DECEMBER 19, 2011

AUDIT REPORT

OFFICE OF AUDITS

NASA'S INFRASTRUCTURE AND FACILITIES: AN ASSESSMENT OF THE AGENCY'S REAL PROPERTY MASTER PLANNING

OFFICE OF INSPECTOR GENERAL

National Aeronautics and
Space Administration

REPORT NO. IG-12-008 (ASSIGNMENT NO. A-11-014-00)

Final report released by:

Paul K. Martin
Inspector General

Acronyms

CoF	Construction of Facilities
CRV	Current Replacement Value
FERP	Facilities Engineering and Real Property
FY	Fiscal Year
GAGAS	Generally Accepted Government Auditing Standards
GAO	Government Accountability Office
NPR	NASA Procedural Requirements
OA	Office of Audits
OIG	Office of Inspector General
OMB	Office of Management and Budget

OVERVIEW

NASA'S INFRASTRUCTURE AND FACILITIES: AN ASSESSMENT OF THE AGENCY'S REAL PROPERTY MASTER PLANNING

The Issue

NASA's real property holdings include more than 5,000 buildings and other structures such as wind tunnels, laboratories, launch pads, and test stands. In total, these assets occupy 44 million square feet and represent more than $29 billion in current replacement value (CRV).[1] However, over 80 percent of NASA's facilities are more than 40 years old and reaching the end of their designated life spans. At the same time, the Agency is undergoing considerable changes in mission focus with the retirement of the Space Shuttle Program after 39 years and uncertainty about the facilities needed for the next space launch program. Moreover, NASA is dealing with these challenges at a time when growing budget deficits are straining the resources of all Federal agencies. This will require the Agency to make even more difficult decisions regarding its infrastructure.

For the past decade NASA, the Office of Inspector General (OIG), the Government Accountability Office (GAO), and Congress have all identified NASA's aging infrastructure as a top challenge for the Agency.[2] In the NASA Authorization Act of 2010, Congress directed the Agency to examine its real property assets and, as appropriate, downsize to fit current and future missions and expected funding levels, "paying particular attention to identifying and removing unneeded or duplicative infrastructure."[3]

In response to these concerns and in order to make the strategic decisions necessary to address its infrastructure challenges, NASA is undertaking a number of efforts including developing its first integrated Agency-wide real property master plan. According to Headquarters Facilities, Engineering, and Real Property (FERP) Division officials, NASA began their efforts to develop the Agency-wide master plan in 2008. Prior to this effort, NASA relied almost exclusively on Center-based planning and the annual

[1] Information related to asset measurement was obtained from NASA's Deferred Maintenance Assessment Report, October 1, 2010. According to NASA Procedural Requirements (NPR) 8831.2E, "Facilities Maintenance and Operations Management," November 18, 2008, the CRV is solely an escalated value and should not be used as an actual replacement cost.

[2] "NASA's Real Property Management Plan," November 2004; NASA OIG, "NASA's Top Management and Performance Challenges," November 2010; GAO, "High Risk Series: Federal Real Property: Progress Made Toward Addressing Problems, but Underlying Obstacles Continue to Hamper Reform" (GAO-07-349, April 2007); and Public Law 111-267, "NASA Authorization Act of 2010," October 11, 2010.

[3] Public Law 111-267, "NASA Authorization Act of 2010," October 11, 2010.

Construction of Facilities (CoF) prioritization process to project the Agency's infrastructure needs. However, that approach made it difficult to coordinate infrastructure needs across the Agency and to strategically align facility resources. NASA intends to use the Agency-wide master plan to better coordinate facilities resource needs across the Agency and link those needs with projected funding. Although NASA has a variety of documents and tools to assist in making strategic decisions on its facilities, Agency officials expect that the Agency-wide master plan will provide a baseline to guide planning for the infrastructure needed to meet mission requirements.

NASA's strategy for developing its Agency-wide master plan is to consolidate the individual real property plans developed by each Center. Through this consolidation, Headquarters officials intend to guide development planning, define shared programmatic objectives, integrate proposals, distribute resources, and ensure that Center plans align with overall Agency missions.

In 2009, NASA adopted a strategy to renew and modernize its facilities that established a goal to reduce the CRV of each Center's facilities by 15 percent by 2055. CRV is the metric by which NASA measures the reduction in its real property footprint. NASA subsequently established an interim goal to reduce CRV by 10 percent by 2020, which was incorporated into NASA's 2010 Center master planning initiative. In October 2009 the Assistant Administrator, Office of Strategic Infrastructure, instructed the Center Directors to update their Center facilities master plans by September 2010.

An integral part of implementing Center master plans is the annual prioritization process NASA uses to budget construction projects. Construction projects are budgeted through the CoF program, which the Agency established to provide funds to Centers for construction of new facilities, refurbishment, major repair projects, and demolition. The CoF program includes four categories of construction projects, each of which should be included in the Centers' master plans:

1. Institutional construction projects are primarily repair and revitalization projects that benefit a Center's critical infrastructure, such as the repair of electrical distribution systems. The Centers are required to submit institutional CoF projects annually to Headquarters, which then prioritizes the projects using a risk-based matrix based on probability, consequence, and other factors that may vary from year-to-year.

2. Programmatic construction projects directly benefit specific programs and are funded by the Mission Directorates.

3. Recapitalization projects are designed to restore facilities to an almost new condition and may include new construction or renovation.[4] These projects are

[4] In the Construction and Environmental Compliance and Restoration appropriation, the recapitalization program funding is included within the institutional and programmatic CoF categories, but a different prioritization process is used for institutional, programmatic, and recapitalization projects.

funded separately from the institutional CoF and therefore not prioritized using the same risk-based matrix.

4. Demolition projects are used to dispose of assets that are underutilized and do not support current or future NASA mission requirements.

NASA expected to complete its first Agency-wide master plan by the end of fiscal year (FY) 2011. However, due to other priorities NASA now expects the plan will not be completed until the end of calendar year 2011. Although intended as an internal planning document, the House of Representatives Appropriations Committee has requested a copy of the plan when it is complete.

Sound Agency-wide master planning and an effective process for prioritizing construction projects will help NASA officials make strategic decisions regarding the Agency's real property assets, especially decisions aimed at eliminating facilities that may no longer be needed. Given the importance of these issues, this OIG audit examined (1) whether NASA has an effective Agency-wide master planning process; (2) whether NASA Centers are actively reducing their footprint in accordance with NASA's facilities strategy; and (3) whether NASA has an effective approach for prioritizing projects for CoF funding. See Appendix A for details of our scope and methodology.

Results

NASA's development of the Agency's first integrated master plan is a positive step toward better managing its diverse real property assets. However, we found deficiencies within the individual Center master plans the Agency is using to develop the integrated Agency plan that may limit the Plan's usefulness for making strategic real property decisions. Specifically, we found that NASA is developing its initial master plan based on Center master plans that (1) were developed using funding assumptions for the recapitalization program that are no longer realistic and (2) are missing essential information needed to make objective Agency-wide real property decisions. In addition, 5 of the 10 Centers did not develop master plans to reduce their real property footprint in accordance with Agency goals because of uncertain mission requirements. Moreover, the restrictive criteria and competitive nature of the prioritization process the Agency used for institutional CoF projects – an integral part of implementing the Center master plans – discouraged some Centers from submitting their top priorities for funding. During the audit, NASA Headquarters and the Centers revised the CoF prioritization process in ways we believe will enable the Centers to better prioritize their CoF projects based on a wider range of information. However, these revisions are not yet reflected in NASA policy.

We acknowledge that developing an integrated Agency master plan in a fluctuating budget environment is a significant challenge for NASA. However, we believe that with improved guidance for developing the Center master plans and implementing an institutional CoF prioritization process, NASA will be in a better position to produce a more comprehensive Agency master plan, which in turn will enable the Agency to make

better strategic decisions regarding its real property assets, especially decisions that involve trade-offs between the Centers.

Development of the Agency-Wide Master Plan Is a Positive Step Toward Better Management of NASA's Diverse Real Property Assets. In our judgment, NASA's efforts to develop an integrated Agency master plan should improve management of the Agency's diverse real property assets. Specifically, a well-designed and integrated master plan should better enable the Agency to perform cross-Center assessments to identify unneeded or duplicative infrastructure and to examine opportunities for consolidation of capabilities. In the absence of an integrated Agency master plan, NASA has relied almost exclusively on Center-based planning and the annual CoF prioritization process to project the Agency's infrastructure needs, making it difficult to coordinate such needs across the Agency

Nevertheless, we found deficiencies within the individual Center master plans NASA is using to develop the master plan that may limit its usefulness for making strategic decisions regarding the Agency's real property.

The Majority of Center Plans Are Based on Funding Assumptions that Are No Longer Valid and Are Missing Required Information. At the time of our review, NASA was still developing its first integrated Agency master plan. During the FY 2012 budget process, the Office of Management and Budget (OMB) reduced NASA's proposed recapitalization budget for FY 2013 through FY 2017 by approximately 60 percent. At that time, NASA Headquarters officials had already begun consolidating the completed individual Center plans, and only 1 of the 10 plans was updated to reflect the reduced budget figure. Accordingly, the Agency-wide master plan is being developed based on Center plans that incorporate a funding projection of approximately $1.7 billion over 5 years rather than OMB's revised projection of approximately $750 million over the same 5 years. Headquarters officials told us they are reviewing their facilities strategy in light of the significance of the reduction in the recapitalization budget, and if major shortfalls persist in upcoming budget cycles officials said they will revise the strategy and issue new guidance. In the meantime, the FERP Division has not directed the Centers to update their master plans based on the new funding assumptions and has proceeded with development of the Agency-wide plan based on the existing Center plans. Given the magnitude of OMB's funding reductions, we believe a master plan that reflects the current projected funding levels expected in FYs 2013 through 2017 would better enable the Centers and the Agency to develop realistic plans to ensure the vitality of necessary infrastructure and reduce NASA's real property footprint.

In addition to using now inaccurate funding assumptions, most Center plans were missing required information such as institutional CoF funding and programmatic CoF projects and how those projects reflected NASA or Center missions. The absence of this information resulted from inadequate guidance from NASA Headquarters to the Centers regarding how to develop their master plans and a lack of communication between the Centers and the Mission Directorates. Without this information, the Agency-wide master

plan will not provide NASA managers with the comprehensive information needed to make strategic Agency-wide real property decisions to support NASA's missions.

Not All Centers Are on Track to Meet Agency Goals for Reducing NASA's Real Property "Footprint." Since FY 2005, NASA has made progress in reducing its overall footprint, disposing of 645 buildings and structures with a total CRV of $931.5 million. This represents a reduction of approximately 13 percent of NASA's total buildings and structures. However, not all Centers are on track to meet the Agency's goals in this area. As part of the 2010 master planning initiative, the FERP Division instructed the Centers to plan for a 10 percent reduction to their CRVs by 2020. However, only 5 of the 10 Centers produced plans that incorporated this goal. Center officials told us that one reason their plans do not reflect this goal is that they are reluctant to dispose of property that may be needed for future Agency missions. Given the varying mission requirements of each Center, we believe that this "across the board" reduction strategy will make it difficult for NASA to achieve its future CRV reduction goals. Instead, we believe the Agency needs a strategy that better balances its CRV reduction criteria with the mission needs of individual Centers.

Institutional CoF Prioritization Process Discouraged Some Centers from Submitting Their Top Priorities for Funding. The institutional projects that are part of each Center's master plan are budgeted through the annual CoF prioritization process and the recapitalization program. However, officials from 6 of the 10 Centers we spoke with stated that their Centers did not always submit the institutional projects considered to be the Center's top priorities because the process was overly restrictive and the applicable requirements varied from year-to-year. For institutional projects to compete for CoF funding, they had to score a high rating on the risk-based matrix, meaning that the existing facility has a high probability of a catastrophic failure in the near term, as well as receive points for other secondary factors.[5] As a result, Center officials said they prioritized institutional projects based on which facilities were the most degraded rather than which construction projects would be most useful to the Centers in meeting programmatic and Agency needs. In addition, although the CoF prioritization process occurs annually, we found that the process was not documented in NASA policy and that the submission requirements varied from year-to-year, making it difficult for Centers to effectively plan the use of their CoF funding.

We acknowledge the need for appropriate oversight of the Centers' CoF project requests to ensure that Agency-wide mission needs are met. We also realize that NASA is faced with challenging decisions when prioritizing institutional needs across the Agency. However, in our judgment a prioritization process that discourages Centers from submitting their top priorities – whether or not these priorities are ultimately funded –

[5] Secondary factors are additional point-earning categories Headquarters uses to further prioritize the projects that have the same risk-based matrix score. These factors and the points available can change each year. The following are examples of factors included in the FY 2013 CoF program submission guidelines: increase infrastructure reliability; life-cycle cost; Center priority; health, safety, and security; and sustainability.

leaves NASA managers without key information needed to assess and prioritize the real property needs of the Agency.

During the course of our audit, NASA Headquarters and Center officials revised the institutional CoF prioritization process for FY 2014. The revised process retains the risk-based matrix, but eliminates the current secondary factors and prioritizes projects using a more consistent set of risk assessment measures including mission dependency, Center priority, and facility/system condition. We believe the revisions to the CoF prioritization process are positive developments that will enable Centers to better prioritize CoF projects based on a wider range of information. In our judgment, updating the new prioritization process in NASA policy would help facilitate its implementation.

Conclusion. NASA faces significant infrastructure challenges as it works to meet current and future mission requirements and to comply with the 2010 NASA Authorization Act's directive to reduce the Agency's infrastructure to meet current and future missions and expected funding levels. Given these challenges, the Agency must effectively plan and prioritize its infrastructure needs. While development of NASA's first Agency-wide master plan is a positive step toward addressing these challenges, we believe improved guidance is needed to facilitate the development of future updates to the plan. Moreover, until NASA develops a plan that reflects current anticipated funding levels and is fully representative of the needs of the Agency and the Centers, it will be challenging for the Agency to prioritize its needs to ensure the vitality of its infrastructure and reduce its real property footprint. In addition, we question NASA's "across the board" real property reduction strategy that requires the same level of reduction from each Center regardless of their individual missions. We believe that with improved guidance on the Center master planning process and the institutional CoF prioritization process, NASA will be in a better position to produce a more comprehensive Agency master plan, which will support NASA officials in making strategic decisions regarding its real property assets, especially those decisions involving trade-offs between Centers.

Management Action

To improve NASA's ability to make effective strategic management decisions regarding real property, we recommended that the Assistant Administrator for the Mission Support Directorate direct the FERP Division to (1) provide clear guidance to the Centers on the information that should be included in Center master plans to ensure that similar information is captured for all Centers; (2) ensure plans to reduce the Agency's real property footprint more fully consider the specific missions of the individual Centers when setting real property reduction requirements; and (3) update NASA policy to better reflect the current risk-based process for prioritizing institutional CoF projects.

In response to a draft of our report, the Associate Administrator for the Mission Support Directorate concurred with our recommendations. We consider the Associate Administrator's proposed actions to be responsive to our recommendations. The recommendations will be closed upon completion and verification of the corrective

actions. While the Associate Administrator concurred with the recommendations, he did not concur with the report itself and stated that the report contained "many inaccuracies." Specifically, he noted that the funding assumptions for the current Agency-wide master plan were valid when Centers began developing their master plans and that the current Agency master plan would serve as a baseline from which NASA can make deviations and decisions on future investments.

We strongly disagree that our report contains inaccurate information. Consistent with our usual process, we carefully considered management's technical comments to our draft and incorporated the information where appropriate. In addition, we followed the quality control procedures required by Federal government auditing standards, including submitting the report for an independent verification of the findings and supporting evidence.

With regard to the example cited by the Associate Administrator, we agree that the Center master plans were developed based on funding assumptions that were valid at the time the plans were prepared, and we do not suggest otherwise in our report. Rather, the report simply points out that given the magnitude of the subsequent funding reductions, a master plan that reflects the current projected funding levels expected in FYs 2013 through 2017 would better enable the Centers and the Agency to develop realistic plans to ensure the vitality of necessary infrastructure and reduce NASA's real property footprint. Moreover, we specifically noted in the report that NASA officials expect the Agency-wide master plan will provide a baseline to guide planning for the infrastructure needed to meet mission requirements.

The full text of the Associate Administrator's comments is provided in Appendix B.

CONTENTS

INTRODUCTION

Background

NASA is the ninth largest Federal Government property holder, with real property holdings that include more than 100,000 acres and more than 5,000 buildings and other structures encompassing more than 44 million square feet. NASA's property holdings are located throughout the world and include commercial office buildings, warehouses, test stands, laboratories, wind tunnels, launch pads, antenna arrays, airfields, roads, and utilities. In total, the assets represent more than $29 billion in current replacement value (CRV).[6] However, over 80 percent of NASA's facilities are more than 40 years old and reaching the end of their designated life spans. This results in significant infrastructure challenges for NASA, such as ensuring its aging real property is available and in a suitable condition to meet current and future mission requirements. At the same time, the Agency is undergoing considerable changes in mission focus, with the Space Shuttle Program ending after 39 years and uncertainty about what facilities will be needed for the next space launch program. Moreover, NASA is grappling with the challenge of its aging infrastructure at a time when growing budget deficits are straining the resources of all Federal agencies. This will require the Agency to make even more difficult decisions regarding its infrastructure.

For the past decade, the Agency's aging infrastructure has been identified by NASA, the Office of Inspector General (OIG), the Government Accountability Office (GAO), and Congress as a top management challenge.[7] The NASA Authorization Act of 2010 directed NASA to examine its real property assets and, as appropriate, downsize to fit current and future missions and expected funding levels, "paying particular attention to identifying and removing unneeded or duplicative infrastructure." Congress noted that, "in a number of areas NASA finds itself 'holding onto' facilities and capabilities scaled to another era." Specifically, the Act requires NASA to develop and provide to Congress by October 11, 2011, a comprehensive study that examines NASA's structure, organization, and institutional assets and identifies a strategy for evolving toward the most efficient retention, sizing, and distribution of infrastructure consistent with NASA's missions and mandates.

[6] Information related to asset measurement was obtained from NASA's Deferred Maintenance Assessment Report, October 1, 2010. According to NPR 8831.2E, "Facilities Maintenance and Operations Management," November 18, 2008, the CRV is solely an escalated value and should not be used as an actual replacement cost.

[7] "NASA's Real Property Management Plan," November 2004; NASA OIG, "NASA's Top Management and Performance Challenges," November 2010; GAO, "High Risk Series: Federal Real Property: Progress Made Toward Addressing Problems, but Underlying Obstacles Continue to Hamper Reform" (GAO-07-349, April 2007); and Public Law 111-267, "NASA Authorization Act of 2010," October 11, 2010.

Agency-Wide Master Plan. A central part of NASA's infrastructure planning effort is the development of its first real property Agency-wide master plan. According to NASA Headquarters, Facilities, Engineering, and Real Property (FERP) Division officials, NASA began this effort in 2008 with the development of an Agency facilities strategy, known as the "similar/smaller" strategy, which Agency leadership adopted in March 2009. NASA's strategy is to "renew and modernize its facilities to sustain its capabilities, and to accommodate those capabilities in the most efficient facilities set practical." The facilities strategy established a goal to reduce CRV by 15 percent by 2055. NASA subsequently established an interim goal to reduce CRV by 10 percent by 2020, which was incorporated into NASA's 2010 Center master planning initiative.

In October 2009, the Assistant Administrator, Office of Strategic Infrastructure, instructed the Center Directors to update their Center facilities master plans by September 2010 in order to progress toward an integrated Agency master plan for facilities. According to the Assistant Administrator's memorandum to the Centers, an Agency master plan is a "necessary step to ensure that NASA invests its limited funds in an optimal alignment with our mission, and to provide a strong connection between institutional funding and mission success." The updated Center master plans were completed in FY 2010 and NASA's Agency-wide master plan is being developed by consolidating these plans. Through this consolidation effort, Headquarters officials are hoping to guide development planning, define shared objectives, integrate proposals, distribute resources, and ensure that Center plans align with the Agency's mission.

Prior to this effort, NASA relied almost exclusively on Center-based planning and the annual Construction of Facilities (CoF) prioritization process to project the Agency's infrastructure needs. However, this approach made it challenging to coordinate infrastructure needs across the Agency and to strategically align facility resources.[8] Although NASA has a variety of documents and tools to assist management in making strategic decisions on its facilities, officials hope that an Agency-wide master plan will provide a baseline to guide the Agency with respect to the infrastructure needed to meet mission requirements. In addition, according to NASA's 2011 Strategic Plan, active management in master planning helps gain efficiencies by eliminating redundancies and assets that no longer benefit the Agency.

According to NASA policy, each Center is required to maintain a Center master plan for facility planning and budgeting activities.[9] In addition, Center master plans should meet the following requirements:

- be a living document, addressing a planning horizon of not less than 20 years, and be kept current with changes to the Center's mission, facilities, and infrastructure;

[8] The CoF program is within the Construction and Environmental Compliance and Restoration account and integrates institutional and programmatic facilities projects with the 5-year recapitalization plan, to ensure space and aeronautics programs have the required facilities to accomplish their missions.

[9] NPR 8810.1, "Master Planning Procedural Requirements," dated April 28, 2005.

- provide a comprehensive presentation of existing and projected assets to meet the mission needs of the Center, and explain how those assets relate to the present and future mission of the Center and how they relate within the context of the Center and its interrelationship with its surrounding area, the local community, and national policy;

- provide a narrative, statistical, and graphic record of existing conditions (natural features, buildings, structures, utilities, transportation systems, and other improvements) at the Center;

- include current, as well as proposed capabilities necessary to support program requirements, as well as facilitate coordination with Center-supported programs and customers as well as Center stakeholders; and

- be used as a tool in the development of Center budgets and in program and project planning.

NASA policy also states that the Center master plans should be the links between the programs and projects and the requirements for Center development and should provide the information needed to make well-informed decisions. In addition, according to FERP officials, the Center plans should link to the Agency's goals both broadly and specifically. The broad linkages should be based on each Center's part in accomplishing NASA's mission. The specific linkages should relate to the Agency's strategy to reduce its facilities footprint and to the Center's assets that support mission activities. The FERP Division is in the process of updating NASA policy and creating a supplemental master planning handbook to provide additional guidance to the Centers for their planning efforts.

FERP officials expected to complete the first version of the Agency's master plan by the end of FY 2011; however, due to other reporting priorities such as the comprehensive study required by the NASA Authorization Act of 2010, NASA officials said they expect the plan to be completed by the end of calendar year 2011. Although the plan is intended as an internal NASA document, the House of Representatives Appropriations Committee has requested a copy.

NASA's Construction of Facilities Program. According to FERP officials, the strategies outlined in the Center master plans assist Centers in determining where to focus institutional improvements. An integral part of implementing Center master plans is the CoF program, which NASA uses to budget construction projects. The CoF program was established to ensure that NASA's science, space, and aeronautics programs have the facilities needed to accomplish their missions, and one of the goals of the program is to support and implement the facilities strategy. The CoF program encompasses discrete projects with initial cost estimate over $10 million, minor construction and revitalization between $1 million and $10 million, facilities planning and design, and demolition. Projects with initial cost estimates of $1 million or less are accomplished through day-to-day facility maintenance and repair activities provided for in program and Center

operating budgets. The CoF program is managed through NASA's Capital Facility Investment program, which established four separate categories of construction projects: (1) institutional, (2) programmatic, (3) recapitalization, and (4) demolition.[10]

Institutional Construction Projects. Institutional construction projects are primarily repair and revitalization projects to benefit a Center's critical infrastructure. For example, projects to repair electrical distribution or potable water systems are considered institutional projects. The Centers annually submit institutional CoF projects to Headquarters. Projects are prioritized by a team that includes representatives from the NASA Office of Strategic Infrastructure, Mission Directorates, Centers, and other functional leadership offices, using a risk-based matrix of probability and consequence, as well as secondary factors used to further prioritize projects that have the same risk-based matrix score. The submission requirements, including the secondary factors, may change from year-to-year. An example of the factors included in the FY 2013 CoF program submission guidelines are: increased infrastructure reliability; life-cycle cost; Center priority; health, safety, and security; and sustainability. The Centers submit their CoF projects 2 years in advance of the budget year of the project. For example, in FY 2011, the Centers submitted projects for funding in the FY 2013 budget.

Programmatic Construction Projects. Programmatic construction projects directly benefit specific Agency programs and are funded by Mission Directorates. The programs are responsible for evaluating and prioritizing facilities needs against other program priorities. The individual Mission Directorates collaborate with the Centers and the FERP Division in implementing the projects.

Recapitalization Program. NASA's recapitalization program was established in FY 2011 in response to the inclusion of facilities renewal as a prominent part of the Agency facilities strategy. The recapitalization program includes projects that are funded separately from the institutional CoF projects and therefore not prioritized using the same risk-based matrix. The recapitalization program was designed to fund projects that (1) have estimated costs of $10 million or more, (2) have strategic replacement or renovation initiatives to restore the facilities to an almost new condition, (3) are consistent with the current Center master plan, and (4) support Agency and mission strategy. NASA's first 5-year recapitalization plan of $1.7 billion was reduced by the Office of Management and Budget (OMB) in the FY 2012 budgeting process to approximately $750 million, requiring NASA to develop a new 5-year plan as part of the FY 2013 budget cycle.

Demolition Program. NASA's demolition program disposes of assets that are underutilized and do not support current or future NASA mission requirements. According to FERP officials, NASA has had an active demolition program since 2004.

[10] In the Construction and Environmental Compliance and Restoration appropriation, the recapitalization program funding is included within the institutional and programmatic CoF categories, but a different prioritization process is used for institutional, programmatic, and recapitalization projects.

From FY 2006 through FY 2010, NASA demolished 332 buildings and structures, thereby reducing its CRV by $703.4 million.

Table 1 shows the amount of money spent by NASA on CoF projects between FY 2006 and FY 2010. During this period, NASA spent approximately $1.91 billion on CoF projects, including $64.9 million for demolition of facilities. In contrast, the total NASA appropriation during this period was $86.7 billion; therefore, the money spent on CoF projects was 2.2 percent of the total NASA appropriations.

Table 1: Dollars Spent on Institutional and Programmatic CoF Projects from FY 2006 through FY 2010 (in millions)

CoF Projects	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Totals
Institutional						
Discrete Projects	$ 48.4	$ 44.6	$ 94.5	$133.4	$126.4	$447.3
Minor Construction and Revitalization	115.5	75.1	105.6	81.6	84.9	462.7
Facility Planning and Design	26.2	14.8	34.5	38.9	23.0	137.4
Demolition	10.4	10.1	14.4	15.0	15.0	64.9
Labor and Travel	0.0	15.8	0.0	0.0	0.0	15.8
Subtotal	$200.5	$160.4	$249.0	$268.9	$249.3	$1,128.1
Programmatic						
Discrete Projects	$137.4	$174.5	$ 88.4	$ 92.5	$ 85.1	$577.9
Minor Construction and Revitalization	42.7	20.1	28.7	29.2	46.4	167.1
Facility Planning and Design	5.6	19.9	0.0	0.0	8.6	34.1
Subtotal	$185.7	$214.5	$117.1	$121.7	$140.1	$779.1
Total CoF	**$386.2**	**$374.9**	**$366.1**	**$390.6**	**$389.4**	**$1,907.2**

Objectives

Our objectives were to determine whether NASA has an effective Agency-wide master planning process; whether NASA Centers are actively reducing their footprint in accordance with NASA's facilities strategy; and whether NASA has an effective approach for prioritizing projects for CoF funding. We also reviewed internal controls as they relate to the audit objectives. See Appendix A for details of the audit's scope and methodology, our review of internal controls, and a list of prior coverage.

IMPROVED GUIDANCE WOULD FACILITATE FUTURE UPDATES OF NASA'S AGENCY-WIDE REAL PROPERTY MASTER PLAN

NASA is developing its first integrated Agency master plan, which is a positive step toward better management of the Agency's diverse real property assets. However, we found deficiencies within the individual Center master plans NASA is using to develop the Agency plan, which may limit the plan's usefulness for making strategic real property decisions. Specifically, we found that the initial Agency master plan is being developed based on Center master plans that rely on funding assumptions for the recapitalization program that are no longer valid. In addition, most of the Center plans are missing essential information needed to make objective Agency-wide real property decisions. Moreover, because of uncertainty regarding mission requirements, 5 of the 10 Centers did not develop their master plans in accordance with NASA's goals for reducing the Agency's footprint. Finally, the restrictive criteria and competitive nature of the prioritization process for institutional CoF projects NASA used until recently discouraged some Centers from submitting their top priorities for funding.

During the audit, NASA Headquarters and the Centers revised the CoF prioritization process. We believe the revisions are positive developments that will enable the Centers to better prioritize their CoF projects based on a wider range of information. However, as of November 2011, NASA policy had not been updated to reflect these changes. In our judgment, updating the new prioritization process in NASA policy would help facilitate its implementation.

We acknowledge that developing an integrated Agency master plan in a fluctuating budget environment is a significant challenge. However, we believe that improved guidance regarding the Center master planning process and the institutional CoF prioritization process, will put NASA in a better position to produce a comprehensive Agency master plan, which in turn will enable the Agency to make more informed strategic decisions regarding its real property assets, especially decisions that involve trade-offs between the Centers.

Development of an Agency-Wide Master Plan Is a Positive Step Toward Better Management of NASA's Diverse Real Property Assets

In our judgment, NASA's efforts to develop an integrated Agency master plan should improve management of NASA's diverse real property assets. Specifically, a well-designed and integrated master plan should better enable the Agency to perform cross-Center assessments to identify and eliminate unneeded or duplicative infrastructure and

to examine opportunities for consolidation of capabilities. This in turn should facilitate NASA's efforts to more efficiently manage its facilities and reduce its real property footprint. In the absence of an integrated Agency master plan, NASA relied almost exclusively on Center-based planning and the annual CoF prioritization process to project the Agency's infrastructure needs, which made it difficult to coordinate infrastructure needs across the Agency and strategically align facility resources to meet mission needs.

The Majority of Center Plans Are Based on Funding Assumptions that Are No Longer Valid and Are Missing Required Information

NASA plans to develop its first integrated Agency master plan by consolidating existing Center master plans. At the time of our review, NASA was still developing this master plan. However, we found deficiencies within the individual Center master plans upon which the Agency master plan will be based which may limit the master plan's usefulness for making strategic real property decisions. Specifically, all but one of the Center plans are based on funding levels that are no longer valid and many of the plans are missing essential information, such as institutional CoF funding, programmatic CoF projects, and how those projects relate to NASA or Center missions. By consolidating these incomplete Center master plans, the Agency master plan may not provide a comprehensive and realistic plan for prioritizing infrastructure needs and reducing NASA's real property footprint.

NASA's Initial Agency-Wide Master Plan Is Not Expected to Reflect Current Projected Funding Levels. To develop an Agency master plan, the Assistant Administrator, Office of Strategic Infrastructure requested in FY 2010 that each Center update its existing individual master plan. However, instead of requesting each Center to provide a formal master plan per NASA policy, FERP accepted alternate documentation in the form of master planning briefing packages (see Table 2).[11] This documentation included projects for institutional and programmatic CoF projects as well as recapitalization projects for the next 20 years in 5-year increments. At the time the Center plans were being developed, NASA's planning figure for the recapitalization program was approximately $1.7 billion over 5 years (FY 2013 through FY 2017).

In early 2011, FERP officials approved the individual Center planning documentation (referred to as Center plans) and began consolidating them into the Agency master plan. However, during the FY 2012 budget process, after the Center plans were completed, OMB reduced NASA's proposed recapitalization budget from approximately $1.7 billion to $750 million –approximately 60 percent less than the amount NASA had used in its

[11] NPR 8810.1, "Master Planning Procedural Requirements," dated April 28, 2005. The master planning briefing package included the leadership briefing and Capital Investment Program Plan. The leadership briefing is a summarized version of a formal Center master plan in presentation slide format, and included a summary of metrics. The Capital Investment Program Plan should identify all investments planned by the institution or by programs regardless of funding source. However, institutional CoF is identified as a lump-sum amount of funding for each year rather than by specific project.

planning. Only 1 of the 10 Centers – Johnson Space Center – updated its master plan to reflect the new recapitalization budget. As a result, the 2011 Agency master plan is being developed based on Center plans that for the most part do not reflect anticipated funding levels.

FERP has not directed the Centers to update their 2010 master plans to reflect current anticipated funding levels. According to FERP officials, they are reviewing their facilities strategy based on the severity of the reduction in the recapitalization budget and, if major shortfalls persist in upcoming budget cycles, will revise the strategy, issue new guidance, and direct the Centers to update their master plans.

We acknowledge that developing an Agency-wide master plan in a changing budget environment presents significant challenges. While senior agency officials note that the Agency master plan is a living document that should be updated every year based on new funding expectations, they concede that significant changes to expected funding levels may require significant deviations from the plan. As such, we believe that a plan that reflects currently projected funding levels will better enable the Centers and the Agency to prioritize infrastructure needs to ensure the vitality of necessary infrastructure and reduce NASA's real property footprint.

Inadequate Guidance and Lack of Communication Resulted in Missing and Inconsistent Information. In addition to using outdated funding assumptions, most Center master plans also did not explain how the real property needs identified reflect current and future Center missions. Specifically, we found that since FY 2010 only 3 of the 10 Centers had developed formal Center master plans in accordance with NASA policy and explained how the construction projects identified in their plan were linked to NASA's or the Center's mission. The remaining Centers developed a master planning briefing package that did not explain how the projects identified were related to NASA's or the Center's mission. Without a defined link between identified projects and a NASA or Center mission, the Center master planning documents do not provide the substantive information that will help NASA officials identify the projects that most closely align with Agency priorities.

In addition, according to a memorandum from the Assistant Administrator, Office of Strategic Infrastructure, one of the goals of the 2010 master planning effort was to quantify and prioritize the institutional and program assets to show what can be accomplished within budget projections. According to FERP officials, the Capital Investment Program Plan, which is submitted as part of the Center master planning documentation, should include all investments planned by the institution or by programs, regardless of funding source. However, we found that 5 of the Centers excluded programmatic CoF projects from their master planning documentation and 1 excluded institutional CoF funding (see Table 2).

Table 2: Variances among Center Master Planning Documentation[a]			
NASA Center	**Formal Center Master Plan updated since FY 2010**	**Projects Linked to NASA Mission**	**Types of Projects/Funding Excluded[a]**
Ames Research Center	No	No	Programmatic CoF
Dryden Flight Research Center	No	No	None
Glenn Research Center	No	No	None
Goddard Space Flight Center[b]	No	No	Programmatic CoF
Jet Propulsion Laboratory	Yes[c]	Yes	None
Johnson Space Center	No	No	None
Kennedy Space Center[d]	No	No	Programmatic CoF
Langley Research Center	Yes	Yes	Programmatic CoF
Marshall Space Flight Center	No	No	Institutional CoF Programmatic CoF
Stennis Space Center	Yes	Yes	None

[a] Data obtained from the Center Master Plans, leadership briefings, and Capital Investment Program Plans, presented to NASA Headquarters for the 2010 master planning initiative.

[b] Goddard officials stated that they did not include programmatic CoF projects because they did not anticipate any new construction for any new capability for their Center.

[c] Jet Propulsion Laboratory only included recapitalization projects in their Center Master Plan per direction from NASA Headquarters, but each type of project was included in their Capital Investment Program Plan.

[d] Kennedy Space Center submitted a 10-year plan, instead of a 20-year plan required by NASA policy.

To some extent, these inconsistencies were the result of inadequate guidance from Headquarters to the Centers regarding the elements that should be included in the Center master plans. Specifically, FERP officials provided the Centers with master planning guidance in the form of assorted e-mails, verbal instructions, and presentation slides. While some Centers believed the guidance was sufficient, officials from 4 of the 10 Centers stated that the piece-meal method in which the guidance was disseminated led to confusion about the requirements.

In addition, officials we spoke with at 5 of the 10 Centers reported that communication between Center facilities offices and the Mission Directorates was inadequate. For example, Kennedy Space Center and Goddard Space Flight Center officials stated that their program offices do not coordinate with the Center facility offices in a timely manner once they become aware of a potential need. According to Center officials, the delays in coordinating with Center facilities offices limit the potential options available to address programmatic facility needs.

Center officials also told us they excluded from their plans much of the information related to programmatic CoF because they were unclear about the long-term mission needs of particular projects. For example, although we found Dryden Flight Research Center included some programmatic projects in their plans, Center officials stated that it

was difficult to obtain project requirements from the Aeronautics Research Mission Directorate because the Directorate did not have a 10–20 year road map to indicate future needs.

According to FERP officials, the Agency master plan is intended to identify the overall direction for the Centers and not necessarily include a comprehensive list of CoF projects. However, in our judgment without the inclusion of all types of construction projects, Center plans will not reflect the full scope of construction activities planned by the Centers. Therefore, the resulting Agency master plan may underestimate the amount of funds needed to execute the plan by hundreds of millions of dollars over the 20-year planning period. Moreover, without consistent and complete Center plans, the Agency-wide master plan may not provide NASA managers with comprehensive and reliable information to make strategic Agency-wide real property decisions to support NASA's missions.

Not All Centers Are on Track to Meet the Agency's Goals for Reducing NASA's Real Property "Footprint"

As shown in Table 3, the total square footage of NASA's facilities grew by approximately 2.8 million square feet since FY 2003 due to new construction and real property transfers from other Agencies.[12] Since FY 2009, the total square footage has increased by 1.7 million square feet; however, that increase is due almost entirely to the transfer of a 1.6 million square foot facility to Stennis Space Center from the Army in 2011, as a result of the Base Realignment and Closure process.

[12] Since the most recently completed CoF budgeting cycle covered FY 2013, and because construction projects cover multiple years, we chose 2003 as a starting point to provide a 10-year outlook for our analysis.

Table 3: Center Square Footage Changes FY 2003 through FY 2011 and CRV Goals and Planned Changes from FY 2013 through FY 2020[a]

NASA Center	Square Footage Increases/ (Decreases) FYs 2003 – 2008	Square Footage Increases/ (Decreases) FYs 2009 – 2011	Plan to Meet 10 Percent CRV Reduction by 2020	Planned CRV Increases/ (Decreases) FYs 2013 – 2020[b]
Ames Research Center	103,568	(148,304)	Yes	(17.3%)
Dryden Flight Research Center	426,478	26,000	No	(5.6%)
Glenn Research Center	(11,972)	(445,561)	Yes	(10.0%)
Goddard Space Flight Center	(6,027)	204,027	No	(3.5%)
Jet Propulsion Laboratory	(36,298)	190,936	No	7.6%
Johnson Space Center	94,159	(60,613)	No	(6.8%)
Kennedy Space Center	201,498	(75,806)	No	(5.1%)
Langley Research Center	(131,219)	(17,176)	Yes	(15.0%)
Marshall Space Flight Center	202,707	9,852	Yes	(11.7%)
Stennis Space Center	258,668	1,981,863[c]	Yes	(10.0%)
Square Footage Increase	**1,101,562**	**1,665,218**		
Total Increase FY 2003 -2011	**2,766,780**			
Average CRV Reduction				**(7.7%)**

[a] Data provided by the Centers.

[b] Data obtained from master planning briefing packages presented to NASA Headquarters for the 2010 master planning initiative.

[c] In 2011, Stennis Space Center took possession of the former Mississippi Army Ammunition Plant, a 1.6 million square foot facility, from the U.S. Army as a result of the Base Realignment and Closure process.

Nevertheless, NASA's goal is to reduce its overall footprint and the Agency has taken steps toward this goal. For example, according to FERP officials, since FY 2005 NASA has disposed of 645 buildings and structures with a total CRV of $931.5 million.[13] This represents a reduction of approximately 13 percent of NASA's total buildings and structures. In addition, NASA is currently in the process of disposing of six sites through transfers and sales to other entities. Furthermore, between 2011 and 2015 NASA has more than 140 demolition projects planned, including infrastructure that will not be needed now that the Space Shuttle Program has ended.

[13] The Agency uses CRV to measure facility reduction progress because it better reflects certain high-dollar NASA assets. For example, many of the Agency's large capabilities – such as test stands, launch pads, and underground utilities – do not have square footage directly associated with them. Accordingly, tracking progress by reduction in square footage would not capture changes relating to these types of assets. However, some Center officials we spoke with questioned the use of the CRV metric because it is an escalated value, does not represent actual replacement cost, and does not consider mission requirements. Agency officials told us they are evaluating other units of measurement that may better reflect their goals.

We found that not all Centers are on track to meet the Agency's goals for reducing its real property footprint. Specifically, as part of the 2010 master planning initiative the FERP Division instructed the Centers to produce plans that reflect a reduction in their CRVs of 10 percent by 2020. However, only 5 of the 10 Centers reported that they would be able to meet this goal (see Table 3).

Some Centers stated that they are not able to meet the Agency's real property reduction goal because they are reluctant to dispose of property they believe may be needed for future missions. For example, officials from the Kennedy and Johnson Space Centers said that mission uncertainties involving human space exploration after retirement of the Space Shuttle program have resulted in their reluctance to meet the CRV reduction goals because they are not sure what facilities may be needed for the next space launch program. Johnson Space Center officials also noted that the majority of the Center's CRV is represented by multi-program facilities, which prevent them from targeting these facilities for disposal. In addition, Center officials noted that because some of the aeronautics and research Centers were unaffected by the retirement of the Shuttle Program their missions continue to grow.

According to FERP officials, the Agency's efforts to reduce its real property is challenging because there is no document that identifies the key missions, technologies, and programs that NASA intends to pursue over the next 20 to 30 years. Although the overall NASA strategic plan discusses NASA goals at a very high level, according to FERP officials it is not specific enough to provide facilities planners with sufficient information to develop plans at the Center level. In the absence of a strategy that describes the Agency's major endeavors and the major capabilities the Agency must maintain, expand, or reduce to pursue those endeavors, master planners said they must work from Center "best guesses." This in turn results in a conservative "keep it in case we need it" approach to master planning rather than one that proactively reconfigures the Agency's infrastructure to meet specific mission requirements.

Given the varying missions of each Center, requiring the same "across the board" 10 percent CRV reduction from each Center does not give adequate weight to the Centers' differing mission-related requirements. Moreover, applying the same "across the board" criteria ignores the possibility that some Centers may be in a position to achieve CRV reductions that exceed the 10 percent Agency goal. Therefore, we believe it will be difficult for the Agency to achieve its future CRV reduction goals without a strategy that better balances its CRV reduction criteria with the mission needs of the individual Centers, especially given the significant reductions to the proposed recapitalization budget.

Institutional CoF Prioritization Process Discouraged Some Centers from Submitting Their Top Priorities for Funding

The institutional construction projects that make up the individual Center master plans are budgeted through the annual CoF prioritization process and the 5-year recapitalization program. During our audit, officials from 6 of the 10 Centers stated that the way in which NASA structured the CoF prioritization process sometimes caused Centers not to submit their top infrastructure priorities (see Table 4). Instead, to ensure that their Centers were able to compete with other Centers for funding, Centers submitted projects they believed would be competitive based on the guidelines provided by Headquarters. Specifically, these officials reported that NASA's process is overly restrictive and that the requirements change too frequently.

Table 4: Institutional CoF Projects Submitted May Not Always Reflect Actual Center Top Priorities

NASA Center	Data Call Criteria Restricted Centers from Submitting their Top Center Priorities?
Ames Research Center	Yes
Dryden Flight Research Center	Yes
Glenn Research Center	No
Goddard Space Flight Center	No
Jet Propulsion Laboratory	No
Johnson Space Center	No
Kennedy Space Center	Yes
Langley Research Center	Yes
Marshall Space Flight Center	Yes
Stennis Space Center	Yes

The institutional CoF prioritization process categorizes and prioritizes Center projects by using a risk-based matrix, essentially a scoring system for facilities projects based on probability and consequence of occurrence, with the highest possible score of 5 for very high consequence by 5 for very high probability. For facilities projects to compete effectively for CoF funding, they have to score a high rating on the risk-based matrix, meaning that their failure has a high probability of catastrophic consequences in the near term.

In addition to the risk-based matrix score, Headquarters further assesses CoF projects using secondary factors to prioritize among projects that have the same risk-based matrix score. These factors may include improved life-cycle costs; Center priority; and health, safety, and security and these factors may vary from year-to-year. Center officials told us the variable nature of these factors makes it difficult to incorporate them into planning for projects. In addition, although the CoF prioritization process occurs annually, we found

that the process was not documented in NASA policy and that the submission requirements varied from year-to-year, making it difficult for Centers to effectively plan use of their CoF funding.

According to Center officials, the use of the risk-based matrix coupled with secondary requirements that change frequently, forces them to submit the projects that are the most competitive instead of the projects Center officials believe are their highest priorities. Consequently, some Center officials said that they often prioritize projects based on the most degraded facilities rather than on what would be most useful for the Centers in meeting programmatic and Agency missions. According to FERP officials, the Centers are not restricted from submitting their top Center priorities, and noted that the annual CoF guidance requests that each Center submit an unconstrained list of institutional projects to support near term infrastructure requirements. However, Center officials said that the time and effort required to prepare an unconstrained list of projects is not worthwhile given the low likelihood such projects would be considered for funding.

FERP officials told us that the CoF prioritization process was established to identify the Agency's greatest needs and said they believe the process adequately accomplishes this goal, especially in light of the limited amount of CoF funding available.

We acknowledge the need for appropriate oversight of the Centers' CoF project requests to ensure that Agency-wide mission needs are met. We also realize that NASA is faced with challenging decisions when prioritizing institutional needs across the Agency. However, in our judgment a prioritization process that discourages Centers from submitting their top priorities – whether or not these priorities are ultimately funded – leaves NASA managers without key information needed to assess and prioritize the real property needs of the Agency.

During the course of our audit, NASA Headquarters and Center officials revised the institutional CoF prioritization process for FY 2014. The revised process retains the risk-based matrix, but also solicits information regarding such factors as mission dependency, Center priority, and facility/system condition. Center officials believe the new process will be an improvement because the new guidance provides additional detail on assessing projects and includes risk assessment measures for the Centers to use when identifying risk and probability.[14] We believe these improvements to the CoF prioritization process are positive developments that will enable the Centers to better prioritize CoF projects based on a wider range of information. In our judgment, updating the new prioritization process in NASA policy would help facilitate implementation.

[14] In August 2011, the OIG reported that the data in NASA's primary system for rating mission dependency and facility condition was unreliable for evaluating NASA's real property assets. Based on that report, NASA management is making improvements to the guidance and process for rating mission dependency and facility condition. Report No. IG-11-024, "NASA Infrastructure and Facilities: Assessment of Data Used to Manage Real Property Assets," August 4, 2011.

Conclusion

NASA faces significant infrastructure challenges as it works to meet current and future mission requirements and to comply with the 2010 NASA Authorization Act directive to reduce the Agency's infrastructure to meet current and future missions and expected funding levels. Given these challenges, the Agency must effectively plan and prioritize its infrastructure needs. While development of NASA's first Agency-wide master plan is a positive step toward addressing these challenges, we believe improved guidance is needed to facilitate the development of future updates to the plan. Moreover, until NASA develops a plan that reflects current anticipated funding levels and is fully representative of the needs of the Agency and the Centers, it will be challenging for the Agency to prioritize its needs to ensure the vitality of its infrastructure and reduce its real property footprint. In addition, we question NASA's "across the board" real property reduction strategy that requires the same level of reduction from each Center regardless of their individual missions. We believe that with improved guidance on the Center master planning process and the institutional CoF prioritization process, NASA will be in a better position to produce a more comprehensive Agency master plan, which will support NASA officials in making strategic decisions regarding its real property assets, especially those decisions involving trade-offs between Centers.

Recommendations, Management's Response, and Evaluation of Management's Response

During our audit, NASA Headquarters and Center officials revised the institutional CoF prioritization process for FY 2014 to allow Center officials to prioritize CoF projects based on a wider range of information. In our judgment, stabilizing and documenting the new prioritization process in NASA policy will help facilitate its implementation.

We recommend that the Assistant Administrator for the Mission Support Directorate direct the FERP Division to take the following actions to further improve NASA's ability to make strategic decisions regarding management of its real property.

Recommendation 1. Provide clear guidance to the Centers on the information that should be included in Center master plans to ensure that key information is captured and consistent for all Centers. Information should include, at minimum, clear linkages between projects and Agency or Center goals, as well as information on all major institutional and programmatic CoF projects.

Management's Response. The Associate Administrator for the Mission Support Directorate concurred with our recommendation, stating that he had directed the Assistant Administrator for Strategic Infrastructure to review and revise existing policies and processes to ensure that clear, consistent guidance is communicated to the Centers. He further stated that the Directorate is in the process of revising NPR 8810.1, Master Planning Procedural Requirements, to include changes that will outline clear

requirements for Center master planning. Currently NPR 8810 is on the Agency review calendar for December 2011, and the Associate Administrator anticipates its approval by March 2012.

Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the corrective actions.

Recommendation 2. Ensure plans to reduce the Agency's real property footprint more fully consider the specific missions of the individual Centers when setting real property reduction requirements.

Management's Response. The Associate Administrator concurred, stating that he has directed the Assistant Administrator for Strategic Infrastructure to ensure that Center-specific missions are considered when setting real property reduction requirements. He further stated that he will review the metrics for real property reductions and provide new guidance that will accommodate individual Center missions and real property attributes.

Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the corrective actions.

Recommendation 3. Update NASA policy to better reflect the current risk-based process for prioritizing institutional CoF projects.

Management's Response. The Associate Administrator concurred, stating that the Assistant Administrator for Strategic Infrastructure is in the process of updating NPR 8820.2F, Facility Project Requirements, to better reflect the budget formulation and risk-based process currently used for prioritizing CoF projects. He stated that he anticipates the NPR will be finalized by January 31, 2013.

Evaluation of Management's Response. Management's proposed actions are responsive; therefore, the recommendation is resolved and will be closed upon verification and completion of the corrective actions.

Other Matters

In his response to a draft of this report, the Associate Administrator stated that the OIG's failure to make many of his office's requested changes resulted in a report "that contains many inaccuracies." Therefore, the Associate Administrator said, "while I concur with the recommendations, it should be noted that I do not concur with the report itself."

He specifically mentions in his response the OIG's conclusion that the master planning process is based on funding assumptions that are no longer valid. He noted that in its technical comments his office had informed the OIG that the funding assumptions for the current Agency master plan were valid when the Centers began developing their plans, and

that the current Agency master plan would serve as a baseline from which NASA can make deviations and decisions on future investments.

We strongly disagree with the Associate Administrator's assertion that our report contains inaccurate information. Consistent with our usual process, we carefully considered management's technical comments to our draft and incorporated the information where appropriate. In addition, we followed the quality control procedures required by Federal government auditing standards, including submitting the report for an independent verification of the findings and supporting evidence.

With regard to the example cited by the Associate Administrator, we agree that the Center master plans were developed based on funding assumptions valid at the time the plans were prepared, and we do not suggest otherwise in the report. Rather, the report simply points out that given the magnitude of the subsequent funding reductions, a master plan that reflects the projected funding levels expected in FYs 2013 through 2017 would better enable the Centers and the Agency to develop realistic plans to ensure the vitality of necessary infrastructure and reduce NASA's real property footprint. Moreover, we specifically noted in the report that NASA officials expect that the Agency-wide master plan will provide a baseline to guide planning for the infrastructure needed to meet mission requirements.

APPENDIX A

Scope and Methodology

We performed this audit from February 2011 through November 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusion based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Our announced objectives included determining whether NASA has effective plans and processes in place to appropriately identify, prioritize, and administer construction projects in a manner that enhances the Agency's ability to meet current and future mission requirements.

We performed work at NASA Headquarters, FERP Division, and Marshall Space Flight Center. We also sent a questionnaire and data call to the other nine NASA Centers:

- Ames Research Center
- Dryden Flight Research Center
- Glenn Research Center
- Goddard Space Flight Center
- Jet Propulsion Lab
- Johnson Space Center
- Kennedy Space Center
- Langley Research Center
- Stennis Space Center

We reviewed Federal and NASA policies and regulations to determine the requirements and criteria for assessing master planning documents and requirements for identifying and prioritizing CoF projects. The documents we reviewed included select NASA Center internal institutional CoF project requests as well as:

"NASA Authorization Act of 2010," Title XI, Public Law 111-267, October 2010

National Research Council, "Investments in Federal Facilities: Asset Management Strategies for the 21st Century," 2004

NASA's Strategic Plan, 2011

NASA Policy Directive (NPD) 8820.2C, "Design and Construction of Facilities," June 13, 2006

NPR 8810.1, "Master Planning Procedural Requirements," April 28, 2005

NPR 8810.2A, "Master Planning for Real Property," December 09, 2009

NPR 8820.2F, "Facility Project Requirements," January 28, 2008

"NASA's Real Property Management Plan," November 2004

We distributed a questionnaire to the Centers listed above, inquiring about each Center's master planning process and their identification and prioritization process for CoF projects. We reviewed two documents that Headquarters required the Centers to develop as part of the FY 2010 master planning initiative: leadership briefing and Capital Investment Program Plan. The leadership briefing is a summarized version of a formal Center master plan in presentation slide format, and included a summary of metrics. The Capital Investment Program Plan incorporated what the Center expects to spend over the next 20 years, and should identify all investments planned by the institution or by programs regardless of funding source. In addition, we reviewed NASA's FY 2010 through FY 2014 Capital Facilities Investment Program Data Call. We interviewed representatives from the FERP Division to identify and discuss implementation of NASA's master planning procedural requirements, NPR 8810.1. We also contacted officials with the Centers' Facilities Management Offices to gain an understanding of each Center's process for the master planning initiative.

Use of Computer-Processed Data. We used computer-processed data to perform this audit. We collected computer-processed data from the NASA Centers in the form of their master planning documentation developed during FY 2010. Specifically, we collected Capital Investment Program Plans from the NASA Centers developed for FY 2013 through FY 2032. The Capital Investment Program Plan is maintained in Microsoft Excel format and can therefore be classified as computer-processed data. However, for our audit objectives we only reviewed the data to determine what types of projects the Centers included in their Capital Investment Program Plan (i.e., institutional and programmatic CoF projects, and recapitalization projects). Therefore, we did not rely solely on the computer-processed data to support our findings, conclusions, or recommendations.

Review of Internal Controls

We reviewed and evaluated the internal controls associated with developing the required Center master planning documents and identifying and prioritizing institutional CoF projects. Our review included a review and evaluation of the oversight and guidance provided by the FERP Division, to the Centers for these areas. We also reviewed the internal controls associated with the processes used by NASA Headquarters to prioritize Center CoF projects for funding. We found deficiencies in these areas, as discussed in this report.

Prior Coverage

During the last 5 years, the NASA Office of Inspector General (OIG), the GAO, and the National Research Council have issued four reports of particular relevance to the subject of this report. Unrestricted reports can be accessed over the Internet at http://oig.nasa.gov/audits/reports/FY11 (NASA OIG), http://www.gao.gov (GAO), and http://www.nap.edu/ (National Research Council).

NASA Office of Inspector General

"NASA Infrastructure And Facilities: Assessment of Data Used to Manage Real Property Assets" (IG-11-024, August 4, 2011)

"NASA's Hanger One Re-Siding Project" (IG-11-020, June 22, 2011)

Government Accountability Office

"High Risk Series: Federal Real Property: Progress Made Toward Addressing Problems, but Underlying Obstacles Continue to Hamper Reform" (GAO-07-349, April 2007)

National Research Council

"Investments in Federal Facilities: Asset Management Strategies for the 21st Century" (2004)

MANAGEMENT COMMENTS

National Aeronautics and Space Administration

Headquarters
Washington, DC 20546-0001

Reply to Attn of: Mission Support Directorate

TO: Assistant Inspector General for Audits

FROM: Associate Administrator for Mission Support

SUBJECT: OIG Draft Report, "NASA's Infrastructure and Facilities: An Assessment of the Agency's Real Property Master Planning" (Assignment No. A-11-014-00)

The Mission Support Directorate (MSD) appreciates the opportunity to review and provide comments on the Office of Inspector General's (OIG) draft report entitled, "NASA's Infrastructure and Facilities: An Assessment of the Agency's Real Property Master Planning" (Assignment No. A-11-014-00) dated November 22, 2011. In the draft report, the OIG makes three recommendation directed to MSD. NASA's response to the OIG's recommendations, including projected completion dates are as follows:

Recommendation 1: Provide clear guidance to the Centers on the information that should be included in Center master plans to ensure that key information is captured and consistent for all Centers. Information should include, at minimum, clear linkages between projects and Agency or Center goals, as well as information on all major institutional and programmatic CoF projects.

Management's Response: Concur. I have directed the Assistant Administrator for Strategic Infrastructure to review and revise our existing policies and processes to ensure that clear, consistent guidance is communicated to the Centers. We are in the process of revising NPR 8810.1, Master Planning Procedural Requirements, to include changes that will outline clear requirements for Center master planning. Currently NPR 8810 is on the Agency review calendar for December 2011, and we anticipate its approval by March 2012.

Recommendation 2: Ensure plans to reduce the Agency's real property footprint more fully consider the specific missions of the individual Centers when setting real property reduction requirements.

Management's Response: Concur. I have directed the Assistant Administrator for Strategic Infrastructure to ensure that Center specific missions are considered when setting real property reduction requirements. I will review our metrics for real property reductions and provide new guidance that will accommodate individual Center missions and real property attributes.

Recommendation 3: Update NASA policy to better reflect the current risk-based process for prioritizing institutional construction of facilities (CoF) projects.

Management's Response: Concur. The Assistant Administrator for Strategic Infrastructure is in the process of updating NPR 8820.2F, Facility Project Requirements, to better reflect the budget formulation and risk-based process currently used for prioritizing CoF projects. I anticipate the NPR being finalized by January 31, 2013.

Other Matters

In addition to the above responses to the recommendations outlined in the draft report, MSD personnel also provided technical comments to the draft report, including proposed revisions and/or corrections to the parts of the report that are believed to be inaccurate. Our technical comments to the draft report were provided to the OIG via e-mail on October 31, 2011, and November 1, 2011, in order to facilitate the OIG's technical correction process.

In reviewing the final draft of the report and preparing our response, we found that many of the comments provided were not used by the OIG, thereby resulting in a report that contains many inaccuracies. One example is the OIG's assertion that the Master Planning process is based on a funding assumption that is no longer valid. Both in our technical comments and in subsequent meetings with the OIG, MSD officials noted that the funding assumptions for the current Master Plan were valid when Centers begin developing their Master Plans. It was only after completion of Center Master Plans that the funding guidance changed. Further, officials noted that the current Master Plan would serve as a baseline from which NASA can make deviations and decisions on future investments. Consequently, while I concur with the recommendations, it should be noted that I do not concur with the report itself.

Again, I appreciate the opportunity to provide a written response to the subject draft audit report and also appreciate the courtesies extended to the MSD and the Office of Strategic Infrastructure by the OIG during the course of the audit. If any additional information regarding our response is required, please contact Fatima Johnson at 202-358-1631 or Maria Bayon at 202-358-1092.

Sincerely,

Woodrow Whitlow, Jr.

Woodrow Whitlow, Jr.

REPORT DISTRIBUTION

National Aeronautics and Space Administration

Administrator
Deputy Administrator
Chief of Staff
NASA Advisory Council's Audit, Finance, and Analysis Committee
Associate Administrator for Mission Support Directorate
    Assistant Administrator for the Office of Strategic Infrastructure
    Acting Director, Technical Capabilities and Real Property Division
    Acting Director, Facilities Engineering Division
Director, Ames Research Center
Director, Dryden Flight Research Center
Director, Glenn Research Center
Director, Goddard Space Flight Center
Director, Jet Propulsion Lab
Director, Johnson Space Center
Director, Kennedy Space Center
Director, Langley Research Center
Director, Marshall Space Flight Center
Director, Stennis Space Center

Non-NASA Organizations and Individuals

Office of Management and Budget
    Deputy Associate Director, Energy, and Science Division
        Branch Chief, Science, and Space Programs Branch
Government Accountability Office
    Director, NASA Financial Management, Office of Financial Management and Assurance
    Director, NASA Issues, Office of Acquisition and Sourcing Management

Congressional Committees and Subcommittees, Chairman and Ranking Member

Senate Committee on Appropriations
    Subcommittee on Commerce, Justice, Science, and Related Agencies
Senate Committee on Commerce, Science, and Transportation
    Subcommittee on Science and Space
Senate Committee on Homeland Security and Governmental Affairs
House Committee on Appropriations

Subcommittee on Commerce, Justice, Science, and Related Agencies
House Committee on Oversight and Government Reform
Subcommittee on Government Organization, Efficiency, and Financial Management
House Committee on Science, Space, and Technology
Subcommittee on Investigations and Oversight
Subcommittee on Space and Aeronautics

Major Contributors to the Report:

Ridge Bowman, Director, Infrastructure and Facilities Management Directorate
Karen VanSant, Project Manager
Susan Bachle, Lead Auditor
Amy Bannister, Auditor
Rebecca Carpenter, Management Analyst

DECEMBER 19, 2011

REPORT No. IG-12-008

OFFICE OF AUDITS

OFFICE OF INSPECTOR GENERAL

ADDITIONAL COPIES

Visit http://oig.nasa.gov/audits/reports/FY12/ to obtain additional copies of this report, or contact the Assistant Inspector General for Audits at 202-358-1232.

COMMENTS ON THIS REPORT

In order to help us improve the quality of our products, if you wish to comment on the quality or usefulness of this report, please send your comments to Mr. Laurence Hawkins, Audit Operations and Quality Assurance Director, at Laurence.B.Hawkins@nasa.gov or call 202-358-1543.

SUGGESTIONS FOR FUTURE AUDITS

To suggest ideas for or to request future audits, contact the Assistant Inspector General for Audits. Ideas and requests can also be mailed to:

Assistant Inspector General for Audits
NASA Headquarters
Washington, DC 20546-0001

NASA HOTLINE

To report fraud, waste, abuse, or mismanagement, contact the NASA OIG Hotline at 800-424-9183 or 800-535-8134 (TDD). You may also write to the NASA Inspector General, P.O. Box 23089, L'Enfant Plaza Station, Washington, DC 20026, or use http://oig.nasa.gov/hotline.html#form. The identity of each writer and caller can be kept confidential, upon request, to the extent permitted by law.