National Aeronautics and
Space Administration

Office of Inspector General
Washington, DC 20546-0001

MAR 30 2005

TO: Deputy Administrator
Chief Information Officer

FROM: Assistant Inspector General for Auditing

SUBJECT: Final Memorandum on Review of Organizational Structure and Management of Information Technology and Information Technology Security Services at NASA
Assignment Number A-04-023-00
Report Number IG-05-013

The purpose of this memorandum is to bring to your attention potential Agency-wide problems with the organizational structure and authorities of information technology (IT) and information technology security (ITS) staff, which could impact the effectiveness of NASA's IT architecture, investments, management infrastructure, and services.

The Office of Inspector General (OIG) conducted a preliminary review (survey) of NASA's Agency-level and Center-level IT as well as ITS organizations so we could enhance our communications with those organizations. Our survey was limited to unclassified IT, although some of the organizations reviewed also deal with classified systems and information. To identify the IT and ITS organization structure and authorities, we interviewed Agency as well as Center IT and ITS management. We also reviewed organizational charts and Center Web sites when available.

This memorandum describes the structure of NASA's Agency-level and Center-level IT and ITS organizations as of September 2004. Even though several Centers have begun reorganizing their IT and ITS organizations and responsibilities since then, we believe our findings remain applicable and should be addressed.

We found that the NASA Office of the Chief Information Officer (CIO) has not fully determined the most efficient and effective Agency-wide organizational structure and authorities for managing and executing IT operations, including ITS. The CIO has recommended an organizational approach and responsibilities for the Center CIO position but left achieving that intent to the discretion of each Center. According to the NASA Deputy CIO for ITS, only recently was an effort made to standardize responsibilities and authorities for each of the Center IT organizations.

Varied Organizational Structure at Agency-Level and NASA Centers

NASA Policy Directive (NPD) 1000.3B, "The NASA Organization," dated November 24, 2004, states that the mission of the Office of the CIO is to manage all NASA IT investments in alignment with Agency priorities, focusing on enabling anywhere-anytime access to information and services in support of NASA's missions. Among other responsibilities, the NPD directs that the CIO ensure a consistent approach, to include appropriate collaboration, centralization, and elimination of duplicative functions, that supports an efficient and effective provision of IT services to the Agency as a whole. NASA Procedural Requirements (NPR) 2810.1, "Security of Information Technology," dated August 12, 2004, provides general responsibilities for CIOs, Information Technology Security Managers (ITSMs), and Computer Security Officials (CSOs) for ensuring IT security.

Each NASA Center had a different organizational structure for facilitating management of IT resources and ITS. Each Center developed its IT organization and infrastructure independently, and our survey identified a variety of reporting relationships, internal organizational structures, and organizational responsibilities across the Centers. That diversity could result in inconsistent and incompatible IT operations and ITS practices across NASA. Furthermore, such diversity could also inhibit effective communication within the NASA IT and ITS community due to confusion about responsibilities, management structure, and terminology.

The CIOs at the 11 NASA Centers were each at different levels of organizational hierarchy. Of the 11 CIOs, 5 were at the directorate level and reported to a Center Director and 6 were located within a functional directorate with varying levels of apparent relevance to IT. The CIO reporting relationships as of September 2004 are summarized below.

Center	**CIO Reporting Relationship**
Dryden Flight Research Center (Dryden), Glenn, Johnson Space Center (Johnson), Kennedy, Goddard Space Flight Center (Goddard)	CIO → Center Director
Ames, Marshall, Stennis Space Center (Stennis), Headquarters (HQ)	CIO → Director, Operations
Jet Propulsion Lab (JPL)	CIO → Director, Research/Engineering
Langley Research Center (Langley)	CIO → Director, Business Management

Center CIO responsibilities, in general, included Center IT and ITS policies. More specifically, responsibilities ranged from little or no operational or enforcement responsibility to authority over IT and ITS spending, managing IT and ITS contracts, or guiding IT and ITS operations. At most Centers, network and ITS operations, perimeter security, and desktop services also fell within the purview of the CIO, but at Goddard, the CIO staff was completely separate organizationally from IT and ITS operations. (Since completing our survey, several Centers have begun reorganizing their IT and ITS organizational structures.)

Limited Agency-Level Oversight of IT Operations

The Agency CIO and ITS officials had very limited oversight and influence over IT and ITS decisions at the Centers. For example, as of January 2005, the NASA CIO did not provide input for the performance assessments of Center CIOs. While the NASA CIO reviewed and concurred with NASA's major IT investments, that office had little influence over mission- and Center-specific IT investment decisions. As a result, IT purchases could be incompatible with other Centers or with NASA's Enterprise Architecture. Furthermore, IT and ITS services throughout NASA may be less efficient, cohesive, and effective because of a lack of central authority over Agency-wide IT.

Efforts are underway to increase centralized oversight and control. Those efforts include the following:

- **Consolidation of NASA's System Inventory.** As of October 2004, NASA tracked approximately 1,489 IT systems across the Agency. We found that those systems had inconsistent definitions of a system and inconsistent interpretations of requirements for each system. To be able to comply with new existing requirements and standardize the definition, risk acceptance, safeguards, and management of systems across NASA Centers and Mission Offices, the NASA CIO was working to consolidate the inventory of NASA systems and reduce the number of systems.

- **NASA Shared Services Center.** In recent years, NASA has been pursuing the OneNASA initiative by ". . . fostering more collaboration across the Agency, and promoting more efficient systems and process throughout the Agency." Consistent with that vision, the NASA Shared Services Center was developed to "provide higher quality, more cost effective and efficient services for selected NASA business and technical services," including IT services that can be managed by way of a shared services concept.

- **Development of NASA Enterprise Architecture.** Led by the NASA Office of the CIO, the Agency is developing requirements and plans for an enterprise-wide IT architecture, consistent with NASA business processes and the Federal Enterprise Architecture promoted by the Office of Management and Budget.

The NASA CIO has been implementing a governance model and a capital investment and planning process. The CIO has also been establishing a NASA Enterprise Architecture and an associated management process. However, until those efforts are fully adopted and integrated into the budget and operations for each Mission Directorate and Center, the ability of the CIO to have insight of and influence over IT and ITS organizations, operations, and budget is limited.

Minimal Analysis of Center IT and ITS Organizations, Operations, and Budgets

The NASA CIO did not compare or analyze the IT and ITS organizational structures or functional responsibilities at each Center. Also, Center IT and ITS budgets were not

systematically compared. Such analysis did not occur primarily because of the limited resources of the NASA CIO and because of a lack of centralized authority and responsibility for the management of IT resources. For example, NASA awarded a multi-year contract to conduct penetration testing as well as review the IT management infrastructure at each of the Centers. The initial performance period was 3 years, from fiscal year (FY) 2001 through FY 2003. The follow-on contract started in FY 2004. At the conclusion of each Center assessment, the contractor delivered to Center management a report on the ITS vulnerabilities discovered and an evaluation of the Center IT management structure. Centers used their own reports as they deemed appropriate.

Nothing came to our attention that would indicate any entity at NASA had aggregated, compared, and analyzed each report to determine patterns of vulnerabilities, lessons learned, or best practices to be shared among all the Centers. We found no NASA policy that specifies mandated or preferred IT and ITS organizational structures or authorities for CIO, ITSM, and CSO positions at NASA or the Centers, reporting relationships, or which organization might require which type of official.

Without a centralized understanding of all NASA IT and ITS organizations, practices, and budgets, NASA may face difficulties making Agency-wide IT decisions that work for the Centers and Mission Offices. Furthermore, without aggregation of information and a comparison of what works and what does not, best practices cannot be determined and shared throughout NASA.

Recommendations for Corrective Action

We recommend that the NASA CIO:

1. **Determine the most efficient and effective organizational structure and authorities needed to meet the intent of existing laws, regulation, and requirements governing management of IT and ITS at NASA.**

Management's Response. Management concurred with the recommendation and proposed to analyze the organizational structures at NASA, other government organizations, and industry in order to determine the most effective and efficient organizational structure and authorities needed at NASA. The results of this analysis will be captured in a white paper by September 30, 2005. The complete text of management's response is in Enclosure 2.

Evaluation of Management's Response. Management's response is responsive to the recommendation. The recommendation is resolved and will be closed upon completion and verification of management's corrective action.

2. **Recommend to the NASA Administrator any needed changes to the current structure and authorities.**

Management's Response. Management concurred with the recommendation and proposed to brief the NASA Administrator on any recommended changes within 60 days of the issuance of the white paper.

Evaluation of Management's Response. Management's response is responsive to the recommendation. The recommendation is resolved and will be closed upon completion and verification of management's corrective action.

If you have questions, or would like to discuss this matter further, please contact Mr. Brent Melson, Program Director, Information Technology at (202) 358-2588. We appreciate the courtesies and cooperation provided to the staff during this review.

for A. Dahnelle Payson

Evelyn R. Klemstine

Enclosures

cc:
Deputy Chief Information Officer for IT Security/Mr. Santiago
ARC/233-17/Chief Information Officer
ARC/233-17/IT Security Manager
DFRC/2516/Chief Information Officer
DFRC/4838/ IT Security Manager
GRC/V/Chief Information Officer
GRC/VP/ IT Security Manager
GSFC/100/Chief Information Officer
GSFC/297/ IT Security Manager
HQ/OCI/Chief Information Officer
HQ/OCI/IT Security Manager
JPL/950/Chief Information Officer
JPL/950/ IT Security Manager
JSC/IA/Chief Information Officer
JSC/IA/ IT Security Manager
KSC/IT/Chief Information Officer
KSC/IT-B/ IT Security Manager
LaRC/148/Chief Information Officer
LaRC/164/IT Security Manager
MSFC/AD30/Chief Information Officer
MSFC/AD30/ IT Security Manager
SSC/RA40/Chief Information Officer
SSC/RA40/ IT Security Manager

Status of Recommendations

Recommendation	Resolved	Unresolved	Open/ECD*	Closed
1	X		September 30, 2005	
2	X		November 30, 2005	

***Estimated Completion Date.**

Management Response

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

March 28, 2005

Reply to Attn of: **Office of the Chief Information Officer**

TO: Assistant Inspector General for Auditing

FROM: Chief Information Officer

SUBJECT: Response to the Recommendations made in the Review of Organizational Structure and Management of Information Technology and Information Technology Security Services at NASA

In response to the Review of Organizational Structure and Management of Information Technology and Information Technology Security Services at NASA, the recommendations for corrective action are as follows:

- Recommendation number 1—"Determine the most efficient and effective organizational structure and authorities needed to meet the intent of existing laws, regulation, and requirements governing management of IT and ITS at NASA."

The NASA Office of the CIO will gather bench marks on other government organizations and industry organizational structures for management of information technology and information technology security services, gather best practice information, perform an analysis of existing laws and regulations, and develop a gap analysis after comparison with existing organization model. The results of the gap analysis and recommendations for the most effective and efficient organizational structure and authorities needed to meet existing laws, regulations and requirements will be captured in a white paper by September 30, 2005.

- Recommendation number 2—"Recommend to the NASA Administrator any needed changes to the current structure and authorities."

The NASA Office of the CIO will brief the NASA Administrator on recommended changes to the current structure and authorities associated with organizational structure and management of information technology and information technology security services at NASA at the Administrator's earliest convenience within 60 days of completion of the white paper for the most efficient and effective IT and ITS organization at NASA.

Patricia L. Dunnington

cc:
OCIO/S. Santiago
OCIO/M. Castagna
NASA Center CIOs
- ARC/Karen Petraska
- DFRC/Rob Binkley
- GRC/Sasi Pillay
- GSFC/Vicki Pendergrass
- HQ/Sandra Daniels-Gibson
- JPL/Thomas Renfrow
- KSC/Bruce Hevey
- LRC/Duane Melson (Acting)
- MSFC/Jim Ellis
- SSC/ Gay Irby (Acting)

NASA Mission Directorate CIOs
- Space Operations/Chris Pino
- Aeronautics Research/Gary Cox (acting
- Science/Joe Bredekamp
- Exploration Systems/Carrie McCaslin