

September 2008

NASA

Agency Faces
Challenges Defining
Scope and Costs of
Space Shuttle
Transition and
Retirement



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Highlights

Highlights of [GAO-08-1096](#), a report to congressional committees

Why GAO Did This Study

The Space Shuttle Program (SSP) is scheduled to retire in 2010, and the transition and retirement of its facilities and assets will be an immense undertaking involving approximately 654 facilities worth an estimated \$5.7 billion and equipment with an estimated value of more than \$12 billion. NASA plans to retire the SSP in 2010 to make resources available for the Constellation program, which is producing the next generation of space vehicles by 2015. Many of the SSP's resources are expected to transition to Constellation while others will be dispositioned or preserved for their historic value.

The Consolidated Appropriations Act, 2008 directed GAO to assess NASA's plans and progress in transitioning and retiring the SSP's facilities and equipment. More specifically, GAO examined 1) the challenges NASA faces in defining the scope and costs of transition and retirement activities, and 2) whether the cost of these efforts is transparent in NASA's budget requests. To address these objectives, GAO analyzed SSP plans, budget guidance, and other documents, and interviewed relevant government officials and contractors.

What GAO Recommends

GAO recommends that NASA clearly identify all direct and indirect SSP transition and retirement costs, including any potential exchange sale proceeds in its 2010 and future budget requests. NASA concurred with our recommendation.

To view the full product, including the scope and methodology, click on [GAO-08-1096](#). For more information, contact Cristina Chaplain at (202) 512-4841 or chaplainc@gao.gov.

NASA

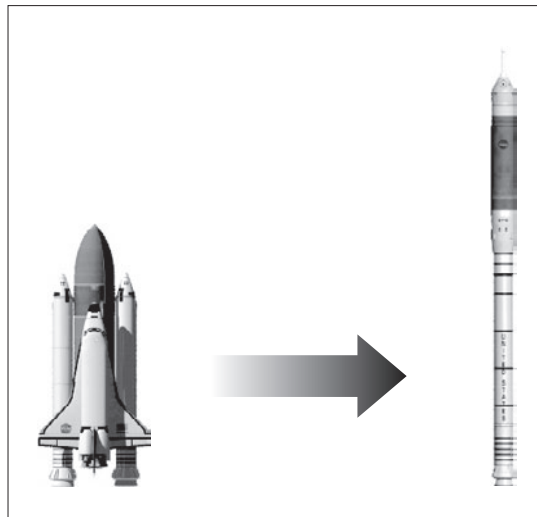
Agency Faces Challenges Defining Scope and Costs of Space Shuttle Transition and Retirement

What GAO Found

The National Aeronautics and Space Administration (NASA) faces disparate challenges defining the scope and cost of SSP transition and retirement activities. For example, because the Constellation program is still finalizing its requirements, the agency does not yet know what SSP property it needs to retain or the full cost of the transition effort. In addition, NASA faces other challenges that hamper its efforts to manage the transition and develop firm estimates of SSP transition and retirement scope and costs. For example, NASA has not developed final plans and/or cost estimates for making artifacts—including the orbiters Atlantis, Discovery, and Endeavour—safe for public display.

The total cost of SSP transition and retirement is not transparent in NASA's current budget request and is not expected to be reflected in its fiscal year 2010 budget request. This is due in part to delays in estimating costs, but also to where costs are being reflected. For example, although SSP's direct transition and retirement costs are identified in the SSP budget line, indirect costs related to environmental clean-up and restoration, maintenance of required real property facilities during the gap in human spaceflight, and demolition of excess facilities are not. In addition, NASA plans to offset some transition costs by utilizing an "exchange/sale" authority that allows executive agencies to exchange or sell non-excess, non-surplus personal property and apply the proceeds toward acquiring similar replacement property.

The Space Shuttle Program Is Retiring in 2010 and NASA Is Transitioning to Constellation Program Spaceflight Vehicles in 2015



Source: NASA.

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United States Government Accountability Office
Washington, DC 20548

September 30, 2008

The Honorable Barbara A. Mikulski
Chairman
The Honorable Richard C. Shelby
Ranking Member
Subcommittee on Commerce, Justice, Science,
and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Alan B. Mollohan
Chairman
The Honorable Rodney P. Frelinghuysen
Ranking Member
Subcommittee on Commerce, Justice, Science,
and Related Agencies
Committee on Appropriations
House of Representatives

The Honorable Mark Udall
Chairman
Subcommittee on Space and Aeronautics
Committee on Science and Technology
House of Representatives

After providing the United States unrivaled access to space for decades, the space shuttle is slated to make its last flight in 2010. The National Aeronautics and Space Administration (NASA) plans to retire the Space Shuttle Program (SSP) to make resources¹ available for the Constellation program, which is expected to achieve initial operational capability in 2015. The transition and retirement of the SSP's facilities and assets represent an immense undertaking. The SSP occupies approximately 654 real property facilities and holds about 1.2 million line items of personal

¹ In recent years, NASA has spent about \$3.5 billion a year on the SSP.

property.² NASA estimates the total replacement value of all SSP facilities is approximately \$5.7 billion, which accounts for nearly one-fourth of the value of the agency's total facility inventory. The total SSP personal property acquisition value is estimated by NASA at about \$12 billion, and there are numerous locations where government personal property is used. The SSP transition and phase-out effort will be complex and challenging, especially when coupled with simultaneously finalizing the designs for the Ares I crew launch vehicle and Orion crew exploration vehicle and conducting potentially the most complicated sequence of shuttle flights ever attempted—completing the International Space Station and conducting a fifth servicing mission to the Hubble Space Telescope all by the end of 2010.

In light of the magnitude of this undertaking, in a joint explanatory statement accompanying the Consolidated Appropriations Act, 2008 (Pub. L. No. 110-161), you asked us to assess NASA's plans and progress in transitioning and retiring the SSP's assets and facilities. More specifically, GAO examined 1) the challenges NASA faces in defining the scope and costs of transition and retirement activities, and 2) whether the cost of these efforts is transparent in NASA's current and upcoming budget requests. To address these objectives, we obtained and analyzed SSP transition and retirement plans and schedules, budget formulation guidance, and transition property assessments. We also interviewed responsible and cognizant government and contractor officials at relevant NASA centers and NASA headquarters. For our full scope and methodology, see appendix I. We conducted this performance audit from February 2008 to August 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Results in Brief

NASA faces disparate challenges in defining the scope and cost of SSP transition and retirement activities. Because the Constellation program is still finalizing its requirements, the agency does not yet know the full

² NASA defines and groups property into two overarching classifications, real property and personal property. Real property includes land, buildings, and other structures that cannot be readily moved without changing their essential character. Personal property is property that can be transported elsewhere with relative ease.

extent of SSP property it needs to retain or what the full cost of the transition effort will be. In addition, NASA faces other challenges that further hamper the agency's efforts to manage transition activities and develop firm estimates of SSP transition and retirement scope and cost. For example, NASA has yet to develop final plans and/or cost estimates for "safing"³ artifacts, including the space shuttle orbiters Atlantis, Discovery, and Endeavour.

The total cost of SSP transition and retirement is not transparent in NASA's current budget request and is not expected to be fully reflected as such in NASA's fiscal year 2010 budget request, when the agency plans to include its first official estimate of the scope and cost. Although SSP's direct transition and retirement costs are included in the SSP budget line, the Cross-Agency Support portion of NASA's budget request includes funding for significant SSP transition and retirement activities the agency considers indirect costs, including environmental compliance and remediation and demolition of excess facilities. These funds, however, are not identified as SSP transition and retirement costs, nor is it easy to discern that they could be in examining this budget line. In addition, NASA plans to offset some transition costs by utilizing an "exchange/sale" authority that allows executive agencies to exchange or sell non-excess, non-surplus personal property and apply the proceeds toward acquiring similar replacement property.

To provide congressional decision makers with a more transparent assessment of funding needs for the SSP's property transition and retirement activities, we are recommending that NASA include more comprehensive estimates of transition and retirement costs in its future budget requests to include identification of all direct and indirect costs and potential exchange/sale proceeds.

Background

In a major space policy address on January 14, 2004, President George W. Bush announced his "Vision for U.S. Space Exploration" (Vision) and directed NASA to retire the SSP after completing construction of the International Space Station in 2010 and focus its future human space exploration activities on a return to the Moon as a prelude to future human missions to Mars and beyond. As part of the Vision, NASA is developing

³ "Safing" entails removing hazardous material so the item can be safely stored and/or displayed.

new vehicles under the Constellation program, with an initial operational capability currently scheduled for 2015. In order to accelerate development and minimize development costs, NASA elected to pursue shuttle-derived options and the use of heritage systems for the new systems. The agency also found that shuttle-derived options are more affordable, safe, and reliable and provide the use, in some instances, of existing personnel, infrastructure, manufacturing and processing facilities, transportation elements, and heritage system hardware.

NASA will transfer whatever real (land, buildings, and facilities) and personal (e.g., system hardware, tools, plant equipment) property is practical given program requirements to Constellation and other programs to offset the need for new acquisitions. Transferring property provides NASA with distinct financial benefits. First, the receiving program avoids the cost of acquiring the needed property. Second, the SSP avoids the costs associated with disposing of the property. The SSP and its contractors are currently conducting transition property assessments (TPA) of property belonging to the SSP in two phases. In Phase 1 the agency is identifying existing SSP personal property and determining property category, item status, availability date, and whether the property should be transferred or declared excess. This process is ongoing and continues to identify SSP property. For example, as of May 2007 NASA had identified about 1 million line items of SSP personal property. By May 2008 this number had increased to about 1.2 million line items. During Phase 2 of the TPA process, the agency is developing detailed plans for disposing of excess SSP personal property including identifying hazardous materials, cataloging recoverable precious metals, providing historical artifact justification, and identifying final destinations. Based on discussions between the Space Shuttle and Constellation programs, it is estimated that about 40 to 47 percent of SSP personal property will be transferred to Constellation and other NASA programs and the remaining property will be declared excess.

NASA has yet to include an official estimate of the total cost of the SSP transition and retirement in any of its budget requests. Although NASA has developed a series of cost estimates for it—ranging from the \$4.4 billion reported by the NASA Inspector General in January 2007,⁴ to the approximately \$1.8 billion estimate prepared by the agency to support its

⁴ NASA Inspector General, *NASA's Plan for Space Shuttle Transition Could Be Improved by Following Project Management Guidelines*, IG-07-005 (Washington, D.C.: Jan. 29, 2007).

fiscal year 2009 budget request—and has been funding SSP transition and retirement activities out of its approved Shuttle budget, the agency has not included any of the estimates for fiscal years 2011 and beyond in its budget requests to the Congress. NASA transition managers maintain that NASA made a strategic decision not to release an estimate of transition and retirement costs for fiscal years 2011 and later until the scope of the effort and the associated costs and schedule were better defined. According to NASA transition managers, the agency has now accomplished this better definition and plans to include an estimate substantially lower than the earlier \$1.8 billion estimate for the total cost of SSP transition and retirement in its fiscal year 2010 budget request.

We have previously reported on NASA's management of the billions of dollars of government equipment under its control.⁵ We found weaknesses in the design and operation of NASA's systems, processes, and policies covering the control and accountability of equipment. We made recommendations that focused on ways to strengthen NASA's internal control environment and improve its property management.

NASA Faces Challenges Defining SSP Transition and Retirement Scope and Costs

NASA faces disparate challenges defining the scope and costs of SSP transition and retirement activities. The Constellation program is finalizing the requirements that will inform the SSP of what real and personal property needs to be retained and what should be declared excess. Furthermore, the property assessments needed to inform NASA's budget planning process may not be completed in time to support the cost estimates the agency plans to include in its fiscal year 2010 budget request. In addition, NASA faces other challenges that further hamper the agency's efforts to develop firm estimates of SSP transition and retirement scope and cost, including finalizing plans for safing artifacts.

Lack of Finalized Constellation Program Requirements Contributes to SSP Transition and Retirement Uncertainties

The Constellation program is still finalizing its requirements and defining needed capabilities; therefore, the agency does not know, in all instances, what SSP property needs to be retained and what property can be declared excess. According to SSP and Constellation transition managers, there is a symbiotic push and pull relationship between the SSP and the Constellation program. Ideally, in this relationship the SSP would push the

⁵ GAO, *Lack of Accountability and Weak Internal Controls Leave NASA Equipment Vulnerable to Loss, Theft, and Misuse*, [GAO-07-432](#) (Washington, D.C.: June 25, 2007).

property that it no longer needs for the safe operation of the space shuttle to the Constellation program in order to avoid property maintenance and/or disposal costs. Likewise, in order to avoid acquisition costs, the Constellation program would pull the SSP property that it has designated as needed. Thus far, however, this relationship has not worked as well as the agency has desired. Essentially, the Constellation program has not finalized its requirements for personal and real property from the SSP because it is still in the process of defining its own programmatic requirements. For example, at the time of our review, the Constellation program had yet to hold its Preliminary Design Review during which it will finalize its preliminary design and operations concepts, two key steps in determining the Constellation program's hardware and processing facility needs. Further, according to the Exploration Systems Mission Directorate (ESMD) Transition Manager, the Constellation program is just now realizing the importance of "pulling" SSP assets to avoid costs, as any and all of the SSP transition and retirement costs post-2010 will be borne by NASA at the expense of the follow-on program(s) or Center Management and Operations budgets.

NASA Will Not Complete the TPA Process Until After the Agency's Budget Request for Fiscal Year 2010 Is Submitted

NASA will not complete the last phase of the TPA process until after the agency's budget request for fiscal year 2010 is submitted and may not complete all TPA activity until the end of fiscal year 2009. NASA plans to complete Phase 1 of the TPA process by the end of September 2008. However, delays in finalizing system designs within the Constellation program are hampering the efforts of the Solid Rocket Booster element of the SSP to complete Phase 1 on time. In effect, Phase 2 of the TPA process will develop the type of detailed information needed to support accurate SSP transition and retirement cost estimates. The TPA Phase 2 process, however, is not scheduled for completion until January 2009—well after the fiscal year 2010 budget request is formulated. Furthermore, the Space Shuttle Main Engine does not anticipate completing TPA Phase 2 until August 2009, well after the budget request is submitted to Congress.

Other Challenges Further Hamper NASA's Efforts

NASA faces other challenges that further hamper the agency's efforts to define the scope and cost of SSP transition and retirement. In addition to the issues discussed above, NASA has not yet developed final plans and/or cost estimates for safing artifacts, including the orbiters Atlantis, Discovery, and Endeavour. Moreover, the SSP lacks a centralized information system to track and control all SSP property. A centralized system would be particularly useful as transition and retirement activities

are expected to rapidly increase in 2010. These and other challenges are summarized in table 1 below.

Table 1: Other SSP Transition and Retirement Challenges

Funding uncertainties	NASA's transition plan indicates that the SSP transition and retirement scope and schedule for each year are also constrained by the amount of funding the SSP Program Manager is able to allocate from the SSP annual operating budget for transition and retirement activities. Changes to the SSP flight manifest have direct impacts on the amount of funding available for SSP transition and retirement activities. Therefore, a firm transition and retirement completion date cannot be determined.
Safing artifacts	SSP transition and retirement costs associated with safing artifacts for public museum display may be more difficult and expensive than originally anticipated. Safing involves removing hazardous material from SSP hardware so that it can be safely handled and displayed. Another challenge with safing SSP hardware is removing hazardous items from the orbiters, including self-igniting fuels. According to NASA officials, every major aerospace museum in the country, including those at NASA centers, wants one of the three operational orbiters, but the museums may not have the resources or expertise for the necessary safing. As an example, according to NASA officials, the National Museum of the United States Air Force at Wright-Patterson Air Force Base expressed interest in obtaining an orbiter to display as part of its collection. The museum entered into discussions with NASA wherein the museum considered offering to bear the costs of safing for the privilege of displaying an orbiter permanently at its facility. However, the Museum subsequently withdrew from the discussions, acknowledging that it lacked the requisite technical knowledge to accomplish the tasks.
Decentralized property management systems	The SSP does not have a centralized database that identifies, tracks, and/or controls all SSP property. Instead, SSP's property management databases are decentralized and spread across the agency and its contractors. The SSP relies on NASA's property management offices to track and manage government real property and government-held personal property. NASA's existing property management systems for government-held personal property, however, do not track SSP personal property by program. The SSP relies on its prime contractors to track and control contractor-held SSP personal property. These contractors, however, use a variety of different software and database systems for this purpose. SSP transition managers indicated that there were literally "tens of systems" in use at different locations. The key tasks of SSP transition and retirement include identifying and categorizing SSP personal property through the TPA process. The disparate nature of the SSP's property management systems precludes the efficient execution of this task.
Bow wave of disposition activity	NASA's SSP transition and retirement effort is facing a "bow wave" of activity that will occur upon retirement of the program in 2010. In order for NASA to maintain the shuttle's flight capability, a stockpile of spare, replacement, and contingency parts must be available for the SSP. This means disposition of the majority of the shuttle's personal property must wait until the program is retired. NASA plans to declare excess over 700,000 lines of SSP property beginning in fiscal year 2009 through at least fiscal year 2016. About 67 percent, or about 472,000 lines, of this disposition, however, is scheduled for fiscal years 2011 and 2012. By comparison, NASA dispositioned 62,994 pieces of property in 2007. The sudden and substantial increase, or bow wave, of disposition activity following the shuttle's retirement has the potential to overwhelm NASA's capacity to dispose of SSP property and lead to schedule delays and cost overruns.

Export control

NASA maintains that some SSP personal property is subject to varying levels of export control by the U.S. State Department's International Traffic in Arms Regulations and/or the U.S. Commerce Department's Export Administration Regulation. According to NASA officials, satisfying export control regulations for excess SSP personal property should be accomplished through appropriate documentation such as end use certificates. Additional processing, up to and including demilitarization, may be required for items obtained from the Department of Defense or appearing on the U.S. Munitions List. NASA is still in the process of identifying potential export-controlled SSP hardware. NASA will be unable to determine the level of export control needed in each instance or accurately estimate the cost of enforcing export controls until this process is completed.

Historic preservation

The National Historic Preservation Act directs federal agencies to establish a program that identifies and evaluates properties to be nominated to the National Register of Historic Places, take responsibility for the preservation of historic properties they own or control, and take into account the effect of any undertaking on a site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. NASA maintains that the SSP has national, state or local importance to the history of human spaceflight and that it has a responsibility to ensure historically significant property is properly documented and considered during SSP transition and retirement. NASA completed an agency-wide survey of SSP-related historic properties in 2007.

Source: NASA.

All of these challenges further hamper NASA's efforts to develop firm estimates of SSP transition and retirement scope and cost. Lastly, at the time NASA will be experiencing an increase in transition activity, it will simultaneously be finalizing the designs for the Ares I and Orion vehicles and conducting potentially the most complicated sequence of shuttle flights ever attempted—completing the International Space Station and conducting a fifth servicing mission to the Hubble Space Telescope all by the end of 2010. These activities will likely create additional challenges for the transition efforts, as they may require more attention than anticipated from the workforce as well as more resources should unexpected problems occur.

SSP Transition and Retirement Costs Are Not Transparent in NASA's Budget

SSP transition and retirement costs are not transparent in NASA's current budget request and are not expected to be fully reflected in its 2010 request. This is partly due to challenges and delays in finalizing cost estimates as described above as well as where costs are being reflected in the budget. Specifically, in laying out its plans for SSP transition and retirement, NASA elected to capture transition and retirement costs within its existing budget structure rather than display them separately. Consequently, the costs of the SSP transition and retirement are dispersed throughout NASA's budget request. SSP's direct transition and retirement costs are included in the SSP budget line. The Cross-Agency Support portion of NASA's budget, however, includes funding for significant SSP transition and retirement activities that NASA considers indirect costs, including environmental compliance and remediation and demolition of

excess facilities. These funds, however, are not identified as SSP transition and retirement costs and it is not easy to discern that they are transition related. Furthermore, NASA plans to offset some transition costs by utilizing an exchange/sale authority that allows federal agencies to exchange or sell non-excess, non-surplus personal property and apply the proceeds toward acquiring similar replacement property.

SSP Budget Line

The SSP budget request for fiscal year 2009 identifies a funding need of about \$370 million for transition and retirement through fiscal year 2010 to pay for activities within each of the SSP’s three major projects—flight and ground operations, flight hardware, and program integration (see table 2). NASA will use these funds to cover the costs of the prime contractor, SSP personnel, and support contractors working on transition and retirement activities. These activities, however, do not represent the full scope of SSP transition and retirement.

Table 2: Transition and Retirement Costs in the SSP Budget Line

Dollars in millions					
Fiscal year	2007	2008	2009	2010	Total
Flight/ground operations	4.2	1.6	2.0	2.4	10.2
Flight hardware	16.7	60.1	85.8	189.4	352
Program integration	2.7	1.4	1.5	1.7	7.3
Totals	23.6	63.1	89.3	193.5	369.5

Source: NASA’s Fiscal Year 2009 budget request.

Cross-Agency Support Appropriation Account

The Cross-Agency Support appropriation account⁶ within NASA’s budget includes or will include funding for significant SSP transition and retirement activities. This appropriation account—which is not aligned with a specific program or project—includes what are essentially NASA’s administrative or overhead costs for all of its centers and activities. Cross-Agency Support will include SSP transition and retirement funding within

⁶The Consolidated Appropriations Act, 2008, required NASA to modify and test its administrative financial management system in order for the system to be able to budget, account, control and report on appropriations it receives in Fiscal Year 2009 and thereafter under a new appropriation account structure. The new structure will comprise seven appropriation accounts within NASA’s budget: Science, Aeronautics, Exploration, Space Operations, Education, Cross-Agency Support, and Inspector General.

its Environmental Compliance and Restoration, Center Management and Operation, and Strategic Institutional Investments budget lines. These funds, however, are not identified as SSP transition and retirement costs. As such, it is difficult to discern the full costs of the transition and retirement effort.

Environmental Compliance and Restoration

Funding for SSP-related environmental clean-up is included under NASA's Environmental Compliance and Restoration program.⁷ NASA currently estimates that the SSP has contributed to environmental contamination at 94 of 163 sites and that the agency's total environmental clean-up liability is about \$1 billion over several decades. Agency officials maintain that they are unable to separate the cost of SSP environmental clean-up from the total estimate of the agency's environmental liability because, in most instances, NASA is unable to differentiate between clean-up associated with the SSP and clean-up associated with legacy programs such as Apollo. Agency officials indicate that historically NASA has spent about \$51 million annually on environmental compliance.⁸

Center Management and Operation (CM&O)

The CM&O budget request is part of the Cross-Agency Support appropriation account that funds the maintenance of facilities. Funding for the property disposal offices at the centers that will physically dispose of excess SSP personal property and funding to maintain real property facilities is included in the CM&O line. The SSP is supposed to provide funding to these offices for any level of SSP property disposal above their normal level of activity, e.g., 62,994 pieces of property in fiscal year 2007. The sheer volume of SSP disposal activity, hundreds of thousands of line items of personal property, however, will likely consume the near full attention of these offices during the time frame of the SSP transition and retirement. Consequently, the baseline CM&O funding will be applied primarily to SSP transition and retirement activities. In terms of facilities maintenance, centers and programs maintain a tenant/landlord-like relationship wherein programs such as the SSP and Constellation in effect pay the centers for the use of facilities, except where specific facilities are

⁷ At NASA, the Environmental Compliance and Restoration program provides for personnel, services, and activities necessary to complete the clean-up of hazardous materials and wastes that have been released to the surface or groundwater at NASA installations, NASA-owned industrial plants supporting NASA activities, and other current or former NASA sites where NASA operations have contributed to environmental problems and where the agency is obligated to contribute to clean-up costs.

⁸ NASA's annual funding for Environmental Compliance and Restoration increased in recent years to fund clean-up of the Plum Brook Nuclear Reactor site.

entirely program funded. Any facility maintenance costs beyond those covered by the lease-type arrangements between the centers and the programs are offset by the CM&O budget.

Strategic Institutional Investments

NASA plans to eventually demolish excess SSP facilities. According to agency officials, NASA plans to fund the demolition of excess real property within the Strategic Institutional Investments line within the Cross-Agency Support appropriation account at a level of about \$15 million annually. The officials noted that because NASA has already scheduled demolition activities through 2015, NASA would probably not request funds to demolish excess SSP facilities until after fiscal year 2015. However, facility demolition post retirement of the Space Shuttle will occur when needed.

Exchange/Sale Authority

NASA plans to offset some transition costs by utilizing an exchange/sale authority that enables federal agencies to exchange or sell non-excess, non-surplus personal property and apply the proceeds toward acquiring similar replacement property. This authority may also enable agencies to reduce certain costs, such as storage and administrative costs associated with holding the property and processing it through the normal disposal process. NASA intends to use proceeds from the exchange/sale of SSP personal property to offset the cost of acquiring replacement Constellation hardware.⁹ According to NASA, it will use the General Services Administration (GSA) to conduct Federal Asset Sales of all personal property located at or near NASA Centers and the Defense Contract Management Agency for the disposition of personal property located at vendor facilities.¹⁰ According to agency officials, however, NASA has not prepared an estimate of anticipated exchange/sale revenue. The officials indicated that proceeds received from the exchange/sale of SSP property will be transferred initially to an existing budget clearing account, wherein

⁹ GSA issues regulations describing how and when the exchange/sale authority may be used, as well as setting reporting requirements on their use. 41 C.F.R. § 102-39. NASA sought and obtained GSA concurrence that the proceeds from the sale of non-excess, non-surplus personal property from SSP could be used to acquire replacement Constellation assets needed for human spaceflight activities.

¹⁰ The Memorandum of Agreement between GSA and NASA stipulates that NASA will receive 80 percent of the gross proceeds from NASA (generic) property sales. For those items designated by NASA as shuttle related or unique, NASA negotiated to receive 90 percent of sales gross proceeds. According to NASA, GSA recovers its costs by retaining this portion of the proceeds from the sale of the property and DCMA recovers its cost through per hour charges to NASA.

the agency will move the funds to a lower-level direct budget work breakdown structure element to supplement the acquisition of replacement property by the Constellation Program.

Conclusions

SSP transition and retirement is an immense undertaking involving numerous actors across government and the aerospace industry. NASA faces great challenges in completing all planned efforts between now and the end of 2010. Effective implementation of these efforts requires careful planning to safely complete the ISS and repair the Hubble Space Telescope while expeditiously freeing SSP funding and facilities for the Constellation program. NASA is still in the process of developing the required plans. Incomplete planning, however, does not preclude the agency from providing the Congress with a more informed basis for decision making. Indeed, NASA's strategic decision to delay submission of an estimate until planning is near complete has placed the Congress at a knowledge deficit relative to available information when considering the agency's total funding needs. In the current budget environment, in which needs outpace available funding, it is imperative that NASA provide the Congress with the best information available, even if that information is incomplete or subject to change.

Recommendation for Executive Action

To provide congressional decision makers with a more transparent assessment of funding needs for the SSP's property transition and retirement activities, we are recommending that the NASA Administrator direct the Space Operations Mission Directorate to include in NASA's fiscal year 2010 and future budget requests the agency's best estimates of the total direct and indirect costs associated with transition and retirement of space shuttle property, including estimates of potential exchange/sale revenue. These estimates should include but not be limited to

- those costs borne directly by the SSP;
- those funds requested under Cross-Agency Support that will be used to support property transition and retirement activities, such as
 - funds requested to demolish excess facilities and buildings, and
 - funds requested for environmental compliance and remediation, and;
- the potential proceeds from exchange/sales of excess space shuttle property.

NASA's fiscal year 2010 and future budget requests should also identify all required transition and retirement activities which NASA has identified but not yet included in cost estimates and report NASA's progress in completing SSP transition and retirement activities.

Agency Comments and Our Evaluation

In written comments on a draft of this report (see app. II), NASA concurred with our recommendation. NASA acknowledged that, thus far, it had not included estimates of the full scope and cost of Space Shuttle transition and retirement costs in any of its budget requests and that the agency is still in the process of finalizing the scope and cost of Space Shuttle transition and retirement activities. NASA stated that it expects estimates for fiscal year 2011 and beyond to be sufficiently mature to include in the President's budget proposal for 2010 and that the agency intends, subject to approval by the Office of Management and Budget, to include the estimates in its fiscal year 2010 budget request. NASA also acknowledged the need to provide the Congress estimates of anticipated revenue from exchange sales but noted that, even taking into account the large amount of personal property to be disposed after fiscal year 2010, the agency does not expect large amounts of revenue from exchange sales. NASA also stated that the SSP was only one contributing factor to specific sites requiring environmental remediation and that NASA consolidates its budget for environmental remediation. This report recognizes that legacy programs contributed to environmental contamination and that NASA has a consolidated budget for environmental remediation apart from individual programs. Nevertheless, environmental remediation of SSP sites represents a substantial portion of the total costs associated with transition and retirement of the SSP. Separately, NASA provided technical comments which have been addressed in the report as appropriate.

We are sending copies of the report to NASA's Administrator and interested congressional committees. We will also make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

Should you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-4841 or at ChaplainC@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff that made key contributions to this report are listed in appendix III.



Cristina T. Chaplain
Director, Acquisition and Sourcing Management

Appendix I: Objectives, Scope, and Methodology

To assess National Aeronautics and Space Administration's (NASA) challenges in transitioning and retiring the Space Shuttle Program's (SSP) assets and facilities and to determine if the cost of these efforts is transparent in NASA's budget requests, we obtained and reviewed NASA documents including the Human Space Flight Transition Plan, Space Shuttle Program Transition Management Plan, Space Shuttle Program Transition and Retirement Requirements, and the Space Shuttle Program Risk Management Plan. We also examined NASA's contract documentation, budget requests, and NASA's 2009 Planning, Programming, Budgeting and Execution Guidance. We physically inspected property and interviewed and received detailed briefings from NASA and contractor transition management officials at NASA Headquarters in Washington, D.C.; the Kennedy Space Center in Orlando, Florida; the Johnson Space Center in Houston, Texas; the Marshall Space Flight Center in Huntsville, Alabama; the Stennis Space Center in Mississippi; and the Michoud Assembly Facility in New Orleans, Louisiana. We also attended NASA's Transition Quarterly Program Manager's Review at the Stennis Space Center. We discussed government property disposal policies and practices with General Services Administration officials in Washington, D.C., and Defense Contract Management Agency officials at the Kennedy Space Center. In addition, we held discussions with Congressional Research Service staff members on their prior and ongoing work related to NASA's transition effort. Furthermore, we met with NASA's Office of Inspector General to discuss its report on the Space Shuttle Program's transition and retirement and reviewed previous GAO testimonies and reports related to NASA's transition effort.

We conducted this performance audit from February 2008 to August 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the National Aeronautics and Space Administration

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001



September 23, 2008

Ms. Christina T. Chaplain
Director, Acquisition and Sourcing Management
U.S. Government Accountability Office
Washington, DC 20548

Dear Ms. Chaplain:

NASA appreciates the opportunity to comment on the Government Accountability Office (GAO) report entitled "NASA: Agency Faces Challenges Defining Scope and Costs of Space Shuttle Transition and Retirement" (GAO-08-1096).

In the draft report, GAO makes one recommendation to the NASA Administrator:

Recommendation: To provide congressional decision makers with a more transparent assessment of funding needs for the SSP's property transition and retirement activities, we are recommending that the NASA Administrator direct the Space Operations Mission Directorate to include in NASA's fiscal year 2010 and future budget requests the agency's best estimates of the total direct and indirect costs associated with transition and retirement of space shuttle property including estimates of potential exchange/sale revenue. These estimates should include but not be limited to

- those costs borne directly by the SSP;
- those funds requested under Cross-Agency Support that will be used to support property transition and retirement activities, such as
 - o funds requested to maintain required facilities during the gap in human spaceflight,
 - o funds requested to demolish excess facilities and buildings, and
 - o funds requested for environmental compliance and remediation, and;
- the potential proceeds from exchange/sales of excess space shuttle property.

NASA's fiscal year 2010 and future budget requests should also identify all required transition and retirement activities which NASA has identified but not yet included in cost estimates and report NASA's progress in completing SSP transition and retirement activities.

Response: NASA concurs with this recommendation.

Please note that NASA has previously notified the GAO of the tasks and methods being used to develop the most efficient and cost-effective work plan for Space Shuttle Program Transition and Retirement (SSP T&R). The work and cost for SSP transition and retirement activities that take place from FY 2006 to FY 2010 have been included in the budget plan for

the SSP since the President's Budget Proposal for FY 2007. This includes all direct work performed by SSP Prime Contractors and NASA Centers to conduct T&R actions prior to FY 2011.

NASA is currently completing final analyses of refined work and budget estimates for SSP T&R tasks for FY 2011 and beyond. The refined work tasks have identified methods to minimize any Shuttle-specific disposal costs that would be in addition to NASA's annual institutional operations budget. As part of this work plan, NASA may request specific actions to gain relief from regulatory or policy requirements for this large volume, one-time personal property excess action. NASA has also identified action plans to determine if the small, remaining funding gaps will be closed by future work allocations or by facility reductions. Any remaining facility gaps will be addressed in future President's budgets. We expect that these work plans for FY 2011 and beyond will possess sufficient maturity to be included in the President's Budget Proposal for FY2010, although the Office of Management and Budget (OMB), ultimately, determines the costs to be included in the President's Budget Proposal. NASA will work with the OMB to determine if these transition and retirement costs for FY 2011 and beyond will be included in the President's Budget Proposal for FY 2010.

In addition, please note that, while NASA will provide calculated estimates of potential exchange/sale revenue based on NASA's historical exchange/sale actual revenues, NASA's historical information does not indicate large revenues from such sales, even taking into account the large potential magnitude of SSP personal property to be excessed after FY 2010. With regard to the portion of the recommendation involving environmental compliance and restoration funds, SSP was only one contributing factor to specific sites which have been determined to require environmental compliance and restoration measures over the next five years. The tasks and budgets for environmental compliance and restoration are identified as a separate, consolidated effort and not unique to SSP T&R.

Thank you for the opportunity to review and comment on this draft report and for the insight it provides. If you have any questions, please contact Mr. Joel Kearns at (202) 358-1223 or Dr. John Olson at (202) 358-3626.

Sincerely,



Shana Dale
Deputy Administrator

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Cristina Chaplain (202)512-4841 or chaplainc@gao.gov

Acknowledgments

In addition to the contact named above, Jim Morrison, Assistant Director; William C. Allbritton; Helena Brink; Greg Campbell; Sylvia Schatz; John S. Warren; and Alyssa Weir made key contributions to this report.

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