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AUDIT REPORT

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NASA'S PLAN FOR SPACE SHUTTLE TRANSITION COULD BE IMPROVED BY FOLLOWING PROJECT MANAGEMENT GUIDELINES

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Acronyms

CEV	Crew Exploration Vehicle
CLV	Crew Launch Vehicle
ESMD	Exploration Systems Mission Directorate
GAO	Government Accountability Office
ISOS	Integrated Space Operations Summit
ISS	International Space Station
JICB	Joint Integration Control Board
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
SOMD	Space Operations Mission Directorate
SSP	Space Shuttle Program
TCB	Transition Control Board
TPRCB	Transition Program Requirements Control Board
WBS	Work Breakdown Structure

IN BRIEF

NASA'S PLAN FOR SPACE SHUTTLE TRANSITION COULD BE IMPROVED BY FOLLOWING PROJECT MANAGEMENT GUIDELINES

The Issue

In January 2004, the President announced "A Renewed Spirit of Discovery: The President's Vision for U.S. Space Exploration." As part of that Vision, the President directed NASA to retire the Space Shuttle by 2010 and develop new launch vehicles for missions beyond low Earth orbit. To accomplish that requirement, NASA must maintain the assets and capabilities required to fly the Space Shuttle safely and effectively through 2010, while simultaneously transitioning some of those assets and related technologies to the next-generation space vehicles, and in particular, the Crew Exploration Vehicle and the Crew Launch Vehicle. This challenge will involve not only the transition of the Space Shuttle Program's workforce of more than 17,000 employees and property valued at more than $17 billion, but the expenditure of an estimated $2.6 billion to $4.4 billion in Space Shuttle Program transition costs alone.[1] The NASA Administrator has identified this transition process as NASA's greatest management challenge for the next 5 years.

The overall audit objective was to evaluate NASA's plans for managing the Space Shuttle's retirement and transition to the Crew Exploration Vehicle and the Crew Launch Vehicle and related systems. Because NASA does not have Agency-wide guidance that specifically addresses how to plan, budget for, manage, or measure an activity such as transition, we developed a model to evaluate the Agency's transition plan (see Appendix C). The model was developed using NASA policy and procedures, best practices and lessons learned from benchmarking studies, and recommendations from Government Accountability Office reports. Details of the audit's scope and methodology are in Appendix A.

Results

Our evaluation of NASA's "Human Space Flight Transition Plan" found that it did not comprehensively address certain elements that we believe are essential to management and high-level oversight of an activity of the transition's scope and importance.

[1] The estimates were based on potential SSP transition costs only; actual costs could be higher or lower, based on transition requirements and transition costs specific to other NASA programs, such as the International Space Station.

Specifically, the transition plan did not comprehensively address the following elements:

- A work breakdown structure that divides the transition activities into manageable segments.
- Detailed cost estimates to support the budget preparation process and facilitate cost control.
- Metrics for measuring transition progress and success.
- Periodic milestone reviews.
- Internal and external communication plans to facilitate an efficient flow of information to the stakeholders.
- Asset end-state requirements[2] and security provisions for Space Shuttle Program property.
- A centralized data management system to document transition-related recommendations and decisions.
- Clearly defined responsibilities for the components of the transition governance structure and designation of the component responsible for post-2010 decisions.

NASA acknowledged that its transition plan does not address these elements, given that the plan "serves as initial, top-level strategic guidance and a governance framework for the development of lower-level directorate, program, and project transition planning guidance documents that will comprehensively capture and address all of the elements necessary for efficient and effective execution of . . ." the transition.

Although lower-level transition guidance documents can address these elements, it is our view that comprehensive, centralized controls are needed for the Agency to ensure consistent and well-coordinated implementation across the span of Directorates, programs, Centers, employees, and contractors. For example, while there is Agency guidance on decommissioning and disposal activities, there is no guidance that addresses the unique efforts involved when closing out a program of the Space Shuttle Program's magnitude. Without comprehensive and centralized controls, transition managers may not be able to ensure effective and efficient transition is occurring within lower-level organizations. This is particularly the case where each program and project is expected to focus on the successful accomplishment of its specific mission, with the likelihood that conflicting transition interests will be subordinated.

In order for the Agency to have a comprehensive and integrated understanding of the status of the transition on an ongoing basis, it should address each of the elements that we

[2] End-state requirements specify the condition and configuration of assets prior to disposition.

identified in a manner that provides assurance of successful implementation and integration among Directorates, programs, and projects. In this regard, the application of project management guidelines contained in NASA guidance could help address the elements we identified and provide a structured approach for defining and managing transaction activities.

While the Agency has not agreed with all of our recommendations as to what should be included in its transition plan, NASA has substantially mitigated the issues we raised. For example, in connection with the Agency's evolving approach to transition management, NASA is currently taking steps to address the majority of the specific issues we have identified. Therefore, we agree with management's comments on a draft of this report that "Transition Managers have made substantial progress in organizing, consolidating, and addressing many of the specific actions or activities outlined as recommendations in your report."

By comprehensively addressing these issues, NASA should be better able to monitor the progress of transition and initiate corrective action when needed. While we would prefer that these issues be addressed in the overall transition plan, efficiencies will be realized as long as there is a robust integrated and centralized focus on the elements critical to successful transition. Of course, without a sustained integrated and centralized focus, we believe that NASA would have great difficulty managing the transition activity effectively and efficiently.

Recommendations

In a draft of this report, we recommended that the Chief Engineer develop guidance within the NASA Procedural Requirements 7120 series that clearly defines and establishes requirements for managing closeout and transition for programs of the Space Shuttle Program's magnitude. We also recommended that the Associate Administrators for the Space Operations Mission Directorate and the Exploration Systems Mission Directorate revise and implement the Human Space Flight Transition Plan to comply with applicable project management guidelines as stated in NASA Procedural Requirements 7120.5C, "NASA Program and Project Management Processes and Requirements," March 22, 2005. Finally, we recommended that the Associate Administrator for Space Operations request that the Operations Management Council recognize and track Space Shuttle Program transition as an Agency management challenge.

Management Action

In response to the draft of this report (see Appendix D, "Management Comments"), the Associate Administrators and the Chief Engineer concurred with the finding that the transition plan did not comprehensively address all elements necessary for transition success. They noted, however, that our views on what the plan should address might be

the result of a differing understanding of the purpose of the transition plan. Specifically, NASA intended the plan to provide overarching programmatic transition planning guidance and the framework to develop lower-level transition plans as well as decision-making and evaluation processes. Management stated that it believes the plan is effective in that context and is a foundational element in the broader transition effort. Nevertheless, management stated that our report provided meaningful findings and agreed to update the plan and address seven of the eight elements that we identified as critical to transition success.

Although the Chief Engineer concurred with our recommendation to develop guidance for managing and closing programs of the Space Shuttle Program's magnitude, his comments did not satisfy the intent of our recommendation. Rather than agreeing to develop additional guidance, the Chief Engineer's response concluded that guidance on decommissioning and disposal existed in NASA Procedural Requirements 7120.5D and NASA systems engineering guidance. We were aware of that guidance; the intent of our recommendation was, given the importance and magnitude of the programs involved, that specific and integrated guidance on activities such as transitioning personnel, hardware, and support systems would be helpful in ensuring comprehensive and well-coordinated activities. We request that the Chief Engineer reconsider his response to this recommendation and provide additional comments by February 28, 2007.

The Associate Administrators did not concur with our recommendation to manage the transition in accordance with NASA project management guidelines stating that they made a conscious choice not to designate transition as a separate project. However, their comments met the intent of our recommendation in that they agreed to conduct transition activities consistent with the intent of NASA program and project management guidance. The Associate Administrators agreed to finalize the transition plan, which they did on November 13, 2006, and update it in response to issues discussed in this report.

In response to our recommendation that transition be monitored by the Operations Management Council as a management challenge, the Associate Administrators stated that they would report transition activities through the Program Management Council as directed by NASA's Strategic Management Council. This meets the intent of our recommendation.

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INTRODUCTION

Background

The President's Vision for U.S. Space Exploration, announced in January 2004, established a new direction for the Nation's space program. As part of the Vision, the President directed NASA to return the Space Shuttle to flight as soon as practical, focus the use of the Space Shuttle to complete the International Space Station (ISS), and retire the Space Shuttle by 2010. With respect to the broader space mission, the President directed NASA to develop new vehicles to provide crew transportation for missions beyond low Earth orbit. One of the key challenges associated with achieving the President's Vision is for NASA to maintain the capabilities required to fly the Space Shuttle safely and effectively while transitioning real and personal property, critical skills, and related capabilities to support the projects within the Constellation Systems Program,[3] such as the Crew Exploration Vehicle (CEV) and the Crew Launch Vehicle (CLV). The NASA Administrator emphasized that challenge in a February 6, 2006, news release, when he stated that the greatest management challenge the Agency faces over the next 5 years is the transition from retiring the Shuttle to bringing the CEV on line.

Initial Transition Planning. In August 2004, NASA began its initial transition planning. It formed an Integrated Space Operations Summit (ISOS) Space Shuttle Program (SSP) Transition Panel to develop assumptions, risks, and milestones and provide recommendations for retiring the Space Shuttle. The panel recommended development of an Agency-wide transition plan, to include integration, implementation, management, and schedule. In January 2005, the SSP Manager directed the Strategic Planning Office to define and develop a formal strategic assessment of all SSP assets and to prepare a transition management plan. The Strategic Planning Office developed National Space Transportation System 60561, "Space Shuttle Program Transition Plan," and 07700, Volume XIX, "Space Shuttle Transition Requirements," to document the requirements for managing the SSP's end-of-program transition.[4] Those two documents were never approved or implemented because there were no Agency-level requirements or budgeted funds to support the transition. Formal transition planning was curtailed until September 2005, when NASA established a transition governance structure.

Transition Governance Structure. NASA's transition governance structure includes transition managers and control boards appointed at the Agency, Directorate, Center, program, and project levels. See the transition governance structure's organization chart

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

[4] Volume XX is under development by the SSP's Strategic Planning Office. Once approved, it will supersede the XIX version.

in Appendix B. SSP transition managers have been appointed at the Directorate level and at the SSP program and project level. The Directorate-level manager is responsible for the Agency's transition organization—the Transition Control Board. The SSP managers at the program and project level are responsible for overall and day-to-day transition management, contract strategy and direction, and budget integration and resource analysis at their respective levels. The transition governance structure contains representatives from two of NASA's four Mission Directorates—the Space Operations Mission Directorate (SOMD) and the Exploration Systems Mission Directorate (ESMD). SOMD is responsible for operating the SSP until its retirement in 2010 and managing the completion and use of the ISS. ESMD is responsible for the Constellation Systems Program.

At the Agency level, NASA chartered two transition boards—the Transition Control Board (TCB) and the Joint Integration Control Board (JICB). In addition, the establishment of a third board, the Joint Transition Program Requirements Control Board (JTPRCB), is being considered. The TCB is co-chaired by the Associate Administrators for the ESMD and the SOMD, and its members include the Chief Safety and Mission Assurance Officer and personnel from the Institutions and Management Office. The TCB meets monthly and is responsible for evaluating transition decisions to ensure that the decisions promote efficiencies and synergies between the human space flight programs and to ensure that existing infrastructure and resources evolve to future programs. The JICB is also co-chaired by the Associate Administrators for ESMD and SOMD, and members include the Program Managers for SSP, ISS, and the Constellation Systems Program and the Directors of Johnson Space Center, Kennedy Space Center, Marshall Space Flight Center, and Stennis Space Center. The JICB meets monthly and is responsible for ensuring that strategies, decision-making, priorities, budgets, schedules, and top-level development and operational requirements are coordinated between ESMD and SOMD. The JTPRCB, if chartered, would be responsible for integration efforts between the SSP, the ISS, and the Constellation Program.

At the Program level, NASA chartered two additional transition boards—the Transition Program Requirements Control Board (TPRCB) and the Joint Program Requirements Control Board (JPRCB). The TPRCB is chaired by the SSP Transition Manager and members include the Manager, SSP Strategic Planning Office, and the transition integration managers from Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center and representatives from Stennis Space Center. The TPRCB has authority to approve program-level transition requirements and establish transition budgets and schedules. The TPRCB also performs initial evaluations of existing capabilities and recommends actions to ESMD and SOMD regarding individual project authority, budget, and requirements. The JPRCB is comprised of SSP and ISS Program representatives. The board reports to the JICB and is responsible for resolving joint technical and programmatic issues and approving joint program requirements, agreements, schedules, and milestones.

Transition Working Group. The transition working group is an operational support group that provides expertise to assist Agency leaders in guiding the transition in areas such as environmental remediation, real property, human capital, budget, acquisition, historic preservation, and information technology. The group includes program management, resource management, strategic communications, and institutional management personnel.

Transition Plan. In December 2005, NASA's Strategic Management Council[5] directed the Associate Administrators of ESMD and SOMD to develop a transition plan describing how the Agency will transition from operating the Space Shuttle and ISS to flying the CEV and exploring the moon and beyond. The transition plan, "Human Space Flight Transition Plan,"[6] discusses topics such as transition management, acquisition, budget, data and records management, environmental management, human capital, information technology, property, and transition metrics.

Objective

The overall audit objective was to evaluate NASA's plans to retire the Space Shuttle and transition to the CEV and CLV. Specifically, we determined whether

- roles, responsibilities, and lines of reporting for transition activities were clearly defined and documented;
- the transition plan comprehensively addressed issues such as capabilities, costs, infrastructure, and workforce; and
- realistic milestones were established for the initiation and completion of transition activities.

We also reviewed internal controls related to the overall objective. See Appendix A for details of the audit's scope and methodology, our review of internal controls, and a list of prior coverage.

[5] The Strategic Management Council, one of three governing councils within NASA, establishes program and institutional budget guidance, priorities, and strategies.

[6] For our draft report, we reviewed Version 7 of NASA's draft transition plan. The Associate Administrators for Space Operations and Exploration Systems issued the final transition plan November 12, 2006. We reviewed that plan and determined that there was no material difference between the draft and final plans. Therefore, the issuance of the final plan did not affect our audit conclusions or recommendations.

TRANSITION PLAN DOES NOT COMPREHENSIVELY ADDRESS CERTAIN CRITICAL ELEMENTS

NASA has taken positive steps to manage the transition from the Space Shuttle to the CEV and CLV by developing a transition governance structure and a transition plan. However, the transition plan does not comprehensively address elements that are critical to a successful transition. To ensure that NASA develops the necessary framework, processes, and supporting infrastructure to manage and oversee the transition, NASA needs a transition plan that comprehensively addresses the following elements:

- A work breakdown structure (WBS) that divides the transition activities into manageable segments.
- Detailed cost estimates to support the budget preparation process and facilitate cost control.
- Metrics for measuring transition progress and success.
- Periodic milestone reviews.
- Internal and external communication plans to facilitate an efficient flow of information to the stakeholders.
- Asset end state[7] requirements and security provisions for SSP property.
- A centralized data management system to document transition-related recommendations and decisions.
- Clearly defined responsibilities for the components of the transition governance structure and designation of the component responsible for post-2010 decisions.

Those elements were not comprehensively addressed because NASA does not have guidance specific to program closeout or transition and chose not to classify transition as a project, which would make it subject to the project management requirements detailed in NASA Procedural Requirements (NPR) 7120.5C, "NASA Program and Project Management Processes and Requirements," March 22, 2005. By comprehensively addressing the critical elements in the transition plan, NASA

[7] End-state requirements specify the condition and configuration of assets prior to disposition.

should be able to monitor the implementation of the plan and initiate corrective action when needed. Without a comprehensive transition plan, we believe it unlikely that NASA will be able to effectively manage its transition of the SSP's workforce of more than 17,000 employees and property valued at more than $17 billion, or effectively manage the SSP transition costs, which are initially estimated to be $2.6 billion to $4.4 billion.[8]

Evaluation Criteria

Because NASA does not have guidance that specifically addresses how to plan, budget for, manage, or measure an activity such as SSP transition, we developed a model to evaluate the transition plan (see Appendix C). The model includes Agency policy and procedures concerning major program planning and management, best practices and lessons learned from SSP benchmarking studies, and recommendations from Government Accountability Office (GAO) reports. Although not specifically included in our model, we also considered internal control principles when reviewing and commenting on the transition plan.

NASA Policies and Procedures. We incorporated into our model any NASA policy or procedure that we considered significant to ensuring a successful transition. Specifically, NASA Policy Directive (NPD) 7120.4C, "Program/Project Management (Revalidated for 1 year 03/02/2006)," and NPR 7120.5C. NPD 7120.4C describes the management system by which NASA formulates, approves, implements, and evaluates all programs and projects established for development and operation of aeronautical and space ground and flight systems and technologies. The NPD states that the management system provides flexible, adaptable, and tailorable methods and principles for the various types of programs and projects that NASA manages. NPR 7120.5C implements NPD 7120.4C and provides a more extensive description of the management system requirements.

Benchmarking Studies. To highlight significant knowledge and experience that exists within and external to NASA regarding program closures, we included results of five SSP benchmarking studies in our model. The SSP strategic planning office conducted the benchmarking studies to identify best practices from previous NASA and external program closures that were applicable to SSP transition. Best practices were identified from a benchmarking study on the NASA Industrial Facility Closure in Downey, California (Downey). Additional best practices were identified from the summary benchmarking study of NASA's program closures at Plum Brook Nuclear Reactor Facility, the Yellow Creek site in Mississippi; the 16-foot wind tunnel facility at Langley Research Center; and the Space Shuttle Payload Carrier program at Kennedy Space Center (NASA Program Closures). The SSP also studied best practices from program

[8] The estimates were based on potential SSP transition costs only; actual costs could be higher or lower, based on transition requirements and transition costs specific to other NASA programs, such as the International Space Station.

closures of the Boeing A/V-8B and F/A-18 Production Line Transition Strategies, the Air Force's Titan IV Program Closeout, and Navy Base Realignment and Closure Activities.

GAO Reports. We identified three GAO reports that were relevant to the Shuttle transition. "NASA: Long-Term Commitment to and Investment in Space Exploration Program Requires More Knowledge" (GAO-06-817R, July 17, 2006), discusses the need for the Agency to develop knowledge-based acquisition strategies to ensure that programs are affordable and executable before committing to long term contractual obligations. "Space Shuttle: Actions Needed to Better Position NASA to Sustain Its Workforce through Retirement" (GAO-05-230, March 2005), discusses NASA's strategy for sustaining its workforce through the Space Shuttle's retirement. The report recommends that NASA identify its future workforce needs using scenario planning. "DoD Business Systems Modernization: Important Progress Made to Develop Business Enterprise Architecture, but Much Work Remains" (GAO-03-1018, September 2003), discusses key elements for a transition plan, to include identifying the gap analysis between current and future business processes and systems; systems that will not become part of the new architecture; and a time-based strategy for replacing legacy systems.

Internal Controls. We considered internal control principles when we reviewed the transition plan for assurance that the SSP transition would be efficiently and effectively planned, managed, and controlled. Office of Management and Budget Circular No. A-123, "Management's Responsibility for Internal Control," December 21, 2004, states that Federal managers are responsible for establishing and maintaining internal controls to achieve effective and efficient operations. The internal controls should be an integral part of the entire cycle of planning, budgeting, managing, accounting, and auditing to ensure program effectiveness and accountability. Circular A-123 states that while individual agencies may identify and implement specific effective control procedures, management officials should have a clear, organized strategy with well-defined documentation processes, verifiable results, and documented retention periods. NPD 1200.1D, "Internal Control and Accountability," May 15, 2006, requires Agency officials to comply with the Circular.

Critical Elements Not Comprehensively Addressed

NASA's transition plan does not comprehensively address certain elements that are critical to a successful transition. Although some of the elements are interrelated (for example WBS and cost estimation), we address each separately.

WBS. NASA's transition plan does not include a WBS that divides the transition activities into manageable segments. A WBS is an effective method to display a project's statement of work making it easier to understand and communicate. A WBS is normally a hierarchical (from general to specific) tree structure of tasks that need to be performed

to complete a project. NASA's transition plan lists the following activities that will take place during transition:

- conducting an inventory of capabilities,[9]
- creating a capabilities database,
- mapping the capabilities to the Exploration architecture, and
- tasking individual SSP projects to develop transition implementation plans.

The activities are presented in very general terms and the specific tasks necessary to complete the activities are not described. For example, the plan does not define the steps necessary to conduct the capabilities inventory, the information required in the capabilities database, or how the capabilities will be mapped to the Exploration architecture. Regarding the last activity, we question how the SSP projects can develop implementation plans if the other activities are not broken down into specific tasks. In addition, each of the SSP projects could approach implementation differently, which may lead to incompatible methods and results.

A WBS provides a mechanism for (1) collecting and organizing cost estimates and actual costs, and (2) performance measurement and control. The lowest levels of the WBS represent the individual tasks against which costs should be tracked and performance measured. It would be extremely difficult to provide a cost estimate for any of the activities listed in NASA's transition plan because the activities are not presented at a level of detail necessary to estimate costs. In addition, the progress in completing the activities can not be easily measured because the specific steps that make up each activity are unknown.

NASA could improve its transition plan, and its overall approach to transition, by developing a WBS as defined in NPR 7120.5C, section 3.2.1.2.b. Dividing the transition activities into manageable segments would enable the transition managers at all levels to more easily assign and monitor performance and estimate and track costs.

Cost Estimates. The transition plan does not contain a requirement to prepare a detailed cost estimate. Preparation of a detailed cost estimate should be possible once the WBS is developed. Although the SSP developed several preliminary transition cost estimates, those estimates were based on potential SSP transition costs only; actual costs could be higher or lower, based on transition requirements and transition costs specific to other NASA programs, such as the International Space Station. In addition, the estimates were not based on specific transition tasks or requirements and, therefore, NASA cannot depend on those estimates to develop the transition cost requirements.

[9] NASA defines capabilities as a functional grouping of program elements to include property, personnel, suppliers, and contracts.

NPR 7120.5C, the ISOS SSP Transition Panel report, and the SSP's Titan IV Program Closeout benchmarking study all support the establishment of a detailed cost estimate for Space Shuttle retirement and transition. GAO has criticized NASA for not developing adequate or accurate cost estimates, which lead to uncertainty and cost overruns. GAO-06-817R states that because NASA will require a sustained commitment from multiple Administrations and Congresses to complete the President's Vision, the Agency needs to identify the resources necessary to achieve its short-term goals. We consider transition as one of those short-term goals and, therefore, preparation of a detailed cost estimate is essential to funding the transition and achieving those goals.

Metrics. The transition plan identifies four major transition goals, but it does not include objectives for those goals or provide specific metrics for measuring transition progress and success. The four goals are

- evolving from current operations to future,
- evolving the workforce,
- efficiency, and
- efficient and safe closeout of the SSP.

Although the goals state what transition is to ultimately achieve, NASA cannot measure its success or progress toward meeting those goals until it identifies specific objectives and metrics that are tied to those goals. NPR 7120.5C requires that cost and schedule metrics be identified for NASA projects and those metrics are subsequently used as one of the decision points during the milestone reviews. Deviations from the metrics will indicate if cost and/or schedule growth exists so that action can be taken to reduce the rate of growth. The NPR requires that cost or schedule growth in excess of 10 percent be reported to upper-level management. If followed, this process provides upper-level management an opportunity to initiate action to control inordinate cost and/or schedule growth.

Milestone Reviews. The transition plan does not require periodic milestone reviews during the transition process. Milestone reviews are generally scheduled at key decision points throughout an activity, project, or program and can be used to evaluate issues such as compliance with development criteria and requirements, readiness to proceed to the next project phase, adequacy of implementation plans, and consistency with the project baseline commitments.

Although the transition plan does provide high-level milestones concerning NASA's overall focus for space exploration, it does not contain milestones for the specific transition activities that support that focus or require periodic reviews to assess the progress of the transition activities. For example, the plan's schedule contains milestones for the remaining Space Shuttle flights, ISS completion, and the start date for CEV, but it

does not provide integrated milestones for any of the transition tasks required to meet those dates.

Our model supports the development of milestones and the use of milestone reviews during transition. The NASA benchmarking studies discussed the importance of identifying milestones for the phase-out of SSP assets and the overall transition activities and NPR 7120.5C, Appendix H states that reviews are an opportunity to add value to products and to organize, assess, and communicate critical data between the project and its stakeholders. Although the transition activities will not provide new products or services to NASA, the goal of the reviews are to maximize the probability of mission success through added value and efficiencies. Based on the magnitude of the transition activity, efforts to maximize the probability for its success should be incorporated into the plan and implemented accordingly.

Communication Plans. Although the transition plan discusses the importance of keeping employees informed of transition activities through "All Hands" meetings, project-level briefings, newsletters, and Web sites, it does not require that internal and external communication plans be developed or that NASA periodically consult with Congress, other Federal agencies, or external stakeholders concerning transition. Communication is considered a vital element for the successful implementation of any activity because it ensures that stakeholders are informed and provides a means to elicit concerns from those stakeholders. Developing internal and external communication plans formalizes the communications strategy by identifying the stakeholders, the desired outcomes of communication at each phase of an activity, and the methods of communication.

The NASA benchmarking studies, the internal NASA ISOS SSP Transition Panel report, and guidance from NPR 7120.5C all discuss the importance of planning for and conducting communications and outreach programs. The benchmarking studies recommended that NASA develop internal and external communication plans to facilitate communication with Congress, NASA employees and contractors, the public, and other Government agencies as needed. In addition, the benchmarking studies and the Transition Panel recommended that NASA reach out to the internal and external stakeholders for buy-in, expertise, funding, legislative needs, and employee morale. Considering the large number of internal and external stakeholders (including the 17,000 SSP civilian and contractor employees), communication plans should help ensure that information concerning the transition is thorough, timely, and aimed at the appropriate audience.

Property Disposition. The transition plan does not contain specific asset end-state requirements or discuss provisions for security for SSP property. Those provisions are important to ensure that assets are not disposed of prematurely or much later than the actual end-use dates and that property is adequately protected until its actual disposition.

The SSP benchmarking studies specifically stated that the asset-end state requirements would drive closeout tasks. In the Downey closure, NASA did not determine the ultimate end-use of property prior to closeout, which created a 6-month delay in closing the facility. In addition, the SSP project offices need the asset end-state requirements to accurately account for the timing and costs of disposal activities. Regarding the need for security provisions, the SSP benchmarking studies recommended that NASA ensure the security of closeout sites. SSP property has been offered for sale on the Internet in the past, and the opportunity to obtain SSP property may increase during the transition period. Any unauthorized disposition of assets increases the risk that assets will not be available to the SSP when needed.

Centralized Data Management System. The transition plan contains procedures for maintaining and preserving SSP records; however, it does not identify a system for maintaining records of recommendations or decisions made by all of the entities included in the transition governance structure. Although SOMD personnel stated that TCB documentation and decisions will be stored in NASA's Process Based Mission Assurance site and the SSP will use the Strategic Capabilities Assessment database, the transition plan does not reference these sites nor explain their use. Recommendations and decisions concerning issues such as strategies, plans, procedures, costs, and asset disposal should be documented and maintained to ensure that NASA has a permanent record of the data and a method for tracking actions taken by the Agency in response to the recommendations or decisions. In addition, such a system would assist in identifying data to communicate to the transition stakeholders.

Decision Thresholds and Post-2010 Governance. The transition plan does not address the levels at which certain transition decisions should be made and does not identify the component that will be responsible for post-2010 transition activities.

Decision Thresholds. The transition plan provides general guidance related to control board responsibilities, but it does not discuss criteria or thresholds for transition decisions. As of September 2006, approval for most of the SSP transition decisions have been made by the TCB. However, NASA needs to delineate when decisions should be made or reviewed by a control board and which boards should be the decision-making authority for which areas. Criteria and thresholds for decision-making are particularly important for SSP assets that impact existing NASA programs, such as the ISS and the Constellation Systems Program, or impact other organizations that might share SSP resources.

NASA's transition plan should incorporate criteria and thresholds that identify which level of NASA management (e.g., program-level or Headquarters-level) should review and approve decisions related to safety, completion of the SSP's mission, contracts, and unique skills or assets. As the SSP nears closure, the number and criticality of decisions will likely increase significantly. NASA needs to establish decision-making criteria to ensure that SSP transition decisions have the appropriate level

of review and approval and that decision-making authority is appropriately delegated to the various control boards.

Post-2010 Governance. The transition plan does not address who will manage facilities and property disposition or make transition decisions after SSP retirement in 2010. The transition plan states that historically, it takes 3.5 years to close down a facility and another 3 years to complete property transition. As of September 2006, SSP personnel are leading the effort to inventory SSP capabilities, determine last need dates, and recommend disposition actions. The SSP has estimated that it could take up to 5 years after the last Shuttle flight to complete asset disposition and could cost between $1.7 billion and $2.6 billion (the estimate includes the cost of facility closures).

NASA must establish guidance for managing transition after 2010 because many of the critical dispositions will not occur until 2011 and beyond. To effectively manage and successfully complete the Space Shuttle transition, NASA must define the roles and responsibilities for transition activities after the SSP ends and will no longer provide a leading role in the transition.

NASA Guidance

The 7120 NPR series should clearly define requirements for managing closeout and transition for programs of the SSP's magnitude. NASA does not have guidance specific to closing or transitioning a program or project and chose not to classify the SSP transition as a project, which would make it subject to NPR 7120.5C project management principles. The Office of the Chief Engineer, which is responsible for NPR 7120.5C, determined that the NPR was not applicable to the SSP transition because the transition did not meet the NPR's definition of a project. Section 1.3.1.a. of the NPR defines a project as

> . . . a specific investment identified in a Program Plan having defined goals, objectives, requirements, lifecycle cost, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs.

Officials within the Office of the Chief Engineer stated that NPR 7120.5C did not apply because transition activities were not funded by a separate budget. However, because SSP transition will affect follow-on space exploration programs, the transition directly affects NASA's overall strategic goals and objectives and should be planned and implemented using an established framework.

Regardless of whether SSP transition is designated a project, NASA would benefit if NPR 7120.5C project management guidelines were followed. The application of those guidelines would meet most of the requirements listed in our model and would ensure that the critical elements of transition, with the exception of property disposition, are adequately addressed. We realize that not all aspects of NPR 7120.5C will apply to

transition; however, use of the guidelines in that NPR, will provide a structured approach for defining and managing the transition activities. The NPR requires managers to develop and define approaches, assessments, communication plans, contracting strategies, cost estimates, data management systems, environmental plans, human capital plans, metrics, milestones, requirements, and roles and responsibilities. Because the transition effort is one of NASA's greatest management challenges in the near future and a major investment involving at least three major programs (ISS, SSP, and Constellation Systems), use of the project management guidelines should result in a more comprehensive plan that provides specific and adequate information to those required to carry out its implementation.

Managing SSP Transition

We commend NASA's efforts in establishing the transition governance structure and developing the transition plan. However, without comprehensive and centralized controls, transition managers may not be able to ensure effective and efficient transition is occurring within lower-level organizations. This is particularly the case where each program and project is expected to focus on the successful accomplishment of its specific mission, with the likelihood that conflicting transition interests will be subordinated. In order for the Agency to have a comprehensive and integrated understanding of the status of the transition on an ongoing basis, it should address each of the elements that we identified in a manner that provides assurance of successful implementation and integration among Directorates, programs, and projects. By establishing a comprehensive transition plan, NASA should be able to better monitor the progress of transition and initiate corrective action when needed. Without such a plan, NASA can not specifically define the tasks and milestones associated with transition activities, and the Agency increases its risk of cost overruns, schedule slips, and a loss of taxpayer and Congressional confidence.

Monitoring Transition

We believe that NASA should include transition as an Agency-level management challenge and monitor it as such. NASA defines a management challenge as

> a concern about a challenge to management. There is insufficient information to confirm a serious systematic internal control weakness in this area. It may pertain to issues that are outside management's control or factors that may create an adverse condition. Close monitoring is required.

In the past, NASA recognized issues such as ISS cost management and full cost accounting as management challenges. The ISS cost management issue was recognized because of rising costs and cost estimating deficiencies within the ISS Program. The full cost accounting issue was recognized because its implementation will allow NASA

project and business managers the opportunity to make better-informed decisions for the use of NASA's limited resources. When issues are identified as Agency-level management challenges, they are tracked by an Agency-level council[10] until resolved and closed.

Although the NASA Administrator stated that the transition process is NASA's greatest management challenge over the next 5 years, the transition has not been formally recognized as an Agency-level management challenge. SSP transition is a key component of the President's Vision and involves three major programs: Constellation Systems, Space Shuttle, and ISS. Planning, implementing, and measuring transition activities from the highest management levels of the Agency are essential to effectively and efficiently managing Space Shuttle capabilities and resources. Reporting the transition process as a management challenge will ensure that transition activities have the visibility and accountability necessary for the Agency to successfully transition to the next generation of space vehicles.

Management Actions

NASA began taking corrective action in response to our discussion draft and draft reports. Since those reports were issued, the Agency began formulating a transition WBS, initiated efforts to develop the metrics needed to define transition success, developed multi-program integrated milestones, and began development of a stakeholder communications initiative. We believe that those actions are a good first step in ensuring that the elements critical to transition are comprehensively addressed and appropriately managed. However, NASA must ensure that it continues to emphasize the transition process and promptly completes the corrective actions planned in response to this report. Completion of those actions should facilitate the development of a comprehensive transition plan and the implementation of a sound and robust transition process.

Management's Comments on the Finding and Evaluation of Management's Comments

Management's Comments. NASA management (the Associate Administrators for SOMD and ESMD and the Chief Engineer) concurred with the general intent of the report and the specific findings for seven of the eight transition elements that we deemed critical for a successful transition. NASA management stated that some of our observations, conclusions, and recommendations might be the result of a differing understanding of the purpose of the transition plan. Specifically, NASA intended the plan to provide overarching programmatic transition planning guidance and the framework to

[10] That Agency-level council is the Operations Management Council, which conducts special quarterly meetings to discuss the status of each management challenge.

develop lower–level transition plans as well as decision-making and evaluation processes. Management stated that it believes the plan is effective in that context and is a foundational element in the broader transition effort.

Regarding the transition elements, NASA concurred with the findings concerning seven transition elements (WBS, Metrics, Milestone Review, Communication Plans, Property Disposition, Centralized Data Management System, and Decision Thresholds and Post-2010 Governance). For the one transition element not concurred with (Cost Estimates), NASA management stated that costs for Space Shuttle transition and retirement activities for FY 2007 through FY 2010 are incorporated in the SSP budget for FY 2008. Cost estimates will continue to be refined through the Planning, Programming, Budgeting, and Execution process and updated estimates generated during the FY 2007 process will be used as cost targets for the second revision of the transition plan.

Evaluation of Management's Comments. We agree that the transition plan should provide overarching guidance and the framework to develop lower–level plans. However, the transition plan did not comprehensively address certain critical elements that we believe are necessary to a successful transition, which is applicable at any plan level. Comprehensively addressing the elements should ensure that adequate information and direction is provided concerning overall transition activities and facilitate development of the lower–level plans.

Regarding cost estimates, we agree that the transition cost estimates should be refined through the Planning, Programming, Budgeting, and Execution process. However, the transition plan does not contain a requirement to prepare a detailed cost estimate based on specific transition tasks or requirements. In the comments, NASA management agreed to develop an integrated transition WBS to be incorporated into Revision 1 of the transition plan. If that WBS identifies specific transition tasks and requirements, it would facilitate preparation of a more precise and comprehensive cost estimate—the preparation of which should be required in the transition plan.

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

Recommendation 1. The Chief Engineer should develop guidance within the NASA Procedural Requirements 7120 series that clearly defines and establishes requirements for managing closeout and transition for programs of the SSP's magnitude.

Management's Response. The Chief Engineer concurred, stating that NPR 7120.5D, "NASA Space Flight Program and Project Management Requirements,"[11] requires that

[11] As of the date of this report, NPR 7120.5D had not been issued. When issued, NPR 7120.5D will supersede NPR 7120.5C for space flight programs and projects; all other programs and projects will continue to use NPR 7120.5C.

decommissioning and disposal plans be formulated and implemented throughout Program/Project Phases C (Final Design and Fabrication), E (Operations and Sustainment), and F (Closeout). The Chief Engineer also stated that the NPR requires that a decommissioning review be conducted in Phase F to confirm the decision to terminate or decommission the system. He added that the entry and success criteria for each of the Program/Project phases is located in Table G.18 of NPR 7123.1A, "NASA Systems Engineering Processes and Requirements,"[12] the text of which is included in the comments.

Evaluation of Management's Response. Management's comments do not satisfy the intent of our recommendation. We recognize that the guidance contained in the NASA Procedural Requirements 7120 and 7123 series sufficiently addresses decommissioning and disposal for most programs and projects. However, the intent of our recommendation was that additional guidance on transitioning the responsibility for certain SSP personnel, hardware, and ground systems to another Mission Directorate (ESMD) would be helpful in ensuring comprehensive and well coordinated activities when closing out a program of the SSP's magnitude. Currently, requirements for managing such a process are not clearly addressed in NASA guidance. We request that the Chief Engineer reconsider his position and provide additional comments on the final report with regard to developing the additional guidance.

Recommendation 2.a. The Associate Administrators for ESMD and SOMD should revise the Human Space Flight Transition Plan to comply with applicable project management guidelines as stated in NPR 7120.5C, and to include provisions for security of facilities and asset end-states associated with its property disposition process.

Management's Response. The Associate Administrators for ESMD and SOMD nonconcurred, stating that ESMD, SOMD, and the Chief Engineer made a conscious choice not to designate SSP transition as a separate project requiring a separate implementation of NPD 7120.5D.[13] The three major programs involved in transition (ISS, SSP, and Constellation Systems) are at different life–cycle phases and the transition activities conducted within each of the programs will be managed consistent with the NPD. The Associate Administrators stated that all transition activities will be planned and controlled using accepted technical management methods, which are the foundation of NASA's guidance.

Evaluation of Management's Response. Although the Associate Administrators nonconcurred, their comments are responsive to the intent of our recommendation. In their response, the Associate Administrators stated that the transition activities will be

[12] As of the date of this report, NPR 7123.1A had not been issued. When issued, NPR 7123.1A will supersede NPR 7123.1.

[13] The written comments (Appendix D) cite NPD 7120.5D; however, discussions with the SOMD Transition Manager and the Exploration Manager indicated that the guidance cited should have been NPR 7120.5D, not NPD 7120.5D.

conducted consistent with the intent of NASA program and project management guidance. Our recommendation did not require that transition be designated as a separate project; it requested that transition activities be conducted in accordance with project management guidelines. Management's plan to use those guidelines for transition activities meets the intent of the recommendation. The recommendation is resolved and will be closed upon verification that management has taken corrective action to address each of the critical transition elements discussed in the report.

Recommendation 2.b. The Associate Administrators for ESMD and SOMD should finalize and implement the Human Space Flight Transition Plan.

Management's Response. The Associate Administrators concurred, stating that the Transition Plan, issued November 12, 2006, was baselined and will be updated in response to this report and the FY 2009 Planning, Programming, Budget, and Execution process.

Evaluation of Management's Response. Management's comments are responsive. The recommendation is resolved and will be closed upon issuance of a revised transition plan that addresses the issues discussed in this report

Recommendation 3. The Associate Administrator for SOMD should request that the Operations Management Council recognize and track SSP transition as an Agency management challenge.

Management's Response. The Associate Administrator for SOMD and ESMD nonconcurred stating that the content of the Transition Plan demonstrates that no control deficiencies exist within the Shuttle Transition process. The Associate Administrators stated that the basis for the recommendation was the lack of a signed plan, which is no longer applicable. Finally, the Associate Administrators stated that NASA's Strategic Management Council directed that SSP transition be reported through the Program Management Council and not the Operations Management Council.

Evaluation of Management's Response. Although the Associate Administrators nonconcurred, their comments are responsive to the intent of our recommendation. The requirement to report transition activities through the Program Management Council meets our intent that senior officials are well informed of transition issues and activities. Therefore, the recommendation is resolved and closed.

APPENDIX A

Scope and Methodology

We interviewed ESMD, SOMD, SSP, Constellation Systems Program, and various project-level personnel at NASA Headquarters, Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center to discuss transition organization and milestones, as well as the development of the draft transition plan. We also interviewed officials within the Office of the Chief Engineer to discuss NASA's approach for formulating transition activities and requirements for termination of a program or project. We attended transition board meetings and budget meetings to observe the process for reviewing transition-related activities.

We reviewed Version 7 of NASA's draft transition plan, which we received from SOMD on May 30, 2006, and October 17, 2006. We reviewed the final "Human Space Flight Transition Plan" (TCB-001, November 12, 2006) and compared the final plan to the draft transition plan (Version 7) that we reviewed for this report. We determined that there was no material difference and that the issuance of the final plan does not affect our conclusions or recommendations. We also reviewed Federal laws, Agency policy, and other documents concerning program termination and transition activities:

- Office of Management and Budget Circular No. A-123, "Management's Responsibility for Internal Control," December 21, 2004.
- The Government Performance Results Act of 1993.
- NPD 1000.0, "NASA Strategic Management and Governance Handbook," August 2005.
- NPD 1000.3B, "The NASA Organization w/Change 21 (4/6/06)," July 30, 2004.
- NPD 1200.1D, draft "NASA Internal Control and Accountability," undated.
- NPD 7120.4C, "Program/Project Management," (Revalidated for 1 year 03/02/2006).
- NPR 7120.5C, "NASA Program and Project Management," March 22, 2005.
- Draft charters for the Agency-level TCB and JICB and the charter for the TPRCB.
- SSP correspondence designating key transition officials.

We developed a model to evaluate the transition plan. The model includes Agency policy and procedures concerning major program planning and management, best practices and lessons learned from SSP benchmarking studies, and recommendations from GAO

reports. We grouped the lessons learned, recommendations, and requirements into 13 categories to evaluate and make recommendations for improving NASA's transition plan. Our transition model is in Appendix C.

We performed this audit from January 2006 through January 2007 in accordance with generally accepted government auditing standards. We conducted fieldwork at NASA Headquarters, Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center.

Use of Computer-Processed Data. We did not perform a detailed assessment of the reliability of the values reported for SSP assets in the ISOS SSP Transition Panel report or the SSP's range for estimated transition costs through 2015. We reviewed supporting documents for the asset values reported in the ISOS report but did not validate those values. We did not perform any testing of the SSP's transition cost estimates because the SSP considered the estimates preliminary. However, changes in the asset values and transition cost estimates would not change our conclusions or recommendations.

Review of Internal Controls

We reviewed internal controls for NASA's transition activities related to authority, responsibility, and organizational structure; policies and procedures; and oversight functions. In November 2006, NASA issued its transition plan that defined roles and responsibilities and provided for a transition governance structure; however, the plan did not comprehensively address all elements that we determined critical to a successful transition. Implementing the recommendations in this report to comprehensively address those critical elements should improve the internal controls over the transition process.

Prior Coverage

During the last 5 years, GAO has issued five reports of particular relevance to the subject of this report. Unrestricted GAO reports can be accessed over the Internet at http://www.gao.gov.

"NASA: Long-Term Commitment to and Investment in Space Exploration Program Requires More Knowledge" (GAO-06-817R, July 17, 2006)

> The report, which discusses NASA's status on implementing the President's Vision for Space Exploration, states that although NASA is continuing to refine its exploration architecture cost estimates, the Agency cannot provide a firm estimate of what it will take to implement the architecture. In addition, the report states that NASA will be challenged to implement the exploration architecture with its projected budget. The report also discusses NASA's acquisition strategy for the CEV and states

that the strategy places the project at risk for cost overruns, schedule delays, and performance shortfalls.

"DoD Business Systems Modernization: Important Progress Made in Establishing Foundational Architecture Products and Investment Management Practices, but Much Work Remains" (GAO-06-219, November 2005)

The report discusses the status of DoD's efforts to develop a transition plan for implementing its business enterprise architecture. The report also identifies requirements that Congress levied on DoD for developing its transition plan.

"Space Shuttle: Actions Needed to Better Position NASA to Sustain Its Workforce through Retirement" (GAO-05-230, March 2005)

The report discusses NASA's strategy for sustaining its workforce through the Space Shuttle's retirement. The report states that efforts, such as assessing hardware and facility needs that will ultimately aid the program in determining workforce requirements, are being delayed because of the near-term focus on returning the Space Shuttle to flight. The report also states that NASA faces uncertainties regarding the implementation of future aspects of the President's Vision and lacks well-defined objectives or goals on which to base its workforce planning efforts. GAO recommended that NASA identify its future workforce needs using scenario planning.

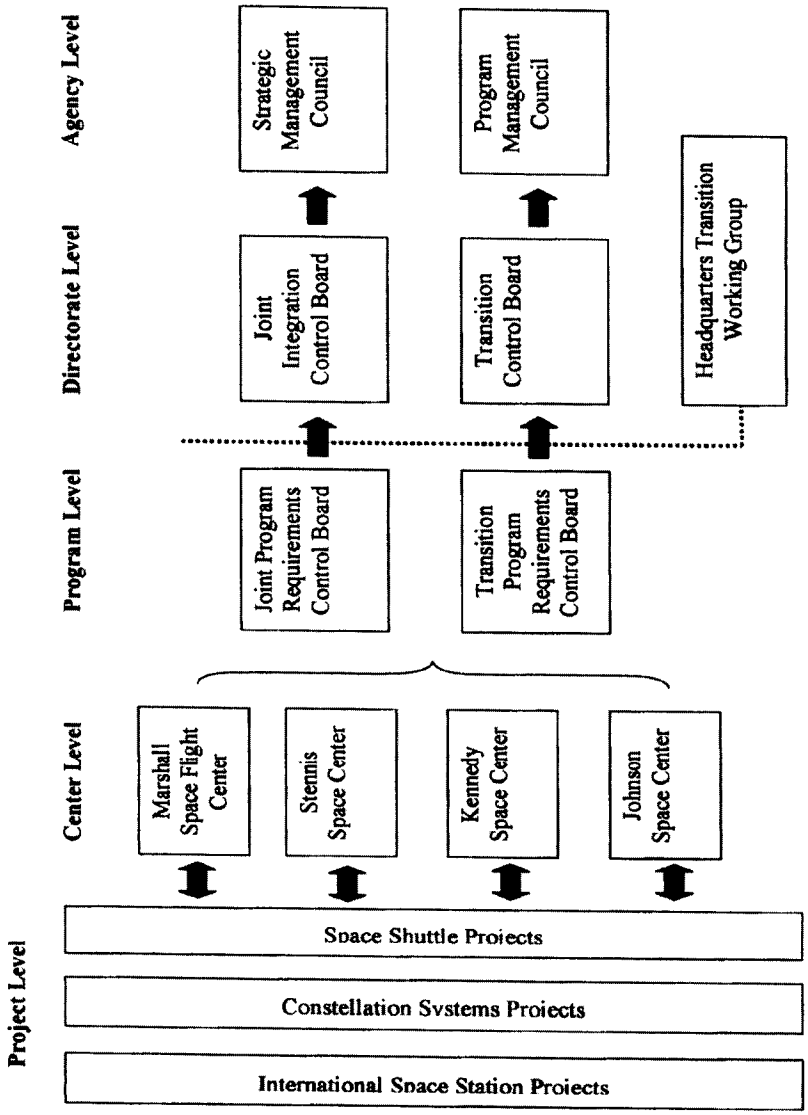
"DoD Business Systems Modernization: Important Progress Made to Develop Business Enterprise Architecture, but Much Work Remains" (GAO-03-1018, September 2003)

The report discusses the status of DoD efforts to develop a transition plan for implementing its business enterprise architecture. The report discusses key elements for a transition plan, to include identifying and analyzing the gap between current and future business processes and systems; identifying systems that will not become part of the new architecture; and establishing a time-based strategy for replacing legacy systems.

"Business Systems Modernization: Summary of the GAO's Assessment of the Department of Defense's Initial Business Enterprise Architecture" (GAO-03-877R, July 2003)

This summary reports on initial DoD efforts to develop a transition plan for implementing its business enterprise architecture. The report identifies key elements of a transition plan, including a statement of resources needing to transition to the new environment.

TRANSITION GOVERNANCE STRUCTURE



TRANSITION MODEL

We developed a model to evaluate NASA's plans to retire the SSP and transition to the Constellation Systems Program (see the following table). We identified 151 lessons learned, recommendations, and requirements from the following guidance, SSP benchmarking studies, and reports:

- NPR 7120.5C, "NASA Program and Project Management Processes and Requirements," March 22, 2005
- Human Space Flight Transition Team, "Lessons Learned from Titan IV Program Close-Out, Fly-out and Phase-out Strategies," July 22, 2004
- Human Space Flight Transition Team, "Lessons Learned from the Department of the Navy Base Realignment and Closure Activities, Closure of Naval Station Roosevelt Roads, Fly-out and Phase-out Strategies," September 17, 2004
- Human Space Flight Transition Team, "Lessons Learned from the NASA Industrial Facility Closure in Downey, CA, Fly-out and Phase-out Strategies," September 17, 2004
- Human Space Flight Transition Team, "Lessons Learned from the Boeing A/V-8B and F/A-18 Production Line Transition Strategies, Fly-out and Phase-out Strategies," November 24, 2004,
- NASA Space Shuttle Strategic Planning Office, "Lessons Learned From NASA Program Closures, Initial Release," November 22, 2005
- GAO Report, "DoD Business Systems Modernization: Important Progress Made to Develop Business Enterprise Architecture, but Much Work Remains" (GAO-03-1018, September 19, 2003)
- GAO Report, "Space Shuttle: Actions Needed to Better Position NASA to Sustain Its Workforce through Retirement" (GAO-05-230, March 9, 2005)
- GAO Report, "NASA: Long-Term Commitment to and Investment in Space Exploration Program Requires More Knowledge" (GAO-06-817R, July 17, 2006)
- Integrated Space Operations Summit III, "Space Shuttle Program Transition Final Report," April 15, 2005

We grouped each lesson learned, recommendation, and requirement into 13 categories to evaluate and make recommendations for improving NASA's transition plan.

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Guidance														
NPR 7120.5C	1.1 Introduction. The project is identified by a NASA program, program commitment agreement, and/or unique work breakdown structure number and has an official title. Provide a reference to the governing Program Plan.													
	Provide a brief general history and summary to include the project's purpose, goals, overall approach, and timeframe. Identify previously conducted projects, studies, proposals, concept study reports, experiments, related activities or any other information appropriate to providing a perspective on the project.													
	Describe participation, if any, of other NASA Centers as well as other Government agencies, industry or international partners. Provide key project dates, such as launch, arrival or other event, and end of mission. Refer to the section of the plan containing the project schedule.													
	Briefly describe the process for controlling project plan changes. Include the approval authority for changes to the plan.	X								X	X			

Transition Model															
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	1.2 Objectives. State the specific project objectives and performance goals and their relationship to the program objectives and goals. Performance goals should be stated in an objective, quantifiable, and measurable form. Include technology objectives and related performance goals, if applicable, and state them in objective, quantifiable, and measurable form. Include project-specific high-level requirements. State the full mission success criteria clearly and concisely in a form suitable for objective verification and validation. State the minimum mission success criteria associated with the high-level project requirements that, if not met, trigger a possible termination review.		X							X			X	
	1.3 Mission Description. Provide a brief overview of the mission, indicating important characteristics of the mission, such as mission trajectory and a brief description of the phases and events on the mission timeline. Drawings, figures, or charts may be used for clarification.										X			

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	1.4 Customer and Stakeholder Definition and Advocacy. State the customers and stakeholders of the project and the process to be used to ensure customer advocacy.			X										
	1.5 Project Authority. Identify the Center where the Project Manager resides, other Centers' responsibilities, and the Governing Project Management Council responsible for oversight of the project. Provide a chain of accountability and a decision path that outlines the roles and responsibilities of the Project Manager, Program Manager, Center Director, and other authorities as required.													X

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	1.6 Management. Describe the project management structure consistent with the work breakdown structure, including organization and responsibilities, integration into the program management structure, and NASA Center participation. Include clear lines of authority and reporting; illustrate the organization graphically. Identify all significant interfaces with other contributing organizations. Describe the process for problem reporting and subsequent decision making, clearly describing the roles and responsibilities of all organizations. Identify specific management tools to support management in planning and controlling the project. Describe any use of special boards and committees. Address any requirement for a NASA Resident Office, including duties and authority.			X										X

Transition Model														
Guidance/Study/Report	**Requirement/Recommendation**	**Approach**	**Assessments**	**Communication and Outreach**	**Contracts**	**Cost**	**Data Management**	**Environment**	**Human Capital**	**Metrics**	**Milestones**	**Property Disposition**	**Requirements**	**Roles and Responsibilities**
NPR 7120.5C	1.7 Governance Structure. Describe the governance structure based on the project category. Describe the process that the project will follow to communicate to the Governing Project Management Council, Mission Directorate, Mission Support Office, and Program Manager. Include clear lines of authority and reporting, including frequency of reporting.			X										X
	1.8 Project Requirements. Document the project requirements. Identify key performance parameters and success criteria as a "flow down" from the program requirements. This includes the allocation of those requirements and success criteria among the systems to be developed, both hardware and software. Describe the process by which project requirements are validated for compliance with program requirements. Describe the process for controlling changes to these requirements.		X							X			X	

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	1.10 Implementation Approach. The implementation approach of the project should be included, as well as a project work breakdown structure and work breakdown structure dictionary. Make-or-buy plans and trade studies should also be included.	X												
	2.1 Schedules. Document the project's integrated master schedule for all major events, independent reviews, and other activities throughout the life cycle of the project. Include approval dates for principal project documentation, life-cycle transitions, major reviews, program-controlled milestones, and significant contract milestones. Identify lower level schedules to be developed and maintained.										X			

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	2.2 Resources. Funding Requirements: Document the initial life-cycle cost estimate consistent with the project work breakdown structure, schedule, and performance parameters to form the project estimate baseline. Present a funding requirements chart that includes the same elements as for the acquisition summary. Indicate the new obligation authority in full cost real-year dollars for the prior, current, and remaining fiscal years. The displayed detail should cover major elements of cost					X								
	2.4 Performance. Describe the project-specific key performance parameters and establish quantitative goal and threshold values for each to be achieved at each milestone.									X				
	3.1 Communications Plan. Describe the communications plan for fostering effective communication of critical management, technical, risk and safety information. Define the relationships among various project elements within the project structure and clearly state the responsibilities for problem reporting and subsequent decision making. Define the relationships and interactions with all stakeholders, team members, and supporting organizations.			X										X

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	3.2 Control Plan. All technical performance, risk, cost, or schedule parameters specified as requiring approval by the Administrator, the Mission Directorate Associate Administrator, Center Director, or Program Manager, should be identified. Describe the project earned value management implementation strategy. Examples include funding by year, threshold key performance parameters, success criteria, program requirements, project objectives, requirement deviation or waivers, management structure, and major program/project documentation. Identify the thresholds associated with each parameter that could cause a change request. Describe the configuration management approach that the project team will implement. Reference the project Configuration Management Plan, if applicable.						X			X				

Transition Model															
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	3.5 Cooperation and Commercialization. Describe all agreements, memorandums of understanding, barters, in-kind contributions, and other arrangements for collaborative or cooperative relationships. List all such agreements necessary for project success. Include all agreements concluded with the authority of the Project Manager and reference agreements concluded with the authority of the Program Manager and above. Identify opportunities for establishing partnerships with private industry, academia, or other governmental organizations to conduct dual-use research, develop mutually beneficial technologies, and transfer results into NASA for mission use and the private sector for commercial application.			X										

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	3.7 Environmental Management Plan. Identify the documentation and schedule of events associated with environmental compliance considerations (National Environmental Policy Act and other requirements). This includes a preliminary Environmental Evaluation and Record of Environmental Consideration signed by the Center National Environmental Policy Act Document Manager, which may lead to an environmental assessment or an Environmental Impact Statement.							X			X			
	3.10 Reviews. Summarize the approach to a continuum of reviews for the project life cycle. Provide the names, purposes, content, and timing of the critical milestone reviews. Describe the process for selecting the independent assessment team and the communication requirements of the results. Explain the reporting requirements for program and project reviews. Reference the Project Review Plan, as appropriate.		X											

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
NPR 7120.5C	3.11 Configuration Management Plan. Describe the structure of the configuration management organization and tools to be used. Identify the methods and procedures to be used for configuration identification, configuration control, interface management, configuration traceability, and configuration status accounting and communications. Describe how configuration management will be audited and how contractor configuration management processes will be integrated with the project.						X							
	3.12 Education and Public Outreach Plan. Describe planned efforts and activities to improve science literacy by engaging the public in understanding the project, its objectives, and benefits. Summarize plans to stimulate interest in science, engineering, and technology through mission-related outreach activities.			X										
	3.14 Knowledge Capture. Summarize the approach to knowledge capture on the project as well as the methods for contributing knowledge to other entities and systems. This includes the development and maintenance of an electronic project library.								X					

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Benchmarking Studies														
Lessons Learned from the Titan IV Program Close-out	Key management decisions regarding the remaining number of flights in the SSP are necessary to begin retirement activities.												X	
	Separate the SSP retirement activities into distinct fly-out and phase-out programs.	X												
	The fly-out program has priority over the phase-out program. Safety and mission success are more important than phase-out activities.	X												
	Personnel retention is a major issue that must be addressed.								X					
	The Titan Program was congressionally directed to close out their operations. The SSP requires that level of direction to proceed.			X										
	A separate phase-out budget is required.					X								
	Environmental remediation is a major issue that must be addressed.							X						

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Management should not be based on rumors. Stakeholders should agree on ground rules at the start of planning and continue them throughout the phase-out.												X	
	Avoid the "Sanford and Son" mentality of saving items unnecessary for program fly-out or follow-on programs.											X		
	Begin early by disposing of excess equipment. Implementing a program-level "clean desk policy" will discreetly exercise the property disposal process and highlight any areas of weakness for improvement before the full-scale phase-out disposal.	X									X	X		
	Determine facilities, tools, skills, processes, and equipment necessary to complete the fly-out, and tie the phase-out schedule for those items to specific program milestones (not calendar dates).	X									X		X	
	Items not tied directly to fly-out milestones are immediate candidates for phase-out.	X									X	X		

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Strategic assessment should account for sparing policies and capabilities needed in off-nominal cases.	X												
	Identifying equipment for follow-on program re-use is very important. This advanced planning will avoid high replacement costs due to premature close-out.	X											X	
	To avoid the loss of critical skills personnel, implement skills retention programs and performance incentives as soon as possible.								X					
	Open and honest two-way communication with all employees is critical to alleviate concerns about employment and financial stability and to ensure mission success.			X										
	Management should be respectful and patient with the emotional ties that their employees have to the retiring program. Encouraging their continued participation will ensure successful program retirement.			X					X					
	Provide career transition assistance and placement programs for employees.								X					

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Titan managers repeatedly emphasized the importance of establishing a mindset shift from a traditional logistics inventory of spares to a philosophy that accounts for all materials and protects those items essential for fly-out.	X												
	Physical verification of inventory, sparing requirements, and handling procedures are essential throughout fly-out planning and implementation.	X												
	Continuously reexamine the fly-out assumptions and make sure efforts are continuously coordinated with the phase-out program.			X									X	
	Appoint a knowledgeable phase-out manager and a small and flexible phase-out team.													X
	The phase-out manager should work with the fly-out manager to identify and document top-level fly-out requirements that impact phase-out.			X									X	
	The phase-out plan should organize and integrate phase-out activities with the fly-out program, and tie them to program milestones.	X									X			

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Plan to remove inactive facilities early and disposition each facility in sequence from low program priority to high.										X	X		
	The Titan Program dispositioned before the last flight approximately 30 percent of its inventory, which were items not necessary to complete fly-out. The SSP may have a similar amount.										X	X		
	Phasing out the SSP will affect other projects and programs that share SSP resources. Identify these entities and impacts early to provide ample notice that existing SSP resources will no longer be available. This will be a diplomatic exercise and will require negotiation since many items will be politically charged. These issues will take time to resolve.	X		X							X			
	Critical skills associated with phase-out (contract management, facility managers) should be identified early. Retention and incentive plans must be developed to support the phase-out program specifically.	X							X		X			

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Contracts will need to be modified to support the phase-out activities. Tie contract activities to fly-out milestones rather than calendar dates, where possible.				X						X			
	The phase-out manager should understand the rules, regulations, and laws governing support services, such as the Federal Acquisition Regulations, and work together with the Defense Marketing and Reutilization Office and the Defense Contract Management Agency to efficiently phase down the program.			X										
	To prevent contract close-out delays, use experienced negotiating teams and work closely with the Defense Contract Audit Agency to resolve open issues early and while knowledgeable personnel are still there.			X	X									

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	The phase-out team must have a good internal cost estimating and evaluation process in place to manage cost and schedules and to adjust when required. A precise understanding of the environmental risks and required remediation actions is fundamental to develop sound cost estimates from which contract price negotiations for phase-out will be based.					X		X						
	Titan's environmental costs associated with phase-out represent about 30 percent of the total phase-out costs and account for the majority of program cost uncertainty.					X		X						
	The cost of environmental remediation for the SSP may be higher than for the Titan program because the SSP is a larger program. The environmental baseline will help determine the estimated cost.					X		X						
	Understanding the initial environmental baseline, the regulatory restrictions that vary by location, the desired end-state, and any anticipated changes in regulations will help the SSP keep disposal and remediation costs down.					X		X				X	X	

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Titan IV Program Close-out	Early comprehension of environmental scope and requirements will save time and cost.					X		X						
	To effectively navigate the constantly changing environmental laws, the SSP close-out team needs a person who is knowledgeable in the technical and regulatory aspects of each target phase-out location.							X						X
	If the SSP suspects it has highly toxic contamination sites, such as hypergolic test facilities, begin the remediation efforts early.							X			X			
Lessons Learned from the Department of the Navy Base Realignment and Closure (BRAC) Activities	The Department of Defense's Base Realignment and Closure process is a tool that the Navy uses to implement closure of a station or facility. SSP can study the Base Realignment and Closure process to understand various options, considerations, and requirements for its activities.	X		X										
	NASA needs an overarching strategy for SSP retirement that guides close-out decision making and enables transition to follow-on program(s).	X												

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Department of the Navy Base Realignment and Closure (BRAC) Activities	Perform a strategic assessment internal to the SSP to produce clear mission execution requirements and enable transition planning.	X												
	Once the internal SSP requirements are understood, expand the strategic assessment to include the International Space Station Program, other NASA Centers, and other external customers.	X											X	
	Develop a strong, comprehensive communication plan that can be tailored for each close-out location. It should address open, frequent communication with internal and external audiences.			X										
	Identify or build a database to contain information regarding all close-out facilities. The information should include items such as environmental condition, property specifications, governing regulations, and permits.	X					X							
	Build metrics from the database to report close-out progress to stakeholders and others.			X						X				

Transition Model														
Guidance/Study/Report	**Requirement/Recommendation**	**Approach**	**Assessments**	**Communication and Outreach**	**Contracts**	**Cost**	**Data Management**	**Environment**	**Human Capital**	**Metrics**	**Milestones**	**Property Disposition**	**Requirements**	**Roles and Responsibilities**
Lessons Learned from the Department of the Navy Base Realignment and Closure (BRAC) Activities	Be aware of any security and maintenance requirements for a dispositioned facility.											X		
	Do not make management decisions based on rumors of potential buyers or interested parties. Consider only those who have the funds and/or support to substantiate their interest.	X												
	The General Services Administration and the Defense Reutilization and Marketing Office can be helpful and innovative arbiters of property sales.			X								X		
	Be aware of contracting options to expedite or better manage close-out activities. An example is sole-sourcing to save time and money in the award process.				X									
	Address Government-owned, contractor-operated facilities early because they may contain potential undisclosed liability issues.	X									X			
	Implement a retention plan for key personnel early in the process.								X		X			

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Department of the Navy Base Realignment and Closure (BRAC) Activities	Consider getting special legislation to direct close-out implementation. Legislation can also direct funds from SSP property sales that would normally go into a general treasury fund to return to an earmarked account for SSP close-out.			X		X								
	Organize a facilities and environmental team to monitor all permits and respond quickly to pending threats. Careful planning of the changing close-out environment is required to meet realistic and achievable permit levels.							X						X
	Engage early with state historical preservation officers to foster a good working relationship and accomplish close-out objectives.			X							X	X		
	Expect environmental costs to be a considerable portion, approximately 30 percent, of the overall close-out budget.					X		X						
	The SSP closure must follow the National Environmental Policy Act requirements. Navy base realignment and closure processes could help guide NASA processes.	X		X				X						

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Department of the Navy Base Realignment and Closure (BRAC) Activities	Develop an initial list of SSP locations subject to possible closure and determine the SSP responsibility in clean-up of these facilities.	X						X						
	Wetland and air credits may be valuable in negotiating a property close-out or sale.							X				X		
Lessons Learned from the NASA Industrial Facility Closure in Downey, CA	Some areas that may require great effort are personnel and equipment moves, environmental issues, and historical preservation.							X	X			X		
	Form a close-out team that includes representatives from key players and stakeholders, such as NASA, program contractors, historical interests, environmental contractors, General Services Administration, and local and state representatives.													X
	SSP needs congressional and NASA Headquarters-level direction to drive the program close-out. The direction should discuss the follow-on program, which capabilities should be preserved, and other specific requirements.			X									X	

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the NASA Industrial Facility Closure in Downey, CA	SSP should seek congressional support and funding for the close-out. Consider working with NASA legislative affairs to draft the verbiage.			X		X								
	SSP should perform a strategic assessment of total program assets, skills, and capabilities. Identify phase-out candidates and streamline operations to gain efficiencies.	X												
	Due to the size and scope of the SSP close-out activity, consider creating regional sub-plans to ensure that appropriate attention can be given to all activities.	X												
	Understanding requirements for the end-state of each site will drive close-out tasks.												X	
	The costs of the Downey closure are indicative of what other Government-owned, contractor-operated site closures may cost.					X								
	Congressional buy-in is needed when specific sites are closed out. These decisions may open debate and require sensitivity to settle the matters.			X								X		

Transition Model														
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Lessons Learned from the NASA Industrial Facility Closure in Downey, CA	Candidates for early phase-out to exercise the disposition processes are stored tooling in the Michoud facility, unpopulated parcels of land, and tooling that may contain asbestos or lead-based paints.										X	X		
	Begin working with the historical register early in phase-out planning to assess what items may present issues and to resolve them efficiently during phase-out.										X	X		
	Establish criteria to determine which documents and records to keep, in what form, and how they should be dispositioned.						X						X	
	Consider developing a database or indexing tool to catalog the documents and information that are stored.						X							
	The tooling that original equipment manufacturers have in their facilities must be accounted for when assessing real property status.	X												
	Ensuring the security and maintenance of a close-out site is very important to protecting the general public as well as the asset value.											X		

Transition Model														
Guidance/Study/Report	**Requirement/Recommendation**	**Approach**	**Assessments**	**Communication and Outreach**	**Contracts**	**Cost**	**Data Management**	**Environment**	**Human Capital**	**Metrics**	**Milestones**	**Property Disposition**	**Requirements**	**Roles and Responsibilities**
Lessons Learned from the NASA Industrial Facility Closure in Downey, CA	Seek legal support regarding export control. SSP may be required to demilitarize equipment, tooling, and other items to comply with Federal export control rules.											X		
	Perform assessments of critical skills to identify personnel who need to be retained.	X							X					
	Develop a comprehensive retention package to keep critical employees, knowledge, and experience within NASA.								X					
	Perform environmental baseline assessments of SSP sites early. Solid baselines will enable clearer definition of tasks and associated costs.					X		X			X			
	Perform environmental remediation only to the extent that the law requires it. Otherwise, time, money, and effort will be wasted trying to meet unreal requirements or satisfying others' concerns or responsibilities.							X						

Transition Model															
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the NASA Industrial Facility Closure in Downey, CA	Develop an external communications plan to address each close-out site's personnel, the surrounding community, and other public relations.			X										
	Develop an effective internal communications plan to establish efficient and appropriate flow of information and to ensure buy-in from stakeholders for each site.			X										
	Consider hiring public relations expertise to form a strategic communications plan.			X										
Lessons Learned from the Boeing A/V-8B & F/A-18 Production Line Transition Strategies	Stakeholder decisions, such as follow-on programs or future support needs, must be made early to determine the requirements of SSP retirement.										X		X	
	Determine facilities, tools, skills, processes, and equipment necessary to complete SSP fly-out, and tie the phase-out schedule for these items to specific program milestones (not calendar dates).	X									X		X	

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Boeing A/V-8B & F/A-18 Production Line Transition Strategies	Consider Boeing's build-to-complete team model for SSP fly-out and phase-out. Modify the structure by delegating similar functions through the fly-out manager. Any configuration changes would be processed through the SSP Program Review Control Board. The process allows the phase-out manager to perform organized disposition while ensuring the achievement of program objectives.													X
	Consider initiatives to maintain or boost employee morale during fly-out and phase-out planning. Morale can be affected significantly at the end of a program, which can affect the safety and quality of the mission.								X					
	Personnel retention will be a very important issue.								X					
	Communication is critical. Hold frequent meetings with team members and stakeholders to ensure an organized, successful effort.			X										
	Perform a physical inventory of spares to determine requirements through program fly-out and phase-out.	X											X	

Transition Model														
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Lessons Learned from the Boeing A/V-8B & F/A-18 Production Line Transition Strategies	Factor into the SSP transition plan the time that it will take to assess the entire parts inventory of the program.	X									X			
	Writing requirements should be a process that includes all stakeholders and should begin early in transition. Well-defined tasks are usually not challenged.										X		X	
	Early meetings with stakeholders should identify program direction and risks, milestones for fly-out and transition, funding constraints, technical requirements, and post-flight support needs.					X					X		X	
	Perform a transition strategic analysis early. The analysis should include all assets, skills, and capabilities and address when they may be reduced or eliminated.	X									X			
	Develop mitigation strategies to repair "reasonable" failures, and ensure separate shutdown funding allocation.					X								
	Implement a least-cost scrap process.											X		

Transition Model

Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from the Boeing A/V-8B & F/A-18 Production Line Transition Strategies	Decide early how to analyze the SSP equipment for disposition, and then build the tools to help manage the disposition process.	X					X				X	X		
	Part-to-tool relationships need to be known to ensure that all needed SSP or follow-on capabilities can be readily tracked and supported.	X												
	The disposition of hardware should be accomplished by contract and program requirements, not by region or geographic location.				X							X	X	
Lessons Learned from NASA Program Closures	Be flexible—programmatic or regulatory changes can invalidate previous decisions. Ensure flexibility by making decisions at the lowest management level possible.													X
	An integrated schedule is essential and must be populated by corresponding logistics, flight hardware, resource integration, and facilities schedules.										X			
	Control the close-out contract and include explicit contractual language to describe the roles, responsibilities, and reporting structure for the close-out tasks.				X									

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from NASA Program Closures	Do not overanalyze items in the initial assessment. Money and time can be better spent in the later checks with system experts during the disposition schedule.	X												
	Perform incremental sweeps and a final sweep of inventory at the end of the program to capture what might have been overlooked.	X									X			
	Begin the processes of knowledge capture while the project offices and personnel are still intact, before personnel begin to move to other programs.								X		X			
	Track both civil service and contractor personnel after their transfer out of the SSP and into retirement so that technical knowledge can be located.								X					
	Retention bonuses can be essential to keeping critical personnel until project completion.								X					
	Develop a policy or plan that addresses the distribution of dispositioned SSP property and the uncontrolled removal of parts and assemblies.											X		

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Lessons Learned from NASA Program Closures	When making decisions, consider the ongoing costs associated with mothballing versus abandoning a facility.					X						X		
	Consider maintaining equipment certification, rather than trying to recertify after a mothballed period.											X		
	Be aware of the impacts of changes to flight hardware status—it could be costly to downgrade a piece and later upgrade it for use by another program.	X				X								
	Communicate clearly and appropriately with Headquarters, Congress, and interested stakeholders to ensure they understand the rationale behind key decisions.			X										
	Formal media training for SSP transition leaders may be beneficial for interactions with technical and public communities.			X										
	For community relations, be as honest as you can, get as much information as you can, and give the community plenty of opportunities to get the information.			X										

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Reports														
GAO-03-1018	Provide a gap analysis that compares the "As Is" and "To Be" architectures to identify differences.	X												
	Identify all of the systems that will not become part of the "To Be" architecture as well as the timeframes for phasing out those systems.	X									X			
	Show a time-based strategy for replacing legacy systems, including identification of intermediate systems that may be temporarily needed.	X									X			
	Define the resources (funding and staff) needed to transition to the target environment.					X			X					
GAO-05-230	Identify future workforce needs based on various future scenarios and develop strategies for meeting the needs of potential future scenarios.								X					
	Include provisions in future SSP contracts requiring contractors to take steps to prepare for sustaining their workforce, such as submitting critical skills retention plans.				X				X					

Transition Model

Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
GAO-06-817R	NASA needs to identify a realistic amount of resources necessary to achieve its short-term goals.					X								
Integrated Space Operations Summit Space Shuttle Program Transition Panel Final Report	Develop an integrated SSP transition plan to include integration, implementation, management, and schedule.	X												
	Create a transition manager position outside of the SSP to oversee the implementation of the process, authorize funds as required, lead the Agency transition team, and advise Agency boards during the decision-making process.													X
	Develop an Agency-wide transition process through which SSP assets will be evaluated for future needs and dispositioned appropriately.	X												
	Develop a detailed budget estimate of SSP retirement costs, including retirement planning activities, transition/phase-out implementation, and human capital retention and reductions. Provide for an independent cost analysis with interaction from the program elements. Establish a separate funding line for transition.					X								

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Integrated Space Operations Summit Space Shuttle Program Transition Panel Final Report	Develop, coordinate, and deliver strategies to address workforce communications, employee morale, stability, attrition, and other workforce climate indicators with respect to program phase-out plans and impacts.			X					X					
	Establish an Agency-level transition workforce team to coordinate all workforce teams and activities for unified processes and results.													X
	Begin working with the Space Operations Mission Directorate, the various functional offices, legislative affairs, and other stakeholders to understand potential policy/legislative needs to support transition.			X										
	Develop an acquisition strategy for SSP transition and an implementation plan for contract modifications required for program phase-out.				X									
	Establish an Agency capital account or other appropriate mechanisms to fund former SSP assets that are to be retained for follow-on programs during the gap in their utilization.					X								

Transition Model														
Guidance/Study/Report	Requirement/Recommendation	Approach	Assessments	Communication and Outreach	Contracts	Cost	Data Management	Environment	Human Capital	Metrics	Milestones	Property Disposition	Requirements	Roles and Responsibilities
Integrated Space Operations Summit Space Shuttle Program Transition Panel Final Report	Establish an Agency-level environmental management team composed of representatives from Headquarters, Centers, SSP, and projects, to develop and implement an environmental transition plan.							X						X
	Develop an Agency-wide knowledge management policy prior to transition.								X					
	Engage Center historic preservation officers to develop an Agencywide plan to manage disposition of current and potentially historic facilities and equipment.											X		

MANAGEMENT COMMENTS

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

December 14, 2006

Reply to Attn of: Space Operations Mission Directorate

TO: Assistant Inspector General for Auditing

FROM: Associate Administrator for Exploration Systems
Associate Administrator for Space Operations
NASA Chief Engineer

SUBJECT: Management Comments to Draft Audit Report, "NASA's Draft Plan for Space Shuttle Transition Could be Improved by Following Project Management Guidelines" (Assignment No. A-06-007-00)

Thank you for the opportunity to provide consolidated Agency comments on your office's audit report number A-06-007-00 entitled "NASA's Draft Plan for Space Shuttle Transition Could Be Improved by Following Project Management Guidelines" (herein referred to as the Report with the subject Transition Plan referred to as the Plan). We appreciate your early audit, as we are establishing and rapidly developing the necessary framework, process, and administrative infrastructure to ensure transition success. We are pleased with your recognition of the positive steps the Space Operations Mission Directorate (SOMD), the Exploration Systems Mission Directorate (ESMD), and the Office of the Chief Engineer (OCE) have taken to date and confirm that your background and assessments are accurate, with certain exceptions. Likewise, many of the recommendations reinforce activities already initiated or accomplished during the course of the Report generation process. Relative to some of your specific observations, conclusions and recommendations, we suspect that our conflicting perspectives may be attributed to a differing understanding of the purpose of the Plan, and philosophical differences with respect to classification of this effort as a "project" verses the adoption and incorporation of project management principles where applicable.

Your Report finds that the Plan does not comprehensively address all elements necessary for transition success; NASA concurs with this finding. The intent of the Plan was to provide overarching programmatic (predominately the Shuttle program) transition planning guidance and the framework in order to develop lower level transition plans as well as decision-making and evaluation processes. The Plan attempts to describe the top-level transition governance structure and reinforce the program-use of existing policies, procedures, and institutional support processes to the maximum extent possible. The development of the Plan served as a catalyst in bringing the institutional community at the Agency and center level to active engagement of transition activities in a structured manner. We believe the Plan to be effective in this context and a foundational element in the broader NASA Human Space Flight transition effort.

As noted above, your Report does raise areas of valid concern and provides meaningful findings that we agree need to be addressed. In many cases, specific actions to address these findings and recommendations are already in place and rapidly evolving. Our integrated ESMD/SOMD/OCE detailed response to the Report is attached. We are available to further discuss the Report and our perspectives on the Plan. Please contact Mr. Joel Kearns, the SOMD Transition Manager, at (202)358-1223 or Dr. John Olson, the Exploration Transition Manager at (202)358-3626 for any questions or clarifications. Again, thank you for the opportunity to provide comments on the audit report.

Scott J. Horowitz
AA ESMD

12/14/2006
Date

William H. Gerstenmaier
AA SOMD

12-14-06
Date

Christopher J. Scolese
NASA Chief Engineer

12/14/2006
Date

ESMD/SOMD/OCE Management Comments to IG Report Assignment A-06-007-00

ESMD/SOMD/OCE Management Comments to IG Report Assignment A-06-007-00
"NASA's Draft Plan for Space Shuttle Transition Could Be Improved By Following Project Management Guidelines"

General Management Comments

We support and welcome the overall audit objectives as another supporting mechanism to strengthen the Agency transition in human spaceflight. As such, the following formal comments to the Report capture our collective Agency direct responses per your request letter dated November 6, 2006. We agree with the intent of many of the general observations of the Report, focusing on the need to define and manage the Transition activities using professionally accepted technical management processes. However, the Report contains several findings which we believe are already addressed in the NASA Human Spaceflight Transition Plan (an overarching internal strategic guide for transition activities, herein referred to as the Plan). The Plan is not, nor was it intended to be, a stand-alone, definitive, and detailed execution plan for a separate project. The Plan serves as initial, top-level strategic guidance and a governance framework for the development of lower-level directorate, program, and project transition planning guidance documents that will comprehensively capture and address all of the elements necessary for efficient and effective execution of NASA Human Spaceflight Program Transition, culminating in mission success and safety.

We believe it is important to note two key developments that have substantially impacted the Agency approach, progress, and products largely addressed in your Report. First, the Plan was completed, signed, and baselined on November 13, 2006 by the respective Associate Administrators as a deliverable to the Strategic Management Council. Second, the Directorate Transition Managers for both the Exploration Systems Mission Directorate (ESMD) and the Space Operations Mission Directorate (SOMD) are in place and managing the activities outlined in the Plan. Working in concert as leads in Human Spaceflight Transition planning, the Transition Managers have made substantial progress in organizing, consolidating, and addressing many of the specific actions or activities outlined as recommendations in your report.

NASA Transition is not being viewed solely as the Space Shuttle Transition and Retirement (SSP T&R), but rather as a continuum of transition that includes SSP T&R to Exploration, the International Space Station (ISS) "Shuttle Transition and Retirement" mitigation actions (STaR), Constellation Transition from Development to Operations, and Commercial Orbital Transportation System (COTS) transition for program and exploration support. We believe this is an important distinction regarding the definition of "NASA Transition" that was not readily captured in the Report. NASA Transition becomes the foundation from which our Transition Strategy and Plan will build and evolve over time.

ESMD and SOMD posit that many activities at the Directorate and program level address most of the elements the Report notes as critical to ensure successful transition. Although the activities are not detailed in the Plan, a significant amount of detail regarding these activities is available from the Programs and Mission Directorates.

Response to Findings and Recommendations

Recommendations:

Recommendation #1 [Page 13]: "The Chief Engineer should develop guidance within the NASA Procedural Requirements 7120 series that clearly defines and establishes requirements for managing closeout and transition for programs of the SSP's magnitude".

Final Report Page 14

Management Response: Concur with comment.

Comments (provided by OCE):
NPR 7120.5D, *NASA Space Flight Program and Project Management Requirements*, requires a preliminary System Decommissioning/Disposal Plan during Phase C (Final Design and Fabrication), a baselined plan during Phase E (Operations and Sustainment), and to implement the plan during Phase F (Closeout). NPR 7120.5D also requires a Decommissioning Review during Phase F, the purpose of which is to confirm the decision to terminate or decommission the system and assess the readiness for the safe decommissioning and disposal of system assets. The entry and success criteria for this review are documented in NPR 7123.1A, *NASA Systems Engineering Processes and Requirements*, Table G.18 and is repeated below:

G.18 Decommissioning Review

A Decommissioning Review (DR) confirms the decision to terminate or decommission the system and assess the readiness of the system for the safe decommissioning and disposal of system assets.

Table G-18 – Decommissioning Review (DR) Entrance and Success Criteria

Entrance Criteria	Success Criteria
1. Requirements associated with decommissioning and disposal are defined. 2. Plans are in place for decommissioning, disposal, and any other removal from service activities. 3. Resources are in place to support decommissioning and disposal activities, plans for disposition of project assets, and archival of essential mission and project data. 4. Safety, environmental, and any other constraints are described. 5. Current system capabilities are described. 6. For off-nominal operations, all contributing events, conditions, and changes to the originally expected baseline are described.	1. The reasons for decommissioning disposal are documented. 2. The decommissioning and disposal plan is complete, approved by appropriate management, and compliant with applicable Agency safety, environmental, and health regulations. Operations plans for all potential scenarios, including contingencies, are complete and approved. All required support systems are available. 3. All personnel have been properly trained for the nominal and contingency procedures. 4. Safety, health, and environmental hazards have been identified. Controls have been verified. 5. Risks associated with the disposal have been identified and adequately mitigated. Residual risks have been accepted by the required management. 6. If hardware is to be recovered from orbit: (a) Return site activities have been defined and approved; (b) Required facilities are available and meet requirements, including those for contamination control, if needed; and (c) Transportation plans are defined and approved. Shipping containers and handling equipment, as well as contamination and environmental control and monitoring devices, are available. 7. Plans for disposition of Mission Owned assets (e.g. hardware, software, facilities) have been defined and approved. 8. Plans for archival and subsequent analysis of mission data have been defined and approved. Arrangements have been finalized for the execution of such plans. Plans for the capture and dissemination of appropriate lessons learned during the project life cycle have been defined and approved. Adequate resources (schedule, budget, and staffing) have been identified and are available to successfully complete all decommissioning, disposal, and disposition activities.

Recommendation #2a [Page 13] : "The Associate Administrators for ESMD and SOMD should... revise the draft Human Space Flight Transition Plan to comply with applicable project management guidelines as stated in NPR 7120.5C, and to include provisions for security of facilities and asset end-states associated with its property disposition process."

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Management Response: Do not concur.

Comments (provided by SOMD and ESMD): The 'In Brief' section of the Report states that NASA's draft plan for space shuttle transition could be improved by following project management guidelines, and we agree with the intent of that statement. However, ESMD, SOMD, and OCE have made a conscious choice to not designate the Transition activities as a separate "Spaceflight Project" requiring a separate implementation of NPD 7120.5D. The Space Shuttle Program, International Space Station Program, and Constellation Programs are each in different life cycle phases as defined in NPD 7120.5D, and the Transition activities conducted within each Program will be managed consistent with the intent of NPD 7120.5D processes applicable to that phase. The Program activities will be integrated with the established Institutional and Facilities management processes. All Transition activities will be planned and controlled using the accepted technical management methods, which are the foundation of NPG 7120.5D. ESMD, SOMD, and the Human Spaceflight Program Offices will use rigorous technical management processes to plan and control transition activities and to execute the Transition activities. Therefore, we agree with the spirit of this recommendation.

One tool used for transition is the Space Shuttle Management Resource Transition (SMRT) document used to describe characteristics (scope, cost, schedule, risk) of a Space Shuttle asset or resource available for transition. It serves as an item-specific record of decisions. Each SMRT includes the resource's description and physical location, Government workforce considerations and contract data, cost estimates for annual cost to operate, close-down, sustain or restart, time/schedule considerations, risk and environmental information and historical preservation information, arranged as to present options for disposition.

Recommendation #2b [Page 13] "The Associate Administrators for ESMD and SOMD should... finalize and implement the Human Space Flight Transition Plan".

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Management Response: Concur with comments.

Comments (provided by SOMD and ESMD): The Human Space Flight Transition Plan was approved and base-lined on November 13, 2006. The Plan will be updated to incorporate several findings of this Report, and additional guidance and direction to be generated as part of the Programming Planning Budgeting Execution (PPBE) 2009 process.

Recommendation #3 [Page 13]: "The Associate Administrators for SOMD should request that the Operations Management Council recognize and track SSP transition as an Agency management challenge."

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Management Response: Do not concur.

Comments (provided by ESMD and SOMD):

SOMD and ESMD do not agree with this specific recommendation. The content of the HSF Transition Plan should demonstrate that there are no existing control deficiencies within the Shuttle Transition process. The Report cites the lack of a signed Plan (no longer applicable) as the basis for its recommendation to report and track transition as an Agency Management Challenge. However, ESMD and SOMD are already responsible for regular reporting transition activities to NASA's senior leadership boards, the Strategic Management Council (SMC) and the Program Management Council (PMC). Through these Agency-level boards, NASA senior officials are kept well informed of transition issues and activities. The SMC specifically directed that Transition be reported through the Agency PMC, not the Operations Management Council, as recommended in the Report.

Findings:

1. **Work Breakdown Structure (WBS) for Transition Activities**

Management Response: Concur.

Comments (provided by SOMD and ESMD):

ESMD and SOMD have made a conscious decision not to make the Human Space Flight Transition, and the associated Space Shuttle Transition and Retirement, a separate project. Retirement and transition are issues addressed across the three programs to determine requirements and implementation procedures. We agree that a WBS is a critical element that provides a framework for organizing and managing work. Even though Transition is not a stand along project or program, an integrated WBS is an effective tool to describe the work to be accomplished.

An integrated Transition WBS, based on existing Space Shuttle Program, International Space Station Program and Constellation Program applicable WBS elements, augmented by Institution and Integration WBS elements, will be developed from December 2006 to February 2007 and incorporated in to Revision 1 of the Plan.

2. **Detailed Cost Estimates**

Management Response: Do not concur.

Comments (provided by SOMD and ESMD):

At this time, it is inappropriate to quote estimated costs for Transition. The SSP and ISS Programs developed transition cost estimates based on the guidelines then available, and included them in their PPBE 2008 PMR submission to Headquarters in May 2006. The

Constellation program worked in conjunction with the Shuttle Program to define asset and workforce requirements that were synergistic and nature and incorporated these into the Constellation budget submission. These estimates will be vetted and refined using the established PPBE process for PPBE 07. For example, as part of the PPBE 06 budget planning process, the ISS Program performed an initial high level assessment of the impact of Shuttle Transition and Retirement (T&R) on the Space Station Program. The costs were incorporated into the President's FY07 Budget Submit for the Space Station Program, and updated for PPBE 06 (FY08 budget formulation cycle).

Transition costs were estimated by the Space Shuttle Program in PPBE 06, and the costs for Space Shuttle Transition and Retirement activities during FY07-FY10 are incorporated in the 2008 SSP Budget. Several cost estimates for FY11 and beyond were developed in PPBE 06 based on various options for asset disposal. Updated estimates, based on revised Transition Content guidelines, will be generated during PPBE 07. After discussion with Agency management through the PPBE 07 process, analyses of these updated estimates will used as the basis of the cost targets to be included in the second revision of the HSFTP in August 2007. A formal Tri-Program planning meeting is scheduled for December 14, 2006 to specifically address FY09 PPBE transition planning issues and guidelines.

3. Metrics for Measuring Transition

Management Response: Concur.

Comments (provided by SOMD and ESMD):

Specific outcomes and measures for assessing progress are identified in NASA's internal Plan dated November 13, 2006. Likewise, at the time of this response, both Directorate Transition Managers have initiated efforts to define smart metrics and surveys to effectively capture and monitor Transition Success. Detailed metrics are under development from October 2006 to February 2007. Metrics will be presented for review at NASA SMC meeting in January 2007. Based on actions at the review, metrics will be base-lined no later than 60 days after the January SMC meeting. Based on the strategic guidance for completing transition provided in the Plan, the Space Shuttle, Space Station, and Constellation Programs have defined and are continuing to further evaluate additional program-unique objectives and program level metrics on a recurring basis.

4. Periodic Milestone Reviews

Management Response: Concur.

Comments (provided by SOMD and ESMD):

Periodic Milestone Reviews have been established at the Space Shuttle Program level for the initial phase of Transition planning, and they have been in operation for some time. Periodic milestone reviews will be established in concert with the PPBE process. In addition, review

opportunities are currently in existence at various levels within the Agency. At the Agency-level, the Program Management Council (PMC) will review Transition as part of the State of the Agency review on a quarterly basis with metrics data being fed on a monthly basis. At the Headquarters Directorate-level, the Transition Control Board (TCB) was established as the forum for transition activities, while the Joint Integration Control Board (JICB) was created to discuss tri-program and cross-Directorate integration activities at the program level. Likewise, the ESMD Quarterly Program Review (PMR) will include a recurring Transition briefing and review. At the program-level, a Space Shuttle Program Transition Quarterly Program Manager Review (QPMR) has been implemented and includes attendees from ESMD and SOMD as well as the Shuttle, Space Station, and Constellation programs. The Shuttle program has also established a Transition Program Requirements Control Board (TPRCB). The Shuttle TPRCB currently has representation from the Shuttle and Space Station programs as well as JSC, KSC, MSFC, and SSC. A Constellation TPRCB with similar representation has been proposed and is in development and review.

The Directorates and Human Spaceflight Programs are evaluating the best implementation path for a tri-program Joint Program Requirements Control Board (JPRCB). Individual Field Centers also have established review bodies to coordinate work within each institution. For example, JSC has established a Joint Transition Integration Panel (JTIP) to address tri-program transition issues and activities. The Directorate Transition Managers have also proposed and plan to implement an annual Transition Summit to effectively engage the full NASA Transition community and our stakeholders, and to gather and disseminate updated Transition information while serving as the periodic Transition Milestone review. Other milestones reviews, such as the Decommissioning Review stipulated in NPR 7123.1A, will be instituted.

5. Detailed Communication Plans

Management Response: Concur.

Comments (provided by SOMD and ESMD):

NASA concurs with the importance of a comprehensive communication plan. The NASA-internal Transition Plan addresses communication with both the workforce (civil servant and contractor community) and external stakeholders. Detailed planning is being conducted at the Space Shuttle program level for FY07-FY10. Subsequent transition guidance of a more detailed nature should flow from the Plan's communication strategy and will engage the Agency Strategic Communications enterprises at all levels.

6. Provisions for security, export control, and asset end-state requirements for property disposition

Management Response: Concur.

Comments (provided by SOMD and ESMD):

The NASA-internal Transition Plan identifies that existing Agency processes that will be used by each Program and Institutional Organization to implement these requirements. Specific guidance of a more detailed nature will be outlined in subsequent lower-level transition documents, with program specific guidance complying with the overarching requirements. The asset end-state requirements will be collectively defined by the Constellation Program Office and the NASA Mission Support Offices responsible for asset disposition, during PPBE 07. Asset End State Requirements and Guidelines will be developed during PPBE 09 and base-lined NLT July 30, 2007.

At the program level, the Shuttle program recently conducted a Strategic Capability Assessment (SCA), which defined last need dates for designated program capabilities. The requirements are in a comprehensive SCA database that can be accessed by both ESMD and SOMD personnel and organizations.

7. Centralized Data Management System for Decisions and Recommendations.

Management Response: Concur.

Comments (provided by SOMD and ESMD):

The JICB/TCB minutes and actions are documented, organized, and tracked in a formal and secure electronic repository. They are also circulated to the board membership for disposition. Each board has a dedicated board secretariat responsible for the appropriate archiving, tracking, maintenance, and management of all information.

8. Clear Roles and Responsibilities for the Components of Transition Governance Structure and Designation of the Component Responsible for Post 2010-Decisions.

Management Response: Concur.

Comments (provided by SOMD and ESMD):

ESMD and SOMD agree to define requirements for a final, post 2010 Shuttle transition phase-out workforce, management structure and organization. The Plan generally addresses control boards and working groups charged with developing the processes necessary to evolve from current operations to the post 2010 operations. This is a joint effort among ESMD, SOMD, respective Program Offices, Mission Support Offices, NASA centers and associated industry contractors. NASA will establish the governance structure for the post-2010 activities during FY07. Information will be gathered during PPBE 09, and a selection of Governance Structure and implementing organization NLT September 30, 2007.

ESMD and SOMD agree that decision thresholds with specific criteria or thresholds would aid in the prioritization and decision-making efficiencies for transition activity execution. However, the broad scope and current continued formulation may be challenging for a

regimented approach. The TPRCB was chartered in 2006 and both the TCB and JICB Charters were updated in November 2006. A Charter for the expanded JPRCB will be updated NLT February 2007. Decision thresholds will be established during PPBE 07 decision determinations, NLT August 31, 2007.

Additional Specific Actions and Activities Not Captured by the Report

In addition to the Report's review of Transition activities, the following are noteworthy to include in the NASA response as they provide positive demonstration of the continued rapid development and increased detailing of the Plan. Each has occurred subsequent to the draft Report: a) Update and Refinement of the TCB and JICB Charters; b) Initiation of ESMD/SOMD Acquisition Strategy Working Group; c) Detailed Workforce and Resource Reviews at JSC, MSFC, and KSC to identify sharing of workforce between programs; and d) Development of both the Document Tree and Roles and Responsibilities "Family Tree" of all Transition Related Personnel.

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