used by NASA to identify and respond to incidents and attacks involving NASA's automated information and telecommunications systems. Our report addressed the adequacy of the Agency's incident reporting, response, handling, coordination, and information-sharing capabilities. NASA management concurred with our 11 recommendations. This report is sensitive with limited distribution; it is not generally releasable to the public.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Inspections	NASA's Implementation of a Public Key Infrastructure (PKI) (G-99-006)	With the increasing number of computer intrusions, NASA requires security, authentication, and access controls over electronic communications (e.g., electronic mail, data interchange, Internet data and use, and financial software). The use of a PKI is one important way to achieve strong security by using cryptography. NASA responded to security needs by selecting products from one vendor to meet key requirements. An interdisciplinary team of auditors and evaluators provided recommendations to NASA concerning the implementation of a PKI.*
Inspections	Dryden Flight Research Center Network Intrusion - Lessons Learned (G-99-002)	We highlighted prudent steps that Dryden took overcoming an unauthorized network intrusion. We shared this report with NASA computer and security officials to share lessons learned from the Dryden experience.
Inspections	X-33 Program Security Assessment (G-98-009)	We assessed the security framework of the Cooperative Agreement between NASA, the Lockheed-Martin Skunk Works, and several other partners to launch a prototype reusable launch vehicle. We made five recommendations aimed at improving security for ground and flight operations. NASA management concurred in three recommendations and is considering the other two.*
Inspections	Lewis Security Manage-ment Inspection (G-98-007)	NASA management concurred with most of the recommendations we made to improve physical and information security weaknesses at Lewis Research Center. Management has already implemented many of the recommendations and is actively addressing others.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 3B - Information Technology Prior Work (Continuation)

Program Area	***Reports***	***Results***
Inspections	Inspection of Kennedy Space Center Computer Hard Drives, (G-99-003)	This inspection determined that more than 80 percent of the personal computers in the Kennedy property disposal process had recoverable information on their hard drives. If released outside the Agency, this information could expose NASA to Privacy Act violations. In addition, 76 percent of the drives tested were found to be loaded with licensed software. Management concurred with all our report recommendations and pledged swift corrective action.*
Inspections	Flight Terminations Systems Assessment, (G-98-011)	This review concluded that NASA practices associated with flight termination systems (FTS's) do not conform to national policy. In addition, Agency decisions on whether to use secure FTS's are not based on appropriate risk-based assessments. Recommendations were made with the purpose of enhancing program security and safety. Management concurred with two recommendations and concurred in part with four. Our efforts continue on this issue.*

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

4. Procurement.

Procurement continues to be a significant support process for all of NASA's enterprises and its overall mission. NASA's procurement obligations accounted for over 87 percent of the Agency's total obligations in fiscal year (FY) 1998, just as they have for the last 5 years. NASA procures over $12.5 billion in goods and services annually. In January 1999, the GAO identified NASA contract management as a major management challenge and program risk. The GAO stated, in part, that NASA lacks adequate systems and processes to oversee procurement activities and to produce accurate and reliable management information in a timely manner. NASA's procurement workload, combined with the significant reductions in procurement personnel, continues to challenge the remaining staff's ability to adequately administer contracts and implement new procurement initiatives.

As NASA places more reliance on contractors to administer programs, we are finding indicators of problems in a variety of areas, such as leasing, noncompetitive procurements, subcontract management, and use of contractors for on-site support. In an audit of leased facilities at the Johnson Space Center (Johnson), we found that several contractors had idle space ranging from 11.4 to 25.5 percent of total available lease space. We estimated that NASA could unnecessarily spend $4.8 million by FY 2005, when the last lease expires. Several contractors also had incorrectly classified their leases, which could result in NASA paying more than $2.7 million in excess lease costs by FY 2005. We found similar problems on contractor leases at Marshall Space Flight Center (Marshall). In another audit, we found that technical analyses for noncompetitive new procurements or modifications were inadequate in 47 percent of the sampled procurement actions. Further, 58 percent of the sampled noncompetitive purchase orders lacked the documentation of price reasonableness required by the Federal Acquisition Regulation. In addition, an audit of subcontract management at two NASA prime contractors identified that very few subcontracts were competed (12 and 28 percent, respectively). We found that NASA had not requested the DCMC review any documentation supporting the noncompetitive procurement justifications. A number of administrative investigations in FY 1999 indicate that there is a need for increased management attention regarding the interaction between civil servants and support service contractors. Recent OIG Inspections and Assessments (I&A) activity indicates a need for diligence on the part of NASA contractors, partners, and civil servants to establish and maintain methods to avoid actual or perceived personal services and inherently governmental relationships. Concerns in this area led to the issuance of an OIG Management Letter in May 1999 regarding undue or improper influence on the selection of contractor personnel by civil servant staff.

NASA also faces risks as the Agency moves toward the greater use of electronic commerce. During FY 1998, NASA made over 113,600 purchases, totaling $66 million, with credit cards. During our first review of credit cards, we found numerous instances of questionable purchases. Additional potential risks exist with other procurement initiatives, such as the use of multiple

award task order contracts and the Small Business Innovative Research (SBIR) Program. For example, some SBIR contractors may have improper affiliations with large companies. We have also found that some companies falsely self-certify that they are not working on any other contract for similar research.

Recent investigations have also resulted in multiple convictions for contractor premature billing schemes, kickbacks involving subcontractors, false testing and certification of components, improper marking of components, and loss of Government-owned-contractor-held equipment. In FY 1999, two NASA contractors reached settlements with the Government regarding premature billing practices where they billed NASA prior to delivering services and materials. Between August 1998 and February 1999, three separate cases resulted in convictions of four NASA contractors for kickbacks involving subcontracts.

Outsourcing. NASA faces many challenges as it outsources various functions, particularly IT functions. While strategic processes must remain in-house, other functions can be outsourced. Activities that may be outsourced include expert IT advice, specific applications, education, maintenance, aspects of software/physical security, and disaster recovery. Advantages of outsourcing include potentially lower costs and faster access to new technology. Outsourcing brings with it considerable risks unless the Agency carefully provides for establishing internal controls after analyzing questions such as:

- Who/what entities have ownership interests in the service provider? Is the provider owned by foreign interests?
- What is the security posture of the provider? Are they compromised by organized groups/hostile entities?
- What is the process contractors use to provide security screening for potential employees being considered for employment under these contracts?
- Does NASA have contract oversight clauses and an oversight apparatus in place?

Future Challenges Keys to effective procurement at NASA include:

- Ensuring proper level of staffing in the current downsizing environment to institute new procurement initiatives properly.
- Maintaining adequate technical expertise within the Agency to provide proper contractor oversight.
- Providing sufficient controls over and monitoring of both prime and subcontractors.
- Implementing or increasing the use of innovative procurement procedures such as earned value management and performance incentive fees.
- Ensuring costs billed to NASA cost-type contracts due to the changing industry environment are reasonable and allowable.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 4A. Prior work is listed in Table 4B. The results column in Table 4B identifies the status of

significant report recommendations.

NASA's Top 10 Management Challenges

Table 4A - Procurement Planned Work

Program Area	***Assignment***	***Focus***
Audits	Health Care Costs at Major NASA Contractors (Carryover) A9907000	Evaluating the reasonableness of health insurance costs at selected major NASA contractors.
Audits	Raytheon Subcontract Management (Carryover) A9905800	Evaluating NASA and Raytheon's management and approval of sole-source subcontracting.
Audits	Contractor Travel Costs (Carryover) A9905600	Assessing contractor travel costs to determine whether reducing travel costs would affect performance effectiveness.
Audits	NASA's Use of Electronic Commerce (Carryover) A9905000	Evaluating the status and effectiveness of NASA's use of electronic commerce to streamline procurement.
Audits	NASA Contract Audit Follow-up System at Johnson Space Center (JSC) (Carryover) A9904500	Assessing the Center's compliance with Office of Management and Budget (OMB) Circular A-50 in performing timely follow-up, resolution, and disposition of audit report recommendations. In addition, assessing the Center's compliance with requirements to track audit reports, report on unresolved recommendations, and evaluate the follow-up system.
Audits	NASA Contract Audit Follow-up System at Marshall Space Flight Center (Carryover) A9901800	Assessing the Center's compliance with OMB Circular A-50 in performing timely follow-up, resolution, and disposition of audit report recommendations. In addition, assessing the Center's compliance with requirements to track audit reports, report on unresolved recommendations, and evaluate the follow-up system.
Audits	Procurement Module Testing of NASA's Integrated Financial Management Program (IFMP) (Carryover) A9901700	Evaluating the adequacy of NASA's testing of the IFMP procurement module

(Continued)

NASA's Top 10 Management Challenges

Table 4A - Procurement Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Contractor Quality Systems	Determining whether the Defense Contract Management Command (DCMC) is effectively performing delegated quality assurance activities on major NASA contracts.
Audits	Subcontract Management by Major NASA Contractors	Evaluating subcontract management by NASA's major contractors with an emphasis on internal controls, competitiveness of awards, and NASA surveillance.
Audits	NASA Administration of Grants and Agreements	Evaluating whether NASA appropriately uses grants and cooperative agreements and properly monitors grant and cooperative agreement requirements.
Audits	NASA Reliance on Corporate Self-Governance Programs	Determining the extent and effectiveness of NASA's use of advance agreements requiring contractors to use Earned Value Management Systems (EVMS).
Audits	NASA Contract Close-Out Process	Evaluating NASA's efforts to promptly close out inactive contracts and reduce unliquidated obligations.
Audits	NASA Contract Audit Follow-Up Systems	Determining whether policies and procedures for resolving audit findings comply with OMB Circular A-50 and whether follow-up activities ensure the prompt and effective resolution of audit recommendations.
Audits	Contractor Merger and Acquisition Costs Charged to NASA Contracts	Assessing merger and acquisition costs on NASA cost-type contracts to determine whether only allowable restructuring costs were charged to NASA and whether the Agency achieved overall savings.
Audits	Contractor Performance on NASA Support Services Contracts	Evaluating the adequacy of NASA oversight of support service contractor performance and the contractors management controls to ensure effective performance by contractor employees.

(Continued)

NASA's Top 10 Management Challenges

Table 4A - Procurement Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Effectiveness of the NASA Smart Card Program	Determining whether NASA has implemented appropriate controls over the use of Smart Cards and whether increased use could result in savings.
Audits	Contractors' Use of Consultant Services	Determining whether NASA has adequate controls over contractors' use of consultant services.
Audits	NASA's Use of Just-in-Time Acquisitions	Determining whether NASA could benefit from expanding just-in-time acquisitions into additional procurement areas.
Audits	Multiple Award Task Order Contracts	Assessing whether NASA's use of multiple award task order contracts is consistent with statutory requirements and is in the best interest of the Agency.
Audits	Consolidated Space Operations Contract (CSOC)	Determining whether the CSOC contract meets the strategic needs of NASA Enterprises by reducing operations costs, consolidating and integrating operations across NASA, and increasing standardization and interoperability.
Inspections	Use of Support Service Contractors at the John H. Glenn Research Center (Carryover) G-99-017	Determining whether the use of support service contractors is appropriate and cost-effective and in accordance with law and regulation.
Inspections	Inspection of NASA Exchange Operations John H. Glenn Research Center (Carryover) G-99-016	Determining whether the Exchanges are being managed in accordance with applicable regulations and guidelines.
Inspections	Inspection of NASA Exchange Operations at the Langley Research Center	Determining whether the Exchanges are being managed in accordance with applicable regulations and guidelines.
Inspections	NASA Headquarters Computer Support Inspection (Carryover) G-99-009	Determining the effectiveness of computer support provided to Headquarters by the support contractor.
Inspections	Assistance to Entertainment-Oriented Productions	Identifying evaluation criteria used in deciding to grant a request for assistance and whether assistance impacts other Agency operations.

(Continued)

NASA's Top 10 Management Challenges

Table 4A - Procurement Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Investigations	NASA Leases (Proactive Investigations)	Identifying improperly executed lease arrangements that caused or could cause NASA to incur unnecessary costs.
Investigations	Grants and Research Contracts (Proactive Investigations)	Identifying potentially fraudulent claims for work not performed.
Investigations	Contract and Subcontract Irregularities (Proactive Investigations)	Identifying irregularities that may be indicators of criminal activity in the area of cost mischarging, kickbacks, and bid-rigging.
Investigations	Non-Conforming and Substandard Parts and Materials (Proactive Investigations)	Determining the relationship between instances of parts failure or product defects and improper testing or non testing by contractors, or providing parts that do not comply with contract specifications.
Investigations	Health Care Fraud (Proactive Investigations)	Identifying and developing fraud-related issues in the health care arena.

NASA's Top 10 Management Challenges

Table 4B - Procurement Prior Work

Program Area	*Reports*	*Results*
Audits	NASA Noncompetitive Procurements (IG-99-056)	Technical analysts did not always adequately support their conclusions about price reasonableness of noncompetitive procurements and contracting officers (CO's) did not always support the reasonableness of prices paid for noncompetitive purchase orders. NASA agreed to have the CO's (1) work closely with the technical analysts to ensure that the technical analyses are supportable and well documented and (2) provide refresher training on the required price support for purchase order awards*
Audits	Allied-Signal Subcontract Management (IG-99-042)	Allied-Signal did not maintain supporting documentation for three out of the four justifications for noncompetitive procurements that we reviewed. As a result, NASA has reduced assurance that the contractor maximized the competition of its subcontracts. NASA agreed to direct Allied-Signal to maintain improved documentation of justifications for noncompetitive procurements and to request that the DCMC review supporting documentation in its next purchasing system reviews.*
Audits	Commercial Use of the Santa Susana Field Laboratory (SSFL) (IG-98-038)	NASA did not receive approximately $3.1 million in rent from a contractor's commercial use of the SSFL, contrary to the Federal Acquisition Regulation (FAR). NASA agreed to charge the contractor rent for its future use and evaluate recovery of rent for past commercial use.*
Audits	NASA General-Purpose Vehicles Acquisition and Use (IG-98-035)	Four NASA Centers reviewed had excessive vehicles. Two Centers also continued to purchase vehicles, rather than lease vehicles through the General Services Administration (GSA). NASA initiated action to eliminate underutilized vehicles and convert to leasing when beneficial to NASA.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 4B - Procurement Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Single-Source Suppliers for Critical Items (IG-98-030)	NASA has not adequately developed analyses of critical, single-source suppliers of industrial materials. Management completed some corrective action. One recommendation remains open pending completion of language to the risk management section of NASA Policy Guidance (NPG) 7120.5A.
Audits	Jet Propulsion Laboratory (JPL) Contract Issues: NASA Costs Paid to Rehired Former JPL Employees (IG-98-027) * Caltech Government Billings Transferred to the JPL (JP-97-012) Early Retirement Option Plan at the JPL (JP-96-004) Travel Policies, Procedures, and Practices at the JPL (JP-95-005) JPL Employee Charges at the Caltech Campus (JP-95-003)	A series of reviews found that NASA's federally-funded research and development contractor had adequate documented policies and procedures, but failed to follow them, resulting in increased costs to NASA. Such incidences have occurred in payments for travel, early retirement, billings, rehired former employees, and employee charges for materials purchased for the Laboratory.
Audits	Risks Associated with Ames Research Center (ARC) Acquisition of Military Family Housing (IG-98-022)	A cost/benefit study to support NASA's acquisition of housing units did not fully identify and consider all costs associated with the housing. In addition, all legal and environmental issues had not been resolved. NASA initiated actions to address the above issues and ultimately located a Department of Defense military organization to retain responsibility for the housing.
Audits	NASA's International Merchant Purchase Card Program (IG-98-011)	NASA's credit card program was generally effective; however, improvements in property accountability, split purchases, cards used by someone other than the cardholder, and purchase and payment controls were necessary. Management took corrective action.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 4B - Procurement Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Tracking and Data Relay Satellite System (TDRSS) Single Access System Reimbursable Rate (IG-98-008)	NASA is understating the TDRSS single access service reimbursable rate for services provided to other U.S. Government customers. NASA agreed to reexamine both rates and policies.
Audits	Contractor Leased Facilities at Marshall Space Flight Center (IG-99-053) * Contractor-Acquired Facilities at Johnson Space Center (IG-99-008) * Contractor Facility Leases (IG-98-002) Contractor Facility Leases at Lewis Research Center (LeRC) (IG-97-009) Contractor Facility Leases, Lockheed Credit Union Occupancy Costs (IG-97-037)	NASA's management of facility leasing can be improved. A significant number of contractor facilities were not effectively used, and some contractor leases were not correctly classified as capital leases. Excessive lease costs existed on two specific leases at LeRC, and occupancy costs charges for a credit union at Kennedy Space Center (KSC) were questionable. NASA initiated actions on all issues identified.
Audits	NASA Single Process Initiative Block Change Process Implementation (P&A-98-002)	NASA must address inconsistent Center implementation, minimal cost savings, and inadequate resources for staffing and implementing the initiative. NASA is working to improve the benefits realized by NASA from the single process initiative.*
Audits	NASA's Cooperative Agreements with Large Commercial Firms (P&A-97-001)	Cooperative agreements appear to have achieved NASA's goals; however, improvements can be made in resource sharing contributions, reporting requirements, and other administrative matters.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 4B - Procurement Prior Work (Continuation)

Program Area	***Reports***	***Results***
Inspections	Contractor Use of General Services Administration Vehicles at the Goldstone Deep Space Communications Complex (G-98-013)	Based on alleged misuse of Government vehicles at the facility, we inspected the use of GSA vehicles by contractors at the Goldstone Complex. NASA contractor employees used GSA vehicles for work-to-home commuting purposes. Such practice was contrary to NASA policy and Federal regulations, but in accordance with collective bargaining agreements. NASA management concurred with our two recommendations to discontinue current practices until contractors submitted appropriate justifications to obtain required Administrator authorizations and to review similar practices of other contractors to ensure the appropriate use of GSA vehicles. A follow-up review is planned regarding implementation of planned corrective actions.
Inspections	Assessment of Property Disposal Outsourcing (G-98-008)	The excess property outsourcing pilot program at Marshall Space Flight Center did not comply with Federal Property Management Regulations. NASA initiated actions to improve the program.
Inspections	Shuttle-Mir Rendezvous and Docking Missions and International Station Readiness Task Forces (G-98-003)	The effectiveness of external task forces related to the Mir and the ISS could be improved. We recommended restructuring the process used by the task forces to obtain contract support.

NASA's Top 10 Management Challenges

5. Fiscal Management.

The Agency has experienced difficulty in implementing the Integrated Financial Management Project (IFMP), a NASA-wide, fully integrated, transaction-driven financial management system intended to provide full-cost accounting and other budget information. In April 1999, we reported that implementation of the new system had slipped from July 1999 to June 2000, costs have increased by $7.1 million, software that the contractor promised would be available at contract award in September 1997 is still not completed, and there is a significant risk that the revised delivery schedule will not be met. Since issuance of that report, we now understand that IFMP implementation may be delayed until the year 2001. The delay in implementing the new system will result in continued reliance on outdated systems that do not provide the financial and management information that the Agency needs. Also, NASA will not be able to implement full cost management as planned, and will instead incur substantial costs to maintain legacy systems that the new system would replace.

In addition to the challenges posed by IFMP, the Agency faces other obstacles in implementing full cost management, budgeting, and accounting. The objective of full costing is to establish the true mission costs of programs and activities, thereby enabling NASA managers and other users of financial statement information to make more reliable business decisions in performing critical work with fewer resources. In a recent audit report issued on NASA's implementation of full costing, we reported that NASA was not planning to distribute the costs of the Space Shuttle Program to those programs benefiting from Shuttle services. As a result, the financial statement presentations for NASA programs that use Shuttle services beginning in FY 1998 will not include the approximately $3 billion per year in Shuttle Program costs. A related report issued by our I&A team also reported that NASA currently does not charge NASA payloads for launches on the Shuttle, and does not calculate the full costs of flying such payloads. This approach has two results: (1) the full costs of projects that fly on the Shuttle are not known, and (2) project managers are incentivized to fly on the Shuttle instead of commercial launch vehicles. An approach to fairly determine the full-cost of flying on the Shuttle is also needed for NASA to make rational decisions about flying (and charging for) commercial payloads. NASA disagrees that it needs to develop a methodology for distributing Shuttle Program costs to benefiting programs on the basis that it is premature to redistribute such costs at this stage in the evolution of its full cost practices. We continue to believe that making such distributions and providing such information to managers is the intent of full costing. An "Interim Approach to Implementation of Full Cost Management, Budgeting and Accounting" prepared by NASA management states, "FY 2000 activities will focus on ensuring that all Agency direct costs, including NASA direct labor costs, at the project level are rigorously and consistently captured and assigned to NASA projects." We agree, and our recommendations regarding accounting for Shuttle Program costs are consistent with the draft interim approach document.

NASA's Top 10 Management Challenges

In the area of obligations management, we recently reported that NASA centers took excessive time to record obligations and, in some cases, had limited or no documentation to support the posted obligation. Centers also did not always promptly record adjustments to obligations. As a result, NASA financial records were not completely current for purposes of preventing overobligation and ensuring fund availability for expenditures. Management concurred with our recommendations, and NASA has modified its Quality Assurance Evaluation process to include the collection of data to measure the timeliness of recording obligations and adjustments. On a related issue, we recently reported that NASA management has not ensured that authorized funds have been used for their intended purposes. Of the 36 reviewed disbursements totaling about $44.8 million, about $44.7 million may have been charged to the incorrect appropriation, which may have resulted in violations of fiscal law.

Another fiscal management concern is cost analysis. Our recent audit report on X-33 cost estimating found that NASA did not adequately address cost reasonableness and cost risk for Phase II of the X-33 Program. Therefore, NASA management approved the Program without the benefit of realistic estimates of the probable cost of the X-33 Program. A risk analysis would have alerted NASA decision-makers to the probability of cost overruns in the Program. Cost overruns put NASA's investment in the X-33 Program at risk. The lack of properly performed cost analyses has been a concern for many years. In 1995 we recommended that NASA perform an OMB Circular No. A-76 cost analysis to determine the least expensive method of satisfying the Agency's air transportation needs. Although our audit showed that using alternatives to mission management aircraft could save $5.8 million annually, NASA has not completed the required analyses. At management's request, we recently reviewed a cost analysis for the mission management aircraft located at Marshall. We reported that the analysis did not comply with OMB Circular No. A-76 since management did not consider commercial airlines as an alternative. We also reported that management was evaluating a plan for replacing some of the mission management aircraft and had not completed the necessary A-76 studies, although management stated they planned to do so. Since commercial airlines can meet NASA's transportation needs, the Agency can save $43.9 million by not replacing the aircraft.

During FY 1999, we also issued reports related to debt collection and the use of NASA exchanges. We found that NASA has made significant progress towards meeting the requirements of the Debt Collection Improvement Act of 1996. However, we identified several opportunities for improvements. NASA management concurred with our recommendation that it strengthen internal controls to ensure compliance with Financial Management Manual requirements for timely debt collection and to measure this compliance through the establishment of performance metrics related to the debt collection process. Management also agreed to establish procedures to ensure that all amounts due NASA are processed by the cognizant accounts receivable office and that reimbursement is made to the Government if NASA-funded courses are not successfully completed. NASA Exchanges are Government instrumentalities established to contribute to the efficiency, welfare, and morale of NASA employees.

NASA's Top 10 Management Challenges

Traditionally, Exchanges operate center cafeterias, gift shops, and vending machines, and promote activities, including clubs or recreation associations. We found that control weaknesses identified in audits performed by the independent public accounting firms are not being corrected in a timely manner. In one instance, this resulted in Exchange employees embezzling money. We also found that Center Directors were not familiar with the contents of Exchange constitutions and bylaws.

Future Challenges The keys to improved fiscal management include:

- Ensuring adequate integration and testing of newly developed automated accounting modules or capability.
- Ensuring that the Agency continues to properly account for and record financial transactions as new capability is implemented.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 5A. Prior work is listed in Table 5B. The results column in Table 5B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 5A – Fiscal Management Planned Work

Program Area	***Assignment***	***Focus***
Audits	Audit of Relief Granted for Overpayment of General and Administrative Costs (Carryover) A9907200	Evaluating the propriety of relief granted to a contractor for overpayment of general and administrative costs billed to the Government.
Audits	Quality Control Review of the Fiscal Year 1998 Financial Statement Audit of the NASA/Johnson Exchange (Carryover) A9906101	Examining the use of appropriated funds for the exchange. This is a spin-off of the review done to ensure that the audit of the Exchange's financial statements for the period ending September 30, 1998, were performed in accordance with generally accepted auditing standards.
Audits	Quality Control Review of NASA's Fiscal Year 1999 Financial Statement Audit (Carryover) A9906000	Determining whether Arthur Andersen conducted its audit in accordance with Government auditing standards and provisions of OMB Bulletin 98-08.
Audits	Quality Control Review Stennis Space Center Exchange (Carryover) A9904700	Ensuring audit of the Exchange's financial statements for the period ending September 30, 1998, was performed in accordance with generally accepted auditing standards
Audits	Quality Control Review of NASA's Fiscal Year 2000 Financial Statement Audit	Determining whether Arthur Andersen conducted its audit in accordance with Government auditing standards and provisions of OMB Bulletin 98-08.
Audits	Controls Over Processing Obligations	Determining whether yearend obligations are valid and properly represent bona fide needs that existed during the period funds were available.
Audits	Performance Incentive Fees	Determining whether NASA is complying with Federal requirements relating to provisional and advance payments for incentive fees.
Audits	Review of Carrier Account Operation	Evaluating whether carrier accounts are properly used to accumulate commitments, obligations, costs, and disbursements and distribute funds to benefiting programs.
Audits	Contract Payments Electronic Funds Transfer and Controls	Evaluating the internal controls associated with electronic fund transfer payments to contractors and to review compliance with existing rules and regulations.

(Continued)

NASA's Top 10 Management Challenges

Table 5A – Fiscal Management Planned Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Property Management and Controls - Contractor-held Equipment	Evaluating management controls/procedures over accountability and utilization of NASA personal property held by off-site contractors.
Audits	A-133 Quality Control Reviews of Audits Performed for Non-Profit Institutions and State and Local Governments.	Ensuring that Certified Public Accountants' audit work and reports meet the applicable auditing and reporting guidance contained in OMB Circular A-133, generally accepted Government auditing standards and generally accepted auditing standards. These audits ensure that the funds NASA awards to these institutions are properly accounted for.
Audits	Review of Reimbursable Pricing	Evaluating reimbursable agreements to determine whether reimbursement amounts are accurately computed and appropriately billed and collected.
Audits	Management of NASA's T-38 Aircraft Fleet	Determining whether NASA has complied with requirements for managing, using, and accounting for the costs of its aircraft and has conducted periodic reviews for the continuing need of its aircraft.
Audits	IFMP/Security and Internal Controls Working Group	Participating in group to address the security and internal control issues related to the configuration and implementation of the Integrated Financial Management System at all NASA Centers.
Inspections	Assessment of NASA Intergovernmental Personnel Act (IPA) Policies and Practices (Carryover, G-99-019)	Determine whether the Agency IPA arrangements with external organizations are effective and compliant with the law and regulation.

NASA's Top 10 Management Challenges

Table 5B – Fiscal Management Prior Work

Program Area	***Reports***	***Results***
Audits	Matching Disbursements to Obligations (IG-99-059)	NASA financial management personnel did not properly match disbursements to obligations. Therefore, authorized funds may not have been used for their authorized purpose. Three recommendations were made to management: (1) require NASA contractors to submit accounting information on their invoices, (2) procurement offices provide payment instructions to NASA financial management activities, and (3) require disbursements be properly matched to obligations. Management does not concur with any of the recommendations.*
Audits	A-76 Study of NASA-3 Aircraft (IG-99-057)	An audit of an OMB Circular No. A-76 study conducted at Marshall of NASA-3, a mission management aircraft used by Marshall, found that NASA's use of the aircraft to transport personnel and equipment did not qualify as one of the purposes for which Federal policies authorize agencies to own or lease aircraft. We estimated that the costs for using commercial airlines is $2.9 million less than the costs for operating NASA-3 over the 5-year period covered by the A-76 study. We also found that NASA was evaluating a plan to replace three mission management aircraft, including NASA-3, and to upgrade a fourth aircraft. Management had not yet performed an A-76 study supporting the proposed aircraft purchase and upgrade, which would cost $43.9 million. We recommended that management dispose of NASA-3 and use commercial airlines to satisfy Marshall's transportation requirements, revise Agency policy to conform with OMB requirements, evaluate commercial airlines and other aviation services when conducting A-76 studies for aircraft, and terminate plans to replace the existing mission management aircraft. Management either nonconcurred or proposed nonresponsive actions to the report's five recommendations. We have requested that management reconsider its position.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 5B – Fiscal Management Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Implementation of NASA's Integrated Financial Management Project (IFMP) (IG-99-026)	The IFMP contractor did not fulfill its agreement to deliver a fully integrated management system by July 1, 1999. This delay will cause NASA to (1) be less than fully compliant with Federal laws and Agency requirements and (2) incur additional contract costs and maintenance costs for legacy systems that would otherwise be avoided through IFMP implementation. We recommended the Agency take steps to protect its interests and receive adequate consideration due to the contractor's nonperformance, and that NASA test the final software to ensure it meets all Federal requirements. Management concurred and has initiated corrective actions.*
Audits	Audit of NASA's Full-Cost Initiative Implementation (IG-99-024)	NASA is satisfactorily progressing in its efforts to implement full-cost accounting using alternative methods and to integrate full-cost concepts into the Agency's new financial management system still being developed. However, NASA is not planning to distribute the costs of the Space Shuttle Program to other NASA programs that benefit from Shuttle services. As a result, the financial statement presentations for NASA programs that use Shuttle services will not fairly present the full costs of these other programs. We recommended that NASA (1) develop a methodology for distributing the costs of the Space Shuttle program, as well as other service-oriented programs, to programs that benefit from the services and (2) consistently use the methodology developed. Management did not concur with our recommended actions. In September 1999, NASA's Chief Financial Officer initiated an interim approach to implementation of full-cost management, budgeting, and accounting throughout the Agency. We are continuing to analyze the interim approach and strategy being pursued by management and will determine whether this issue needs to be forwarded to the NASA Administrator for a final Agency determination.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 5B – Fiscal Management Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Obligations and Adjustments – Recording Obligations and Adjustments (IG-99-021)	To comply with statutory requirements, NASA is required to establish procedures to promptly record and adjust all incurred obligations. In addition to the legal requirements, managers rely on recorded obligation information for decisionmaking. At four Centers we reviewed, an estimated 17 percent of obligations was not recorded against applicable allotments within 15 working days. Also, the Centers did not make necessary adjustments to obligations in a timely manner. NASA managers concurred with our findings. They plan to develop metrics regarding the elapsed time for recording obligations and the correction of errors. Managers will include these factors as part of the continuing enhancement of their Quality Assurance Evaluation process.*
Audits	X-33 Funding Issues (IG-99-001)	NASA established an arrangement with Lockheed-Martin within the X-33 cooperative agreement to delay billing for completed and Government-accepted milestones until the following fiscal year. As a result of this practice, NASA had unrecorded yearend obligations, costs, and liabilities totaling $22 million in FY 1996 and $34 million in FY 1997. This resulted in Agency reports and the financial statements not being accurate. Management agreed to study the appropriateness of existing funding and payment practices and to take corrective actions deemed appropriate.*
Audits	NASA's IFMP Time and Attendance/Labor Distribution Module (IG-98-004)	NASA concurred with our recommendation to develop a policy and assess the risks associated with the planned deployment of the Integrated Financial Management Project Time and Attendance module through the World Wide Web. NASA also began to develop necessary management controls for several high-risk areas that we identified in the planned module (modifying and certifying data, prior period adjustments, and access to personnel and payroll data).

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 5B – Fiscal Management Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Observations Regarding the IFMP Time and Attendance Module (Management Letter M-IG-97-011)	NASA evaluated similar time and attendance systems in use at several Federal agencies and private companies to identify best practices that could be applied at NASA. Also, NASA started a security risk analysis to assess the need for electronic signatures in the planned time and attendance system.
Audits	Early Phases of NASA's Integrated Financial Management Project (IFMP) (IG-97-001)	NASA did not perform an adequate risk analysis as part of the requirements definition, did not adequately evaluate alternatives for meeting its requirements, and did not prepare a realistic cost estimate and implementation schedule. Management eventually performed risk analyses and continues to do so to ensure that necessary security and management controls are included as part of the contract's requirements. Management revised its cost estimates and delivery schedule as it identified additional risk areas.
Audits	Participation in the Security and Internal Control Working Group	The group provides a forum to resolve issues regarding the development and implementation of NASA's planned integrated financial management system. The group is working with the Independent Verification and Validation agent on strategies to evaluate internal controls associated with an implemented system.

NASA's Top 10 Management Challenges

6. Program and Project Management.

The Agency faces two significant challenges in this area. First, on April 3, 1998, NASA issued NASA Procedures and Guidelines (NPG) 7120.5A, "NASA Program and Project Management Processes and Requirements." The new guidance substantially revises NASA management procedures at a time when the Agency has many programs and projects that were initiated under the earlier procedures. The new guidance was issued to improve program and project management by (1) including all parties involved from the beginning of the program or project, from solicitation to delivery of the end item, and (2) placing more responsibility/risk in the hands of the contractor which, in turn, will reduce the amount of Agency oversight. Second, the majority of current NASA contracts are being administered under the previous NASA Management Instruction (NMI) guidance that the new NPG replaced. Over the past eighteen months, the Agency has been transitioning to full implementation of the NPG. During this transition period, considerable risk existed, and continues to exist, that a noncompliance could occur that may have a material impact on the success of NASA programs. In addition, the effects of downsizing the Agency's acquisition workforce and increased reliance on contractor support (see Issue 2) present new challenges that NASA must monitor until full implementation of the NPG occurs.

NPG 7120.5A should be revised to emphasize contractor performance monitoring and technology transfer. The current NPG requirements for performance monitoring consist only of reporting assessments of contractor performance back to the contractor and maintaining records in accordance with established policy. We believe the NPG should include specific requirements related to technical monitoring, communications, and contractor performance. Based on our FY 1996 review of new technology reporting, we found several deficiencies in NASA's technology transfer and commercialization process. We recommended a complete reassessment of the new technology reporting process, including (1) defining an active role for NASA senior management, (2) developing a detailed implementation strategy, and (3) providing sufficient resources to implement the new strategy. Management concurred with our recommendations and has implemented corrective actions. Consistent with these recommendations, NPG 7120.5A should be revised to incorporate the requirements and responsibilities of program and project managers regarding new technology reporting.

NASA has established an NPG 7120 Working Group (Group). The Group is comprised of various Headquarters and NASA Center personnel. The Group meets periodically to address recommended changes, revisions and suggestions to improve the overall program and project management guidance contained in the NPG 7120. For example, the NASA OIG has made formal recommendations, in several audit reports that the group has discussed and implemented. These are discussed below in the various audit narratives.

NASA's Top 10 Management Challenges

While NPG 7120.5A has been issued, there are many other NASA directives that should be issued or revised to support effective program management. For example, in 1997, NASA issued NPD 9501.3, "Earned Value Performance Management," to establish the basis for applying earned value management (EVM) to contracts. However, to effectively use EVM as a management tool, it must be an integrated part of program and project management. Currently, EVM is not consolidated as an overall program and project management responsibility. The fragmentation of the policy results in unnecessary separation of authority for EVM policy, which has been delegated to the Chief Financial Officer, while the day-to-day responsibility for EVM implementation rests with program and project managers. We recently recommended that management revise EVM procedures and issue EVM policy as program and project management directives and guidance. In addition, NPG 8840, "NASA Procedures and Guidelines for Implementa-tion of the National Environmental Policy Act (NEPA) and Executive Order 12114," when issued will establish standard procedures for implementing NEPA and the Agency's overall environmental planning process. These processes and procedures are important for program and project management, but NPG 8840 has been in draft for over 9 months and still has not been issued. Also, the Agency plans to revise the NASA Federal Acquisition Regulation Supplement (NFS) to include various risk management considerations. The change will encompass safety, security (including information technology security), health, export control, and environmental protection, within the acquisition process. While these are important program and project management considerations, the change will require several months to incorporate into the NFS and implement.

During the last 12 months we issued several audit reports that identified program and project management issues that ranged from inadequate Contracted Advisory and Assistance Services (CAAS) from DCAA and DCMC to a lack of NASA oversight on its major programs and projects. These issues were not only attributable to contracts awarded under the new NPG but those still being managed under the auspices of the NMI. With regard to deficiencies identified under NMI managed programs, our office took a proactive approach in recommending corrective action. We reviewed the new NPG to ensure that it would reduce the occurrence or eliminate the problems that occurred under the old NMI. Detailed below are four examples of the types of program and project management issues that we reported and believe provide strong support that program and project management is considered a significant area of management concern.

<u>Space Station Corrective Action Plans</u>. Boeing's corrective action plans and the Johnson Space Center's (Johnson's) oversight of the plans need improvement. The Space Station Program has experienced a continued deterioration in cost and schedule performance after a September 1997 adjustment of the contract cost baseline, but variance analyses and corrective action plans have not been effectively utilized to control the negative variances. Additionally, Johnson did not provide effective oversight of Government surveillance of the Earned Value Management System, including the verification of corrective actions related to cost and schedule

variances. As a result, the Space Station Program lacked assurance that negative variances were identified and corrective actions were taken to reduce associated risk. Further, Johnson did not ensure that Boeing took corrective actions on conditions noted since at least March 1997 to properly prepare and submit Variance Analysis Reports. As a result, Variance Analysis Reports may not adequately identify cost and schedule risks. (Also see Issue 3.)

Earth Observing System (EOS) Common Spacecraft Planning and Management. In general, the EOS contractor-planned schedule and cost performance is adequate. However, program management can be improved in the areas of quality control and communication of award fee determinations. Specifically, NASA does not have assurance that the DCMC is performing required quality assurance services. Further, DCMC did not finalize and submit its Agency Quality Assurance Plan for contract NAS5-32954 in a timely manner. Although the plan has now been submitted, NASA has not formally approved it. Finally, DCMC has not submitted required status reports to the NASA Flight Assurance Manager at Goddard. The information is necessary to ensure that quality assurance issues are addressed in a timely manner.

Audit of the X-33 Cooperative Agreement. NASA has had limited success in the use of a cooperative agreement on a major program. The X-33 Program cooperative agreement represents NASA's "new way of doing business," that is, faster, better, cheaper; partner-ing; less documentation; fewer staff and reduced oversight. While the cooperative agreement has provided certain benefits including faster award and greater flexibility in managing the X-33 Program, we found its use has contributed to a variety of program management problems. The problems have adversely affected X-33 Program planning, execution, resource management, and property control. NASA Program Directive (NPD) 7120.4A, "Program/Project Management," and NPG 7120.5A state that the directives apply to all programs and projects. However, Agency guidance on use of cooperative agreements with commercial firms, NPG 5800.1D, "Grant and Cooperative Agreement Handbook," does not specifically require that program and project managers comply with program management requirements when a cooperative agreement is used for a major system. NPG 5800.1D guidance on the use of cooperative agreements with commercial firms was not designed for major (large dollar) programs like the X-33. Consequently, early in the X-33 Program there was some uncertainty as to which program management requirements applied to the X-33 under the "new way of doing business." We recommended that management revise NPG 5800.1D to include guidance requiring that program and project managers entering into partnering agreements with commercial firms for the design and development of major systems must comply with NPD 7120.4A and NPG 7120.5A. Management concurred with the recommendation and is taking appropriate corrective actions.

An important element of effective program and project management is cost analysis. As noted in Issue 5, we have reported deficiencies in cost analysis procedures on the X-33 Program and other Agency initiatives. We have made recommendations for management to modify NPG

NASA's Top 10 Management Challenges

5800.1D and NPG 7120.5A to include well-supported cost analysis and quantification of cost risk.

Audit of Advanced X-RAY Astrophysics Facility (AXAF)[1]. Overall, NASA responded adequately to the initial AXAF launch delay and has focused additional attention on contractor performance. The AXAF launch delay will increase contract costs by an estimated $28.8 million. The initial delay was caused by problems in software development and inadequate time scheduled for integration and test activities for the AXAF flight and ground software. When software development was identified as a high risk, the AXAF risk management plan was not updated because NASA policy did not require the plan to be updated. Also, NASA did not assign personnel with software expertise at the contractor location. However, when the delivery delay became known, NASA management took action to minimize the impacts and adjusted the contractor award fee to reflect actual performance. We made recommendations for management to modify NPG 7120.5A to include well-supported cost analysis and quantification of cost risk.

Future Challenges Keys to effectively managing NASA programs include:

- Improving planning to enable the Agency to accomplish its missions in the face of declining budgets and staff.
- Eliminating duplication in programs and improving coordination with other research and development organizations.
- Ensuring that programs and projects accurately assess their progress and successfully achieve their goals.
- Effectively using technology developments to increase Agency productivity.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 6A. Prior work is listed in Table 6B. The results column in Table 6B identifies the status of significant report recommendations.

[1] AXAF was renamed the *Chandra X-ray Observatory*.

NASA's Top 10 Management Challenges

Table 6A – Program and Project Management Planned Work

Program Area	***Assignment***	***Focus***
Audits	Space Flight Operations Contract (SFOC) Phase II (Carryover) A9906400	Determining whether the contract is effectively managing the consolidation of the previous Space Shuttle contracts at Johnson Space Center and Marshall Space Flight Center.
Audits	The Deep Space Network (DSN) Support Services	Determining the need for the DSN Logistic Depot in Barstow, California, and whether more cost-effective alternatives have been considered by Johnson Space Center.
Audits	Space Infrared Telescope Facility (SIRTIF) Schedule and Budget Controls	Determining whether the SIRTIF project is effectively controlling and managing project scope, schedule, and budget and whether the project is comparing cost and schedule results against valid planning data.
Audits	Mars Exploration Program, Program Planning	Determining whether the Mars Exploration Program Office adequately planned and budgeted to meet its strategic goals.
Audits	Verifying and Validating Performance Data Under the Government Perform-ance and Results Act	Identifying the data sources for selected performance goals and measures and assessing the accuracy of the comparison of planned vs. actual performance.
Audits	Audit of Space Shuttle Payloads	Evaluating the effectiveness of NASA policies, procedures, and practices relative to Space Shuttle use for payload assignments.
Audits	Free Flight Program	Determining whether NASA's work on innovative air traffic management duplicates existing or completed research, is adequately coordinated with airline industry partners, and effectively uses research funds.
Inspections	Assignment of Astronauts to Long-Duration Space Missions	Determining whether NASA has developed an appropriate process for selecting astronaut crews for long-duration space missions.
Inspections	Astrobiology Program	Determining whether (1) NASA's Astrobiology program is properly organized and funded and (2) the Astrobiology Institute and the Strategic Enterprises are working effectively together to achieve the Agency's goals.
Inspections	Software Engineering Assessment of the International Space Station	Determining whether ISS program management is using proper software engineering practices in the development and management of ISS flight software and software tools.

NASA's Top 10 Management Challenges

Table 6B – Program and Project Management Prior Work

Program Area	***Assignment***	***Focus***
Audits	Earned Value Management (EVM) at NASA (IG-99-058)	The authority to implement EVM policy should be aligned with the responsibility for program and project management rather than with the fiscal chain of command and fiscal policy directives. We recommended that NASA issue EVM policy as program and project management directives and establish procedures for reporting comprehensive EVM information to upper management. Management did not provide comments on the draft report and has been requested to provide complete comments on the final report.*
Audits	NASA Implementation of the Government Performance and Results Act (IG-99-055)	NASA has made substantial progress in implementing the Act, including preparing and updating its Strategic Plan and issuing Performance Plans for FY 1999 and FY 2000. However, Senior management has not (1) provided adequate oversight of overall progress on the established FY 1999 performance targets and (2) established appropriate procedures to ensure the data would be used and were accurate and reliable. Management agreed to correct the deficiencies.*
Audits	JPL Management of Subcontractor Technical Performance (IG-99-054)	Jet Propulsion Laboratory's (JPL's) most significant subcontracts were not subjected to adequate surveillance. Subcontractor data disclosed problems in the designing, building, and safeguarding of hardware and employee noncompliance with quality system procedures. JPL did not act on these problems in a timely manner, in part, due to the lack of surveillance activity. We recommended that NASA direct the JPL Director to revise current project management policies to require project management assessment and monitoring of sub-contractor procedures to ensure that they are designed and functioning to prevent, detect, and correct technical problems. Management partially concurred; we requested further information regarding the specific corrective actions.*

(Continued)

* Recommendation(s) remain open.

Enclosure

NASA's Top 10 Management Challenges

NASA's Top 10 Management Challenges

Table 6B – Program and Project Management Prior Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Performance Evaluation Plan for the Earth Observing System (EOS) Data and Information System Core System (ECS) Contract (IG-99-038)	The ECS contractor's performance was not linked to the contract's Performance Evaluation Plan. The award fee plan relied on subjective evaluations by Government personnel as the basis for award fee determinations. The plan did not contain objective measures of performance and, therefore, did not sufficiently link performance objectives to the award fee. Management agreed to revise the Performance Evaluation Plan to link award fee payments to specific cost, schedule, and performance objectives in the restructured ECS contract.*
Audits	Earned Value Management at NASA—ECS Performance Measurement Baseline (IG-99-037)	NASA can improve the use of EVM on the ECS contract by performing an integrated baseline review to substantiate the validity of the contractor's performance measurement baseline. Without a valid baseline, variances may not be detected and addressed with corrective action plans. Management agreed to review and appropriately revise its Program and Project Management guidance and to perform a baseline review for the restructured ECS contract.*
Audits	Audit of X-33 Cooperative Agreement (IG-99-019)	NASA has had limited success using a cooperative agreement on the X-33 Program. However, using a cooperative agreement contributed to program management problems such as (1) program plans, internal agreements, and guidance documents either were not prepared or were not timely; (2) industry partners did not provide required analyses of their cost estimates or submit monthly reports on resource contributions; (3) Center practices for controlling and reporting costs require improvement; and (4) ownership of the X-33 flight vehicle upon program completion has not been determined. Management generally concurred and initiated corrective action.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 6B – Program and Project Management Prior Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	Advanced X-ray Astrophysics Facility (IG-99-016)	Launch of the Chandra X-ray Observatory was delayed because of problems in software development and inadequate time scheduled for integration and test activities for the observatory's flight and ground software. Although software development was identified as a high risk, the observatory's Risk Management Plan was not updated because it was not required by NASA policy. We recommended that management revise the NASA policy to require program managers to update Risk Management Plans as high-risk issues arise. Management concurred and planned to address the issue through the Program/Project Management Working Group.*
Audits	EOS Common Spacecraft Planning and Management (IG-99-011)	Program management for the EOS spacecraft designated as PM-1 and CHEM-1 can be improved in the areas of quality control and communication of award fee determinations. The Defense Contract Management Command did not submit an approved Quality Assurance Plan and periodic status reports to the NASA Flight Assurance Manager. In addition, NASA event coordinators made significant changes in the contractor's award fee scores without discussing the changes with the event monitors. Management concurred and initiated responsive corrective actions.
Audits	Earth Science Commercial Data Buy Program (IG-98-025)	One of ten contracts awarded for Phase I of this program duplicated an existing NASA capability to access the same data through current Agency agreements. Cost projections show that NASA could unnecessarily spend an additional $576,000 during Phase II. We recommended that NASA not award a Phase II contract. Management concurred, and NASA will not pursue a Phase II contract.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 6B – Program and Project Management Prior Work (Continuation)

Program Area	***Assignment***	***Focus***
Audits	NASA's Plans to Successfully Achieve the Earth Observing System Scientific Objectives (IG-98-010)	Our audit disclosed that budget cuts would affect NASA's ability to achieve its original EOS Program goals. The Agency partially concurred with our recommendation to reevaluate the EOS goals when it addresses the Earth Science Enterprise's overall science requirements.
Audits	Earth Observing System Data and Information System (EOSDIS) Federation Plan (IG-98-002)	NASA did not perform a cost/benefit analysis prior to initiating the pilot program to broaden participation in the distribution of EOSDIS information products through a federation of partners. The Agency concurred with our recommendation to conduct the analysis before making a decision regarding moving to a federated plan.
Audits	Review of the NASA/ Commerce Agreement and Management of the Polar-Orbiting Operational Environmental Satellite Program (P&A-97-002)	The agreement on the management of the Polar-Orbiting Operational Environmental Satellite represents a successful partnership between Department of Commerce and NASA that benefits from close coordination at the working level and long-range acquisition planning. We identified program budget overestimates of about $26.9 million and potential savings of $43 million by obtaining a launch service commitment. We also determined that approximately $34,000 of available award fees were inappropriately added to the award rollover pool. Management has taken responsive actions to most of our recommendations.

(Continued)

NASA's Top 10 Management Challenges

Table 6B – Program and Project Management Prior Work (Continuation)

Program Area	***Assignment***	***Focus***
Inspections	Assessment of the Triana Mission (G-99-013)	The Triana mission is a relatively new NASA project to build, launch, and operate a spacecraft that will take pictures of the sunlit side of the Earth and transmit them to the Internet 24 hours a day. Total cost for Triana increased considerably as the focus changed from education to science. Based on a circumscribed peer review process, we reported that the added scientific capabilities may not be the best expenditure of NASA's limited science funding. We also reported that the Triana spacecraft, originally conceived as a cooperative effort among university students, industry, and Government, is essentially being built, launched, and operated by NASA. In addition, NASA's major role in developing and launching the spacecraft did not appear to further the goals of the National Space Policy of 1996 and the Commercial Space Act of 1998, which direct NASA to acquire spacecraft and launch vehicles from the private sector whenever possible. We recommended that NASA reassess and modify its approach to the Triana mission. NASA management did not concur with our recommendation.

NASA's Top 10 Management Challenges

7. Launch Vehicles.

NASA uses two types of launch vehicles, the Expendable Launch Vehicle (ELV) and the Reusable Launch Vehicle (RLV). The ELV's do not carry people, and each vehicle can be used only once. ELV's are used to carry satellites and exploratory mission components into space, such as the Cassini and Mars Surveyor. NASA depends upon commercial sector suppliers for ELV's. There are various types of ELV's used by NASA, depending on the mission requirements. The Commercial Space Act generally requires the Federal Government to acquire space transportation services from U.S. commercial providers. In addition, the Aeronautics and Astronautics Coordinating Board (AACB) is a joint Department of Defense (DoD)/NASA senior management review and advisory body. It was chartered by interagency agreement in 1960, in part, to help ensure the effective use of U.S. scientific and engineering resources; avoid unnecessary duplication of effort, facilities, and equipment; and reduce costs. The AACB effort encompasses space launch activities, including coordination of ELV efforts. Prompted by planned and expected future budget reductions at both agencies, DoD and NASA agreed to pursue an AACB cooperation initiative in June 1995. The U.S. Department of Commerce (DoC) has also joined the initiative. The AACB cooperation initiative has been successful in improving Government operations and saving funds for both NASA and the DoD. However, during an FY 1998 review, we found that actions to implement almost half of the AACB's recommendations were incomplete because of insufficient management oversight or commitment by the involved parties. The remaining open recommendations offer DoD, NASA, and DoC potential additional opportunities to achieve significant operating improvements and savings.

We are reviewing NASA's management of the availability of small ELV's to ensure schedule milestones and cost effectiveness, particularly launches for NASA's Offices of Earth Science and Space Science "smaller, faster, cheaper, better" satellites. Some of these small ELV's have experienced technical problems, resulting in launch delays and cost increases when alternative launch capabilities had to be acquired. Since NASA acquires launch services commercially, the Agency does not maintain the same level of control as compared to in-house operations. Estimating costs and committing to scheduled launches are major challenges in this environment.

In contrast to ELV's, the RLV provides access to space using the same vehicle multiple times. The Space Shuttle is NASA's current operating RLV. However, the Space Shuttle fleet is aging and is expensive to operate. The Space Shuttle Program officially began in 1972 and the first flight was in 1981. In FY 1999, the Space Shuttle budget was nearly $3 billion, approximately 22 percent of the total NASA budget. Each of the Shuttle orbiters is taken out of service about once every 3 years for planned major modifications and repairs. However, because of the age of the fleet, unscheduled repairs are often necessary. For example, a recent Shuttle mission experienced problems when wiring problems were detected. Consequently,

inspections and repairs are being performed on the Shuttle fleet. The President's National Space Policy directed that NASA work with the private sector to develop flight demonstrators that will support a decision by the end of the decade on development of a next-generation reusable launch system. The Policy also directed NASA to develop new and innovative space technologies and smaller, more capable spacecraft to improve the performance and lower the cost of future space missions.

NASA has several programs and projects ongoing for the design and development of RLV technology demonstrators (for example, X-33, X-34, and X-37) that seek to improve performance and lower the cost of space access. Current access costs significantly impact NASA's budget and the commercial growth of the aerospace sector. The goal of the current RLV program is a substantial reduction in the cost of sending cargo to low-Earth orbit. Initially NASA's goal was to work with industry to develop the necessary technology so that the commercial sector could then build the new RLV. The X-33 Program's goals are to mature single-stage-to-orbit technologies, demonstrate reduced launch costs, and reduce technical and programmatic risks enough to attract private industry to build and operate an RLV. NASA is using a cooperative agreement for the X-33 Program, a first for a major technology program. The work being performed under the current cooperative agreement is to build a half-scale demonstrator vehicle. Once the technologies are demonstrated, a full-scale RLV will be developed. NASA would be a customer for launch services rather than own and operate the vehicles. However, the technical and financial risks are still too high at this time to attract substantial industry investment in the development of the new RLV.

NASA does not have specific, quantifiable RLV technology requirements and a clear "roadmap" for the Space Transportation efforts. This issue is related to the current NASA Space Transportation Architecture Study now in process in response to Congressional and OMB concerns. In this regard, a recent NASA in-house study concluded NASA does not have sufficient knowledge at this time to make a decision on a next-generation RLV. NASA needs to answer technical questions in several core technology areas[2] before selecting an architecture and configuration for a next generation RLV. NASA does not believe these questions will be fully answered until at least 2003 and possibly as late as 2005. Since other programs, such as the Space Shuttle and ISS will be affected by decisions on the RLV, launch vehicles will continue to be a significant management challenge. However, a major effort is currently underway to address the Space Transportation concerns. NASA is currently preparing an Integrated Space Transportation Plan, a comprehensive, agency level space transportation plan, which will lay the framework for future Space Transportation efforts.

[2] The core technology areas are composite structures, composite tanks, propulsion, thermal protection systems, avionics, and aircraft-like operability.

NASA's Top 10 Management Challenges

Future Challenges Keys to the development and use of launch vehicles include:

- Assuring the availability of small ELV's to ensure schedule milestones and cost effectiveness of NASA missions.
- Evaluating whether NASA's providing the majority of developmental funds and assigning technology rights to its industry partners in the development of the new RLV's are in the best interest of the Government.
- Establishing and monitoring surveillance plans for all major functions of the Space Shuttle operations contract.
- Ensuring that plans are in place and are effectively implemented to address Shuttle systems obsolescence, logistics support, technical/safety upgrades, and funding.
- Closely monitoring Space Station hardware delivery plans and initiating prompt corrective actions to preclude slips in the launch schedule.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 7A. Prior work is listed in Table 7B. The results column in Table 7B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 7A – Launch Vehicles Planned Work

Program Area	***Assignment***	***Focus***
Audits	Audit of Small Expendable Launch Vehicle Services (SELVS) (Carryover) A9904400	Determining whether the SELVS-KSC contract was properly planned and managed.
Audits	Small Usable Booster (X-34) Development Program (Carryover) A-HA-98-050	Assessing program management effectiveness and conformance with NASA program management guidance in NASA Procedures and Guidelines 7120.5A.
Audits	Management of Expendable Launch Vehicle Services	Determining the impact of recent legislation and launch vehicle failures on NASA's successful launch rate.
Audits	Integration and Coordination of Reusable Launch Vehicle (RLV) Technology Initiatives	Determining whether NASA has adequately integrated and coordinated RLV initiatives to ensure these activities are carried out efficiently and effectively without duplication of effort.
Audits	Hypersonic Technology Program	Determining whether the Hyper-X program goals are reasonable and achievable, funding is appropriate, and cost and schedule are realistic and properly managed.
Audits	Advanced Space Transportation Programs	Determining whether the strategies and procedures for planning and executing Advanced Space Transportation Program technology investments and assigned priorities are adequate.

NASA's Top 10 Management Challenges

Table 7B – Launch Vehicle Prior Work

Program Area	***Reports***	***Results***
Audits	Follow-up on Audit of Orbiter Maintenance Down Periods OMDP) (IG-98-016)	NASA could save $7.6 million per OMDP by performing maintenance at KSC, but would incur significant risk. The Agency agreed to reevaluate where OMDP's are performed after the ISS is complete and a less aggressive Shuttle Manifest exists.
Audits	Privatization of NASA Sounding Rocket Program (IG-97-020)	OIG review of Agency plan to reduce infrastructure costs by privatizing the Sounding Rocket Program at the Wallops facility was not supported by a cost comparison or program impact analyses. The Agency agreed with the finding and intends to implement both the comparison and analyses before making a final decision.
Audits	Reusable Launch Vehicle Program (IG-97-019)	NASA must continue its efforts to obtain Congressional approval of a waiver indemnification for its private sector RLV partners. The Agency took appropriate steps to rectify this condition.
Audits	Reusable Launch Vehicle Survey of X-33 Task Agreements (IG-97-018)	The OIG review found that the X-33 partner needs to develop and implement systems for monitoring and tracking cost, schedule, and technical performance. The Agency concurred and began corrective action.

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

8. Research and Technology Demonstration/Application.

Since its inception in 1958, the Agency has been charged with ensuring that NASA-developed technology is effectively transferred to the U.S. industrial community to improve its competitive position in world markets. One of NASA's primary functions is to conduct research that reduces risk so that the industrial community can successfully commercialize new technology. The process of technology commercialization involves multiple stages. In the initial stages, NASA identifies promising new technologies. Through Agency projects, researchers conduct demonstrations to validate the new technology and establish its readiness for further application and commercial potential. In some cases, NASA then works with industry, sometimes through partnerships, to further develop the technology and reduce risk. After risk is sufficiently reduced, industry is responsible for the remaining steps of the commercialization process.

Each NASA Enterprise is responsible for technology demonstration. The Commercial Technology Division, Office of Aero-Space Technology, has Agency-wide responsibility for commercialization. In addition, the Assistant to the Administrator for Commercialization focuses on the increased and accelerated commercialization of high-leverage, high-payoff assets in order to free up NASA resources and talents to concentrate on the development of cutting-edge technologies and the continued exploration of space beyond Earth orbit.

Within each Enterprise, technology demonstration projects must compete with other priorities for scarce resources. For example, OMB officials recently voiced concerns about technology demonstration on the New Millennium Program. Specifically, OMB was concerned that the Program was emphasizing science gathering at the expense of technology demonstration. New Millennium was originally intended as a technology demonstration program, but it has faced pressure to include science-gathering missions. In response to OMB concerns, NASA has stated that technology demonstration will have a larger role in New Millennium missions.

Future Challenges Keys to effective technology demonstration and transfer include:

- Achieving a balance between scientific research and technology development and demonstration projects.
- Continuing to refine the technology transfer process to ensure that U.S. industry achieves the maximum benefit from the new technologies identified.
- Dealing with the budget cuts and funding limits that restrict NASA's ability to perform technology development and commercialization activities.
- Forming innovative partnership arrangements with U.S. industry to share both the risk and costs of technology demonstration and commercialization.
- Ensuring that NASA technology demonstrations do not unfairly distort the marketplace.

NASA's Top 10 Management Challenges

The following tables address this FY 2000 challenge. Planned projects are listed in Table 8A. Prior work is listed in Table 8B. The results column in Table 8B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 8A – Research and Technology Demonstration/Application Planned Work

Program Area	***Assignment***	***Focus***
Audits	Engineering Research and Technology Development on the International Space Station (ISS)	Determining whether NASA has implemented the National Research Council recommendations for using the ISS for engineering research and technology development activities.
Audits	Effectiveness of the New Millennium Program	Determining whether the New Millennium Program is effectively managed to achieve the desired results of validating new technologies for flight programs while gathering scientific data.
Audits	Strategic Enterprise Technology Programs	Determining whether the technology program of individual Strategic Enterprises is properly aligned with the goals and objectives of NASA's Strategic Plan and the NASA Technology Plan.
Audits/ Inspections	Commercialization of Space Station and Space Shuttle	Determining whether NASA complied with the Commercial Space Act of 1998 and whether the Agency is developing appropriate plans for Space Station and Space Shuttle commercialization.

NASA's Top 10 Management Challenges

Table 8B – Research and Technology Demonstration/Application Prior Work

Program Area	*Reports*	*Results*
Audits	X-33 Cost Estimating Process (IG-99-052)	NASA is using a cooperative agreement for the X-33 Program, a first for a major technology program ($1.1 billion). Under the terms of the cooperative agreement, NASA will provide about 80 percent of the funds and Lockheed Martin Skunkworks will invest at least 20 percent to demonstrate the X-33. However, NASA did not adequately address cost reasonableness and cost risk for the X-33 Program. Cost overruns put NASA's investment in the X-33 Program at risk. Since this is a cooperative agreement, the recipient may end its partnership or request that NASA invest more money should cost overruns become too burdensome. NASA agreed to improve its evaluation processes for cost reasonableness and cost risk and to update the X-33 Program's estimate to complete to reflect cost uncertainties.*
Audits	Advanced Air Transport-ation Technologies (AATT) Project (IG-99-030)	The AATT project has developed and the Federal Aviation Administration (FAA) has deployed three decision support tools: Traffic Management Advisor, Surface Movement Advisor, and Passive Final Approach Spacing Tool. Because the technology is so complicated, the transfer of these tools cannot be accomplished successfully without NASA's assistance. Therefore, we emphasized the importance of NASA assisting the FAA to ensure the decision support tools are successfully deployed. To ease the transition, NASA is developing a technology transfer plan that will provide for coordination with the FAA.

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 8B – Research and Technology Demonstration/Application Prior Work (Continuation)

Program Area	*Reports*	*Results*
Audits	Audit of Commercial Remote Sensing Program Office (CSPRO) (IG-99-023)	The NASA CRSPO has not leveraged the commercial remote sensing industry to provide products that meet baseline scientific requirements. Therefore, NASA has not been able to reduce the costs of remote sensing science and technology programs through competition within the commercial remote sensing industry. We recommended that NASA (1) publish a baseline of scientific requirements to foster competition within the commercial remote sensing industry and (2) use this baseline in initiatives to fulfill NASA's Earth Science objectives at the lowest cost. The Earth Science Enterprise will publish a Science Implementation Plan that identifies baseline scientific requirements, and the CRSPO will continue to facilitate communication between industry and the scientific community. However NASA believes it is industry's choice to provide data and services to the scientific community.*
Audits	Management Controls in Earth Systems Sciences Building Contract (IG 98-015)	We found that NASA misused $385,000 of research and development funds for construction (Construction of Facilities funds should have been used). NASA corrected the mistake.
Audits	Dissemination of Earth Science Program Data and Information (IG-98-013)	Earth Observing System information was not reaching four of the five intended user groups: (1) education, (2) public sector, (3) technology, and (4) commercial. NASA began corrective actions to ensure these four groups as well as the scientific users have access.

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

9. International Agreements.

One of the goals of the National Space Policy is to promote international cooperative activities that are in the national interest. The National Aeronautics and Space Act of 1958 gives NASA statutory authority to enter into binding agreements with foreign entities. Since its inception, NASA has entered into approximately 3,500 international agreements. These agreements span every NASA Enterprise and involve numerous programs and projects with the most notable being the ISS Program. NASA's international agreements also often provide for foreign nationals and representatives to have access to NASA facilities and information. NASA's Office of External Relations is responsible for determining the appropriateness and level of access. Inherent in a decision to grant foreign personnel access is the risk of sabotage or disclosure of information of military or economic importance.

An OIG audit determined that NASA had not identified all export-controlled technologies related to its major programs and did not maintain a catalog of classifications for transfers of export-controlled technologies. Also, Agency oversight of and training for personnel in the Export Control Program needed improvement. Specifically, annual audits of each center's export control system were not adequately performed, and NASA personnel lacked training in controlling and documenting export-controlled technologies. As a result, NASA may not have adequate control over export-controlled technologies to preclude unauthorized or unlicensed transfers. NASA needs an export control identification and classification process to control all the Agency's export-controlled technologies so that NASA employees are aware of the technologies they need to protect. Without a comprehensive classification and cataloging process, a NASA center may be unaware of decisions by other centers concerning the release of similar technology. Moreover, without a process, the prospect of unknowingly exporting export-controlled technology exists, which could result in damage to NASA and the national security.

Visits by foreign nationals and foreign representatives are a common means of facilitating interchanges with NASA's foreign aeronautical, scientific, and technical counterparts in support of broad Agency objectives and program goals. NPG 1371.2, "Procedures and Guidelines for Processing Requests for Access to NASA by Foreign Nationals or Representatives," provides instructions to NASA managers specifically authorized by NASA to receive, coordinate, review, and approve certain types of visits and other access by foreign nationals or foreign representatives to NASA centers. The guidance provides standard procedures for timely and accurate processing of various types of foreign visits and other access requests. These procedures will help NASA fulfill its responsibilities for facilitating visits that support U.S. national interests, as well as NASA's international program interests and operational requirements. The procedure will also assist in screening visit requests to determine whether they conform with Agency and national policies, including U.S. national security, nonproliferation and foreign policies, and export control regulations. We have identified

potential problems related to controls over the access of, escorting, and badging of foreign national visitors at one NASA center. We have alerted NASA management that NASA personnel designated as sponsors of foreign national visitors should ensure that all applicable procedures are followed, especially those procedures in the access approval area, pertaining to escorts and badging. We are currently reviewing this issue on a NASA-wide basis.

The Federal Bureau of Investigation (FBI) notified NASA that Agency programs are a high priority target for foreign intelligence services. Based on that assessment, the NASA Administrator has requested the FBI conduct surveys at each of NASA's principle field centers to help assure that the Agency's counterintelligence and technology transfer postures are sufficient to face the security challenges of the new Millennium. The FBI plans to use the information obtained from these surveys to make recommendations on how the Agency can strengthen its counterintelligence programs, ensure consistent high standards at all centers, and link the programs with the intelligence and law enforcement communities.

The OIG is also concerned with funds transferred by NASA to the Russian Government for payment to contractors working on the ISS Program. In particular, there is concern that the same U.S. banks that have recently been implicated in the Russian Government money laundering scandal are also being used by NASA for ISS related payments to the Russian Government. NASA assembled a team that traveled to Russia in late September to review payments made by the Agency to the Russian Government. The OIG will continue to assess this situation to identify any potential vulnerability to NASA.

The GAO conducted a review at the request of the House Science Committee to provide information on the U.S. Government's international science and technology agreements that support and encourage international cooperation in research and development. GAO was asked to specifically identify at seven Federal agencies (1) the number of international science and technology agreements active during FY 1997 and (2) the number of these agreements that resulted in research projects or other activities. NASA was unable to easily provide the GAO with a total universe of its active agreements, but did identify those that were approved during FY's 1995 through 1997. Of those identified for NASA, 98 percent subsequently resulted in research projects or other research-related activities.

NASA is actively pursuing initiatives to improve the efficiency and effectiveness of the Agency's international activities. During FY 1999, NASA requested the FBI to conduct a counterintelligence review of its operations after espionage was detected at the Department of Energy. NASA has also initiated an Agency-wide Security Campaign whereby presentations were made to target audiences at each center on information technology security, physical security, counterintelligence, counterterrorism, export control, technology transfer, and foreign visitor program management.

NASA's Top 10 Management Challenges

NASA also revised its agency-wide policy directive and implementing guidance for approving and controlling visits to NASA facilities by foreign nationals and representatives. NASA's Office of External Relations conducted a self-assessment of international technology transfer and export control practices and subsequently reorganized the office to consolidate the responsibility for control over foreign visits in the same division office having responsibility for export controls. The Agency is also developing, in conjunction with the Department of Energy, an agency-wide computer based system for approving foreign national visits. This system will be used to better monitor and control access to NASA facilities.

In FY 2000, the OIG plans to conduct work in the areas of (1) "deemed" exports[3] of NASA information and technology, (2) safety processes followed by the Space Station's international partners, and (3) international agreements for ISS engineering research and technology development.

Future Challenges Key considerations with the use of international agreements are:

- Program and project vulnerability to schedule delays and cost overruns that require diplomatic rather than contractual solutions.
- Security controls on technology that impact national security.
- Controls to assure the quality and timeliness of the goods and services provided.
- Mechanisms to assure a balance between program needs and national considerations.
- Plans with specific critical paths and planned alternative courses of action to maintain program/project continuity.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 9A. Prior work is listed in Table 9B. The results column in Table 9B identifies the status of significant report recommendations.

[3] Any release to a foreign national of technology or software that is subject to the Export Administration Regulations is "deemed to be an export" to the home country of that foreign national and is commonly referred to as "deemed exports."

NASA's Top 10 Management Challenges

Table 9A – International Agreements Planned Work

Program Area	***Assignment***	***Focus***
Audits	Contractor Control of Sensitive Technologies (Carryover) A9903300	Evaluating the controls over contractors that export technology for NASA missions to ensure that transfers of commodities, software, or technology to foreign partners comply with export control laws and regulations.
Audits	Deemed Export of NASA Information and Technology	Determining whether NASA has appropriate policies and procedures in place to ensure that technology and information is not inadvertently exported to foreign nationals.
Audits	Safety Process for International Space Station Partners	Determining whether components of the Space Station provided by foreign partners meet NASA safety requirements and whether NASA has conducted required safety reviews of the international partners.
Inspections	Information Technology and Export Controls at NASA Institutes	Determining whether NASA has implemented appropriate Information Technology Security procedures and has addressed export control issues at NASA research institutes.

NASA's Top 10 Management Challenges

Table 9B – International Agreements Prior Work

Program Area	*Reports*	*Results*
Audits	NASA Team to Review Payments to the Russian Government	The Office of Inspector General (OIG) had a representative on the NASA team that traveled to Russia to review payments made by the Agency to the Russian Government. The OIG will continue to assess this situation to identify any potential vulnerability to NASA.
Audits	Audit of NASA Control of Export-Controlled Technologies (IG-99-020)	NASA has not identified all sensitive technologies related to its major programs and does not maintain an inventory process for sensitive technologies. In addition, training of personnel in the Export Control Program needs improvement. We recommended that management ensure that all sensitive technologies are identified and protected, only qualified personnel perform export control audits, and NASA employees are trained in properly classifying and protecting sensitive technologies. Management concurred with the recommendations and has begun corrective actions.*
Audits	Audit of NASA's Moscow Liaison Office (IG-97-033)	NASA agreed to implement better management controls of its Moscow Liaison Office that supports NASA personnel on temporary duty travel to Russia. Some of the efforts included strengthening controls over travel to Russia and acquisition of support resources such as housing, vehicles, and equipment.
Audits	Russian Involvement in the International Space Station Program (IG-96-007)	The OIG reinforced GAO and congressional concerns regarding Russia as a partner in the space station because of cost schedule impacts affecting all space station partners. The Agency continued assessing various options while coordinating with partners.
Inspections	Assessment of NASA's Financial Assistance to Foreign Visitors (G-98-006)	In evaluating support of cosmonauts flying on U.S. missions pursuant to agreements between NASA and the Russian Space Agency, we recommended, among other matters, that NASA factor payments by the foreign governments into calculations of compensation by NASA (management disagreed). NASA agreed that the foreign visitor bank accounts should not be held jointly with civil servants.

NASA's Top 10 Management Challenges

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

10. Environmental Management.

NASA management has been slow in negotiating cost sharing and cost recovery agreements for the Jet Propulsion Laboratory (JPL) and the Santa Susana Field Laboratory (SSFL). In reports issued in FY's 1997 and 1998, we recommended that NASA pursue these negotiations. While negotiations have begun for JPL, they have progressed slowly. Negotiations have not begun for the SSFL. According to management, NASA has only limited legal grounds to require other Government agencies to negotiate cost sharing agreements for Resource Conservation and Recovery Act (RCRA) sites. Management also stated that a recent Defense Contract Audit Agency (DCAA) finding will allow the contractors to charge the environmental cleanup costs through their General and Administrative (G&A) expense to NASA. (DCAA has stated that environmental costs are allowable charges through G&A expense.)

We disagree with management's position. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and RCRA laws and regulations provide bases for negotiating fair cost sharing agreements between Government agencies and have been used in such negotiations. Also, DCAA's decision concerning allowing contractors to charge environmental cleanup costs through their G&A does not impact two Government agencies negotiating a fair cost sharing agreement. For example, Marshall officials negotiated a fair cost sharing agreement with Tennessee Valley Authority officials for a RCRA site at Yellow Creek, Mississippi. Also, NASA negotiated a fair cost sharing agreement with Corps of Engineer officials for a Wallops Flight Facility RCRA site.

Management has been slow in complying with NASA policies established in response to the 1997 GAO audit report for identifying potentially responsible parties and negotiating cost sharing and cost recovery agreements. NASA should pursue identifying potentially responsible parties and negotiating cost sharing and/or cost recovery agreements. NASA is paying millions of dollars to clean up its facilities that were often contaminated by other Government agencies and/or contractors. These agencies and contractors should be responsible for their fair share of the cleanup costs.

Another environmental concern relates to NASA's decommissioning of the Plum Brook Reactor Facility in Sandusky, Ohio. In 1997 we recommended that NASA begin the process of decommissioning the facility, thereby saving millions of dollars in future maintenance and disposal costs. NASA agreed and has made progress on the decommissioning. The Agency committed to the Nuclear Regulatory Commission to submit a decommissioning plan to terminate the license for the Reactor Facility at the end of 1999, and to complete the decommissioning activities by the end of 2007. The decommissioning is a sensitive issue, and the estimated costs (over $100 million) are significant.

NASA's Top 10 Management Challenges

Future Challenges Keys to effective management of environmental issues include:

- Prioritizing and addressing environmental obligations.
- Developing consistent procedures under an Agencywide policy.
- Negotiating cost-sharing agreements for environmental cleanup with previous Government and private sector tenants that are also responsible parties.

The following tables address this FY 2000 challenge. Planned projects are listed in Table 10A. Prior work is listed in Table10B. The results column in Table 10B identifies the status of significant report recommendations.

NASA's Top 10 Management Challenges

Table 10A – Environmental Management Planned Work

Program Area	***Assignment***	***Focus***
Audits	Cost Sharing for Environmental Cleanup Efforts (Carryover) A9902800	Determining whether NASA is adequately identifying potentially responsible parties and developing cost-sharing or cost-recovery arrangements with them.
Audits	National Environmental Policy Act (NEPA) Compliance (Carryover) A9902100	Evaluating NASA's compliance with NEPA provisions, which require agencies to factor environmental considerations into the planning of any Agency action.
Audits	Hazardous Waste Management	Determining whether NASA and its contractors manage hazardous wastes so that the risk for environmental harm and resulting liability is reduced while conserving natural resources.
Audits	Sale of Hazardous Material to the Public	Determining whether NASA has protected its interests by implementing controls over the sale of hazardous materials to the public.
Audits	Consolidation of Recycling and Waste Collection Efforts at Collocated Facilities	Determining whether savings can be generated by consolidating recycling and waste prevention programs and contracts at collocated facilities.
Audits	Cost Sharing for Environmental Cleanup Activities	Determining whether NASA has implemented its policy for cost sharing on environmental cleanups and has adequately justified its decisions to pursue or not to pursue other responsible parties.
Audits	Resource Conservation and Recovery Act (RCRA) Cleanup Costs	Assessing whether NASA is effectively managing RCRA sites to ensure that cleanup efforts comply with environmental directives, orders, and other agreements and that costs are contained.
Audits	ISO 14000 Implementation	Determining whether NASA's current environmental management systems meets the Agency's needs and if ISO 14000 certification will serve NASA's interests.
Investigations	Environmental Issues (Proactive Investigations)	Identifying selected contractors and facilities associated with NASA that are not in compliance with environmental laws and regulations.

NASA's Top 10 Management Challenges

Table 10B – Environmental Management Prior Work

Program Area	***Reports***	***Results***
Audits	Environmental Aspects of the External Tank Contract NAS8-36200 (IG-99-051)	The production of the external tank for the Space Shuttle still presents the potential for environmental impact. The current external tank contract has not been modified to incorporate the Federal waste reduction program as set forth under Federal Acquisition Regulation (FAR) part 52.223-10. Consequently, adverse environmental impact may not be minimized and potential recycling benefits cannot be realized. We recommended that management (1) modify the current external tank contract, if economically feasible, to include a requirement for the contractor to establish a waste reduction program that complies with the FAR requirements; and (2) ensure that the requirement for a waste reduction program is included in the Space Flight Operations Contract (SFOC). Management concurred with the intent of both recommendations. However, we do not believe that management's proposed corrective actions will ensure that a waste reduction program is included in the SFOC contract and have asked management to reconsider its position.*
Audits	Cost Sharing for Santa Susana Field Laboratory (SSFL) Cleanup Activities (IG-98-024)	The Rocketdyne contaminated portions of the SSFL during the performance of past Air Force contracts. NASA has not negotiated cost sharing agreements with responsible parties and may have overpaid $16.4 million in remediation costs. Rocketdyne may also have overcharged NASA $4.7 million in preventative costs through potential Cost Accounting Standards noncompliant allocation practices. NASA could continue to overpay $13.7 million annually. NASA has initiated corrective actions.*

(Continued)

* Recommendation(s) remain open.

NASA's Top 10 Management Challenges

Table 10B – Environmental Management Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Kennedy Space Center's Recycling Efforts (IG-98-017)	In evaluating Kennedy's efforts to maximize recycling, we found that the Center's annual progress reports for recycling goals and objectives contained inaccurate and inconsistent data, preventing reasonable measurements of program accomplishments. In addition, Kennedy lacked procedures to retain proceeds from its recycling program, which could be used to promote the Center's recycling goals and objectives. Management concurred with our recommendations and implemented corrective actions.
Audits	Lewis Research Center's Hazardous Waste Manifest Process (IG-98-014)	We found internal control weaknesses in Lewis' hazardous waste manifest process that could prevent the Center from ensuring full regulatory compliance and minimizing its liability when disposing of hazardous waste. The manifest is the key document used to track the waste throughout the disposal process. Center management concurred with our recommendations to strengthen its controls.
Audits	Efforts to Eliminate Ozone Depleting Chemicals (ODC's) from Space Shuttle Operations (February 25, 1998)	NASA's Shuttle Program has proactively reduced its use of ODC's by 90 percent by finding replacement substances and processes. Although the Agency has taken positive steps to reduce ODC's, we identified seven areas in which the Agency could improve its control over ODC's. NASA has taken or proposed actions that are responsive to our suggestions.

(Continued)

NASA's Top 10 Management Challenges

Table 10B – Environmental Management Prior Work (Continuation)

Program Area	***Reports***	***Results***
Audits	Status of Plum Brook Station Nuclear Reactors – Lewis Research Center (IG-97-038)	NASA had chosen to maintain the Plum Brook reactors in a safe-storage condition instead of decommissioning them, as recommended by expert studies. We found that NASA could save about $5.5 billion if it were to begin decommissioning now rather than in 2017, based on the avoidance of annual maintenance costs and escalating costs of radioactive waste disposal. NASA concurred with our recommendations and is identifying its best option for decommissioning. Management has been meeting regularly with the Nuclear Regulatory Commission to develop strategies.*
Audits	Cost Sharing for Cleanup Activities at the Jet Propulsion Laboratory (JPL) (IG-97-024)	Caltech, NASA's prime contractor at JPL, contaminated surrounding ground-water sources during the performance of past Army contracts. NASA had not negotiated cost sharing agreements and would have paid $114 million to clean up JPL, the majority of which is attributable to other parties. NASA is currently negotiating cost sharing agreements.*
Investigations	Partnerships With State, Local and Federal Law Enforcement Agencies Targeting Environmental Crimes	As a result of a joint investigation by NASA Office of Inspector General and other Federal and state law enforcement agencies, a contractor pled guilty to a criminal information for improperly storing and disposing of hazardous waste. The company paid $6.5 million in fines. The OIG and other agencies are pursuing civil claims.

* Recommendation(s) remain open.