National Aeronautics and Space Administration (NASA)
FY 2008 Plan for Developing NASA Facilities

February 20, 2007

Astronaut Quarantine Facility, Johnson Space Center, Houston, TX – LEED Certified, 2005.

Office Building 4600, Marshall Space Flight Center, Huntsville, AL – LEED Silver Certified, 2005.

This document has been prepared to respond to direction provided in Section 101 (e) of the NASA Authorization Act of 2005 (P.L. 109-155), signed December 30, 2005, as follows:

(e) FACILITIES.—
(1) IN GENERAL.-- The Administrator shall develop a plan for managing NASA's facilities through fiscal year 2015. The plan shall be consistent with the policies and plans developed pursuant to this section.
(2) CONTENT – At a minimum, the plan developed under paragraph (1) shall describe—

- (A) any new facilities NASA intends to acquire, whether through construction, purchase, or lease, and the expected dates for doing so;
- (B) any facilities NASA intends to significantly modify, refurbish, or upgrade, and the expected dates for doing so;
- (C) any facilities NASA intends to close, and the expected dates for doing so;
- (D) any transactions NASA intends to conduct to sell, lease, or otherwise transfer the ownership of a facility, and the expected dates for doing so;
- (E) how each of the actions described in subparagraphs (A), (B), (C), and (D) will enhance the ability of NASA to carry out its programs;
- (F) the expected cost or savings expected from each of the actions described in subparagraphs (A), (B), (C), and (D);
- (G) the priority order of the actions described in subparagraphs (A), (B), (C), and (D);
- (H) the budget assumptions of the plan, which for fiscals years 2007 and 2008 shall be consistent with the authorizations provided in title II of this Act, including the funding levels for maintenance and repairs, and
- (I) how facilities were evaluated in developing the plan.

(3) SCHEDULE – The Administrator shall transmit the plan developed under this subsection to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than the date on which the President submits the proposed budget for the Federal Government for fiscal year 2008 to the Congress.

Cover Photos of the Astronaut Quarantine Facility, Johnson Space Center, Houston Texas and the Office Building 4600 at Marshall Space Flight Center, Huntsville, Alabama, illustrate the first two NASA facilities Certified under the U.S. Green Building Council, Leadership in Energy and Environmental Design (LEED) Program. Achieving these certifications contributed toward NASA's being one of the first three Federal Agencies to "Get to Green" on the President' Management Agenda.

PLAN FOR DEVELOPING NASA FACILITIES

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EXECUTIVE SUMMARY

PLAN FOR DEVELOPING NASA FACILITIES

FY 2008 President's Budget
January 2007

Achieving the Vision for Space Exploration is a challenge requiring new and innovative roles, responsibilities, capabilities, and relationships throughout NASA. Mission success will depend not only on Agency program success, but also on building and maintaining a strong internal institution and infrastructure: "Ten Healthy Centers".

On December 13, 2005, NASA's Strategic Management Council proposed a set of attributes that will define strong, healthy Centers – Centers strategically positioned, configured, and operated to support NASA's Mission. These attributes represent performance expectations for NASA Centers to guide them toward successful management of the Agency's people, physical assets, and finances.

Attributes of strong, healthy Centers will include:

- Clear, stable, and enduring roles and responsibilities;
- Clear program/project management leadership roles;
- Major in-house, durable spaceflight responsibility;
- Skilled and flexible blended workforce with sufficient depth and breadth to meet the Agency's challenges;
- Technically competent and value-centered leadership;
- Capable and effectively utilized infrastructure; and
- Strong stakeholder support.

This "Plan for Developing NASA Facilities" presents a summary of the overarching planning documents that guide and form the articulated framework for the Agency's real property management decision making. The report strives to demonstrate the integrated processes that are in place to inform, direct, and support the implementation of NASA's real property management goals.

The focus of the Plan is "Capable and Effectively Utilized Infrastructure" and the integral importance of facilities in meeting the NASA mission. Starting with the Agency strategic viewpoint in Section I of the NASA Strategic Plan, NASA Strategic Goals are presented and steps are outlined which demonstrate the responsible stewardship of NASA regarding management of its assets for its Mission: "To pioneer the future in space exploration, scientific discovery and aeronautics research." Additionally, an overview is provided of mission support by NASA Centers to embrace the Vision for Space Exploration.

In fulfillment of the Vision for Space Exploration, NASA has begun an evolution from current operations of flying the Space Shuttle and assembling the International Space Station (ISS) to sustaining the ISS, developing, and then flying the Constellation program's series of vehicles for exploring the Moon, Mars, and beyond. Hence, the NASA Transition is a continuum of careful planning, optimized utilization and responsive disposition of resources, real and personal property, personnel and processes focused upon leveraging existing Shuttle and ISS assets for the Exploration programs' safety and mission success. NASA Transition is both an integrated strategic effort as well as a tactical, execution-oriented systems approach. As such, it is a key driver for NASA Facilities planning and utilization decisions. As the

Constellation Program planning and development matures, the infrastructure requirements to support this effort will also evolve and enable the Agency to enunciate more finely-detailed facilities support of the mission goals.

In Section II, NASA Real Property Management Plan (RPMP), the NASA strategic goals are translated into real property management tactical goals in order to sustain and optimize supporting NASA's missions and the capabilities required for today and tomorrow. NASA's primary real property management goal is to align its facilities with NASA's mission while applying fiduciary accountability.

Next, implementation of the NASA real property management goals is addressed in Section III, NASA Real Property Asset Management Plan (RPAMP). NASA's facilities engineering and real property management strategy and requirements tools are discussed. A graphic depiction which supports the rationale for NASA's facilities strategy and requirements tools is provided in The Facility Life Cycle Performance Curve.

In Section IV, Construction of Facilities (CoF) Program Process, NASA strategy is translated into program level processes. The manner in which the CoF Program is developed is addressed with specific focus on NASA's internal processes with Headquarters Mission Directorates, Mission Support Offices and the Centers. However, external processes to the agency in program formulation are included in the project process cycle and flow charts. Section IV is concluded by providing a summary of NASA's major strategic initiative to update, formalize, and unify all the Center master plans, which will provide a comprehensive, long-term facilities planning framework. The resource of information contained in these proposed Center plans for the future of individual facilities will be captured in a web-based portfolio to support Agency-wide advanced facilities planning.

Finally, project level detail evolved from the program processes is provided in Section V, FY 2008 NASA Facilities Projects. This section, together with the information presented in Appendices D, E, and F, provide the currently available detailed data in response to the sub-elements of paragraph (2) of the legislative direction contained in Section 101(e) of the NASA Authorization Act of 2005. This data is consistent with the information contained in NASA's FY 2008 President's Budget request. NASA's FY 08 Institutional, Program Direct and Demolition Only Projects are presented. Status of known facility closures, other transactions and cost savings is discussed. The referenced appendices provide lists of both Institutional and Program Direct Construction of Facilities Projects, and Demolition Only Projects. Projects presented in these appendices are either continuing or will be initiated in FY 2008.

Overview – Facilities Macro Level Statistics

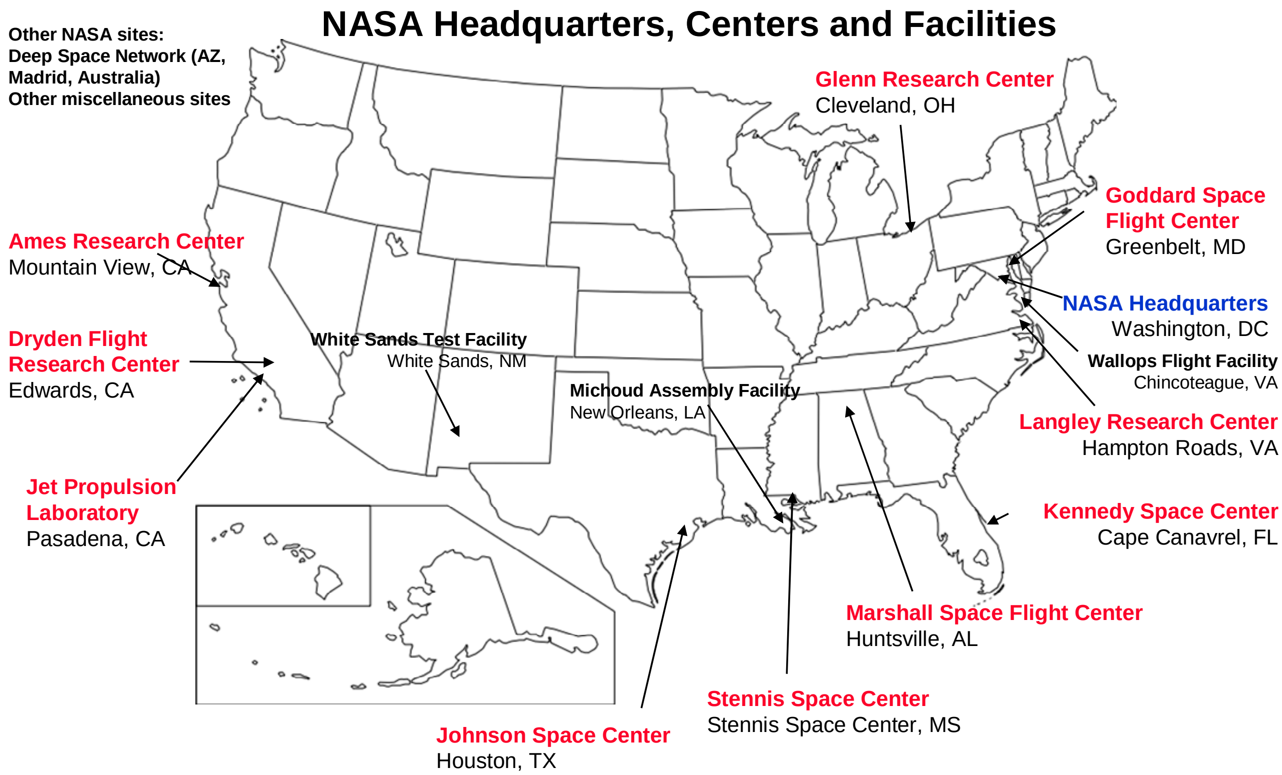
NASA is the ninth largest federal government property holder. NASA Real Property Facts Overview is provided in Figure ES-1 (*below*).

NASA Real Property

- Just the Facts:
  - Over 2700 Buildings
  - Over 2400 Other Structures
  - Over $23 Billion Current Replacement Value
  - 44 Million Square Feet
  - Over 360,000 Acres
  - Aged, high technology facilities.

NASA Real Property Facts Overview (Figure ES-1)

NASA CENTERS

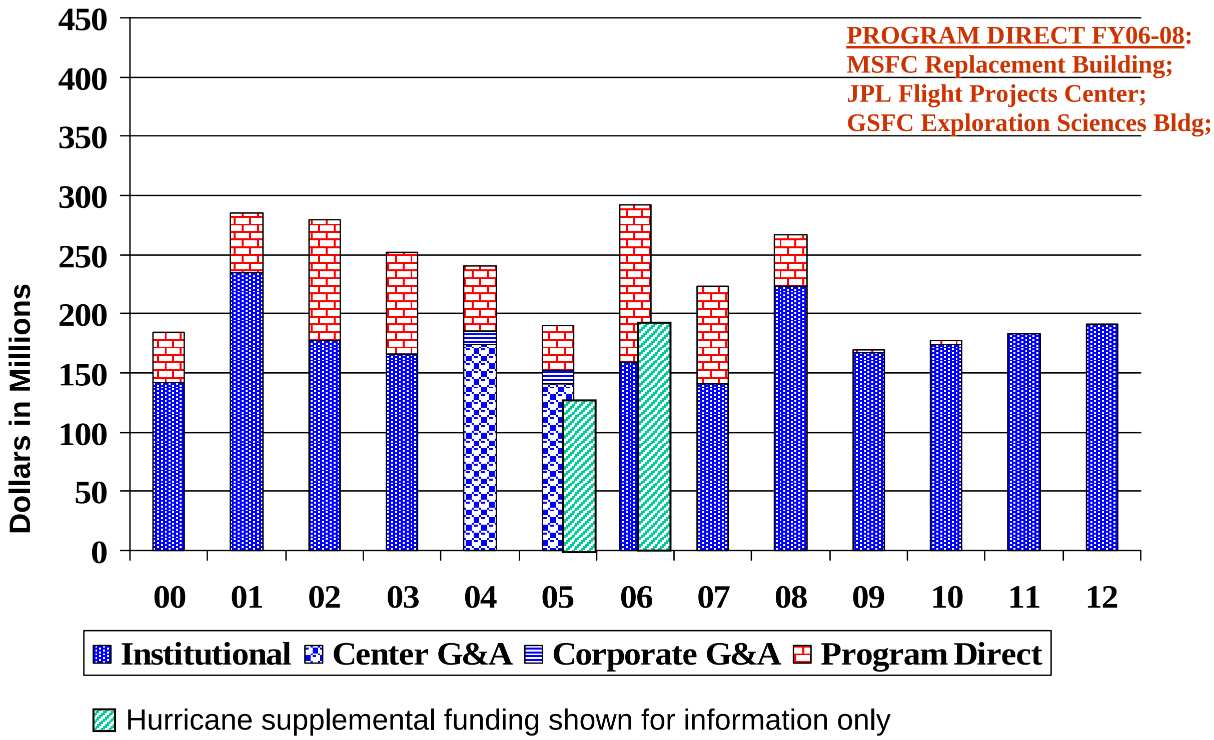


NASA Real Property Locations (Figure ES-2)

NASA Facilities locations are illustrated in Figure ES-2 (*above)*. NASA Headquarters is shown in blue, the ten Centers in red and Other Facility Locations in black.

NASA's CoF Funding Profile for the 21st Century is shown in Figure ES-3 (*next page*). Cost figures in this chart are project procurement costs only. NASA has two major types of funding for CoF projects, Program Direct and Institutional. Program Direct projects are those specifically required and funded by the associated program. Institutional projects support the general infrastructure and functions of the Center. Institutional funding is shown in blue; Program Direct funding is shown in red. The Agency CoF procurement funding level is the total of both the red and blue. (In addition, the funding received in FY 2005 and 2006 for the Hurricane Supplemental is shown in green for information only.)

CoF Funding 2000-2012
(Procurement Only)



January 29, 2007

NASA Construction of Facilities (CoF) Funding Profile (Figure ES-3)

I. NASA Strategic Plan

On January 14, 2004, President Bush presented the Vision for U.S. Space Exploration. The fundamental goal of this vision is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will:

- Implement a sustained and affordable human and robotic program to explore the solar system and beyond;
- Promote international commercial participation in exploration to further U.S. scientific, security, and economic interests;
- Develop the innovative technologies, knowledge, and infrastructures both to explore and to support the decisions about the destinations for human exploration; and,
- Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations.

The Vision for Space Exploration translated to the current NASA Mission and Strategic Goals is shown in Figure I-A.

NASA Mission and Strategic Goals (Figure I-A)

Achieving the Vision for Space Exploration is a challenge requiring new and innovative roles, responsibilities, capabilities, and relationships throughout NASA. Mission success will depend not only on Agency program success but also on building and maintaining a strong internal institution and infrastructure. Guided by the Vision for Space Exploration, NASA has begun an evolution from current operations of flying the Space Shuttle and assembling the International Space Station (ISS) to sustaining the ISS, developing, and then flying the Constellation program's series of vehicles for exploring the Moon, Mars, and beyond. Hence, the NASA Transition is defined as the careful planning, optimized utilization and responsive disposition of resources, real and personal property, personnel and processes focused upon leveraging existing Shuttle and ISS assets for the Exploration programs' safety and mission success. Likewise, it is a continuum of transition for program and exploration support that includes: Space Shuttle program Transition and Retirement (T&R), ISS program impacts from Shuttle Transition and Retirement (STaR), Constellation program transition from development to operations, as well as Commercial Orbital Transportation Services (COTS) transition and possible implementation. Further, NASA Transition is both an integrated strategic effort as well as a tactical, execution-oriented systems approach. As such, it is a key driver for NASA capital assets planning and utilization.

NASA's capital assets, including real property, land, buildings, facilities, roads, and utility systems, constitute a major capital investment and make this Agency the ninth largest Federal Government property holder. NASA has responsibility for over 360,000 acres of real property (100,000 acres are fee owned) and over 5,000 buildings and other structures totaling more than 44 million square feet. The Current Replacement Value (CRV) for NASA real property is over $23 billion.

NASA will continue to purchase, construct, and operate only those assets required to conduct NASA programs, maintain the Agency's core capabilities, and meet national responsibilities, fully leveraging Agency retained assets to increase their functionality in support of mission success. As such, NASA's real and personal property needs, emphasizing facilities, will be evaluated based upon fulfillment of direct or anticipated program and mission requirements. Likewise, every attempt will be made to identify, implement and execute facilities efficiency and effectiveness via management, development and operations strategies that reduce life cycle cost and risk while ensuring safety and mission success.

First, NASA will identify, evaluate, and address real property and other assets and requirements as an integral part of Agency planning activities. Specifically related to NASA Transition, the Strategic Capabilities Assessment Database (SCADB) has been developed and maintained to identify the cross-Agency Shuttle last need and Constellation first need dates for all real and personal property assets, including facilities. Thus, via this roll-up database, one can filter and track data for either strategic or tactical decision making/execution. Further, NASA will include real property, logistics, and environmental requirements and associated life-cycle cost in program and project budgets by ensuring that facility program and project managers, logistics manager, and environmental specialists participate as members of mission and program planning teams. The Agency will ensure that Mission Directorates and program managers review real property, logistics, and environmental requirements throughout program life cycles and address changing requirements as they occur. The Agency also will identify capability shortages and determine how they can be addressed to ensure that Agency-validated future capabilities are maintained. And NASA will identify and eliminate redundant and excess real property capabilities and demolish or deconstruct unneeded facilities and equipment consistent with the requirements of the National Historic Preservation Act.

Second, NASA will seek alternative options to ownership of real property where feasible and economically viable, and alternative uses for Agency underutilized real property, including leasing and consolidation of functions. NASA will make full use of its authorities under the space act to enter into public-private agreements that provide for cost sharing to sustain real property management capacity. This includes the Agency's authority to enter into enhanced-use leases under its demonstration authority. Under these same authorities, NASA also will seek third-party financing and servicing opportunities. In addition, the Agency will market temporarily available capacities to non-NASA customers, divest real property when appropriate, and seek adaptive re-use of historical facilities wherever possible.
Third, NASA will sustain and revitalize its real property assets and purchase, construct, and/or operate new real property only when existing capabilities (including those owned by NASA and other external entities) cannot be used or modified cost-effectively. When construction is needed, NASA will use advanced technologies for master planning, design, construction, and facility operations to ensure that NASA facilities are built for sustainability, safety, security, and environmental soundness.

Finally, through the Agency's corporately managed Shared Capability Asset Program (SCAP), NASA will ensure that the Agency's unique high-value research, test and evaluation capabilities remain available to support missions that require them. NASA will identify and prioritize these critical assets and their associated human capital investments and make strategic investment decisions to replace, modify or disposition them based on NASA and/or other national needs. The implementation of SCAP is particularly important to the NASA Transition effort as it helps ensure that cross-cutting assets, many largely funded by Shuttle in the past, remain viable and are treated appropriately in the forward planning process.

NASA will coordinate Shared Capabilities and Assets and investments with overall real property management planning and execution initiatives to ensure that the needs of the special classes of assets currently identified (e.g., wind tunnels, thermal vacuum test capability) are considered in long term planning. NASA will continue to assess requirements and performance of the asset classes and, over time, assets and /or asset classes may be added to, or withdrawn from, the Shared Capability Assets Program account based on Agency priorities and balance among the assets being considered.

NASA Center Roles for Supporting the Vision for Space Exploration:

NASA faces challenges in its transition from flying the Space Shuttle and building and sustaining the International Space Station to developing and flying the new Crew Launch Vehicle and related Exploration Architecture Systems. The Space Shuttle transition and phase-out effort will be complex and challenging, especially when coupled with conducting potentially the most complicated sequence of Shuttle flights ever attempted. These challenges will require that the Agency identify opportunities to use existing operations capacity for development of required new systems. This includes shifting, rather than growing, a development and production capacity, transferring sustaining capabilities to new systems design efforts, and evolving infrastructure to reduce operational costs.

As we near the final phase of the Space Shuttle Program, it will be necessary for the Agency to transfer assets to follow-on programs and field Center institutions and transition to the next era in NASA human space flight. This will require a structured, cost effective approach for determining which capabilities are needed for the Constellation Systems Program and decommissioning, deconstructing and disposing of the rest.

NASA's Constellation Program is getting to work on the new spacecraft that will return humans to the moon and blaze a trail to Mars and beyond. Thousands of people across the agency are pulling together to meet this challenge, with work assignments that will sustain ten healthy and productive NASA centers, each of which is playing a vital role in making the Vision for Space Exploration a reality. Following is a thumbnail description of each of these roles:

Image above: An Earth Departure Stage, docked to the Crew Exploration Vehicle, fires its engine to leave Earth's orbit.
Credit: NASA/John Frassanito and Associates

Ames Research Center (ARC), Moffet Field, CA
NASA Ames will be the lead for development of thermal protection systems and information technology for NASA's exploration effort. This responsibility includes developing the heat shield and aeroshell for the new spaceship called the Crew Exploration Vehicle (CEV) Orion. They're also leading the development of the Lunar Crater Observation and Sensing Satellite, which will launch with the Lunar Reconnaissance Orbiter in 2008 and crash into the lunar south pole to search for water ice.

Dryden Flight Research Center (DFRC), Edwards, CA
Dryden will lead the abort flight test integration and operations for the CEV. The center will support abort systems tests, drop tests, landing and recovery tests, flight re-entry and landing profiles and range safety.

Glenn Research Center (GRC), Cleveland, OH
Glenn will manage the work on the CEV's service module, which will provide maneuvering with its propulsion system, generate power using solar arrays, and keep the vehicle cool with heat rejection radiators. Glenn is also the lead for the upper stage of the Crew Launch Vehicle.

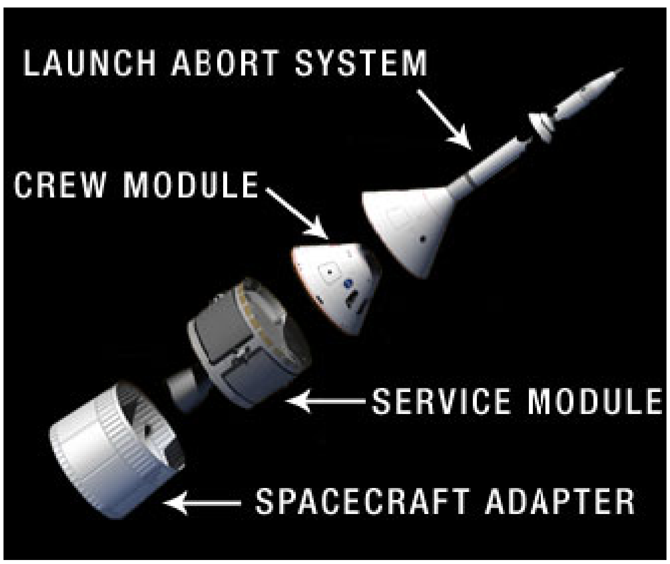


Image left: Components of the Crew Exploration Vehicle. Credit: NASA

Goddard Space Flight Center (GSFC), Greenbelt, MD
Goddard has responsibility for communications, tracking and support mechanisms for the CEV. The center will also continue its work on the Lunar Reconnaissance Orbiter mission, set to launch in October 2008.

Jet Propulsion Laboratory (JPL), Pasadena, CA
JPL leads a multi-center activity in support of the Mission Operations Project to plan systems engineering processes related to operations development and preparation. JPL also provides co-leadership for the Constellation Program Office Systems Engineering and Integration Software and Avionics team.

Johnson Space Center (JSC), Houston, TX
Johnson, home to NASA's astronaut corps and mission control, is managing the Constellation Program. The center will integrate the CEV, Crew Launch and Cargo Launch Vehicles for all mission operations. JSC is the lead for the crew module, and will provide flight operations support to the Crew Launch Vehicle. As with Shuttle program and Apollo before, JSC will plan missions, train crews and run mission control.

Kennedy Space Center (KSC), FL
Kennedy will continue its tradition of launching NASA's explorers into space. KSC hosts the Ground Operations Project, which manages all activities related to ground operations for the launch and landing sites, including ground processing, launch, and recovery systems.

Image above: The Crew Launch Vehicle, top, and the Cargo Launch Vehicle.
Credit: NASA/John Frassanito and Associates

Langley Research Center, Hampton Roads (LaRC), VA
Langley leads Launch Abort System integration supporting the CEV Project, providing oversight and independent analysis of the system's development. Langley also leads the Command Module Landing System Advanced Development Project and will support CEV testing.

Marshall Space Flight Center (MSFC), Huntsville, AL
Marshall hosts the Constellation Launch Vehicle Ares projects and is responsible for managing all Crew Launch and Cargo Launch Vehicle related activities. Marshall will design the Crew Launch Vehicle's first stage and is responsible for launch vehicle testing. Additionally, Marshall operates the Michoud Assembly Facility near New Orleans, LA that may be the site of several other Constellation production and assembly activities as well as Commercial Orbital Transportation Services manufacturing.

Stennis Space Center (SSC), MS.
By building on more than 40 years of experience in rocket propulsion testing, Stennis will continue to serve in its traditional test role, serving as the integration lead for all rocket propulsion testing under the Rocket Propulsion Test Program. The first rocket engine to be tested will be the J-2X, an engine comparable to those tested at the center 40 years ago for the Apollo Saturn V rockets. Various engine components, engine systems, and stages will be tested. In the Constellation Program, the J-2X will be used to power the Upper Stage of the Ares Crew Launch Vehicle.

The Vision for Space Exploration includes robotic exploration of planetary bodies in the solar system, advanced telescope searches for Earth-like planets around other stars, and the study of the origins, structure, evolution, and destiny of the universe. Other initiatives guide NASA's study of Earth from space and build on NASA's rich heritage or aeronautics and space science research.

Science both enables, and is enabled by, exploration. NASA's access to space makes possible research into scientific questions that are unanswerable by conventional means. Space-based telescopes observe the farthest reaches and earliest times in the universe. Robotic spacecraft travel to, land on, rove over, and even return from planetary bodies throughout the solar system. And, Earth-observing satellites keep watch over Earth, making regular observations of global change and enabling better predictions of climate, weather, and natural hazards.

NASA is also the lead government agency for civil aeronautics research, and aeronautics remains a core part of the Agency's Mission. NASA's aeronautics research initiatives will expand the capacity and efficiency of the Nation's air transportation system and contribute to the safety, environmental compatibility, and performance of existing and future air and space vehicles. To achieve in these objectives, NASA will invest in the Agency's in-house expertise to ensure that NASA retains the world-class skills, knowledge, and facilities needed to guarantee the Nation's innovative contributions to aeronautical challenges, both civilian and military.

II. NASA Real Property Management Plan

The Real Property Management Plan (RPMP) sets Agency goals and improvement initiatives to support the NASA Strategic Plan Implementing Strategy to “achieve management and institutional excellence comparable to NASA’s technical excellence”.

Specifically, this plan supports the Strategic Plan objective that “NASA will improve the institutional management of capital assets to ensure that NASA’s real property, personal property, processes, and systems are sustained and optimized to support NASA’s missions and the capabilities required for today and tomorrow.”

The RPMP directly responds to the addition of Real Property to the President’s Management Agenda (PMA) directed by the February 4, 2004, Executive Order 13327 – Federal Real Property Asset Management. The purpose of this Executive Order is to improve overall management of Federal real property assets on a Government-wide level. The expected results of this new focus include expanded asset portfolio tracking and analysis capabilities, comprehensive asset management strategies, increased sales of underperforming assets, and reduced maintenance and operating costs. Under the PMA Scorecard evaluation, NASA was one of three Federal agencies to “Get to Green” on both Status and Progress effective June 2006. Currently, NASA is “Green” on Status, and “Yellow” on Progress.

The Agency strategic planning process incorporates facility planning as an integral component. The goals and objectives of the Vision for Space Exploration, Agency Strategic Plan, Mission Directorate Strategies, and Center Implementation Plans cannot be met without considering the real property element.

Once program/project requirements are defined, facilities requirements are addressed to ascertain whether existing infrastructure is adequate, needs renovation or must be newly constructed for any proposed acquisition or major modification of infrastructure. In order to assess the most beneficial solution for the government, a Business Case Analysis is required (NASA Policy Requirement 7120) which includes full life cycle cost (including operations, sustainment, and disposal), benefit estimates, alternatives and sensitivity analyses, and risk assessments. *(Note: Extract provided as Appendix C.)*

NASA plans to use a variety of tools to manage our real property in the most efficient and effective manner possible. This includes the use of its authorities under the Space Act, for entering into real estate agreements such as third party financing and Enhanced Use Leasing (EUL). In the Consolidated Appropriations Act of 2003 (P.L. 108-7), NASA was provided authority to implement EUL as a pilot program at two NASA Centers; the Agency chose to use this authority at the Kennedy Space Center in Florida and the Ames Research Center in California. NASA continues to seek appropriate paths to achieving expansion of its EUL authority through the legislative process.

Additionally, aging institutional facilities and utility distribution systems must be sustained or revitalized in order to support current and future facility requirements. A balanced funding approach is essential for continuing to operate facilities safely, efficiently, and support the Agency’s mission.

Thus, NASA’s Real Property Management Goals are defined in Figure II-A.

Agency Real Property Management Goals

1	**NASA will identify and address real property requirements as an integral part of Agency, Mission Directorate, program, and project planning.**
2	**NASA will construct and operate new real property to meet mission requirements only when existing capabilities cannot be effectively used or modified.**
3	**NASA will continually evaluate its real property assets to ensure alignment with the NASA Mission.**
4	**NASA will leverage its real property to its maximum potential.**
5	**NASA will sustain, revitalize, and modernize its real property required by the NASA Mission.**

NASA Real Property Management Goals (Figure II-A)

III. NASA Real Property Asset Management Plan

The NASA Real Property Asset Management Plan (RPAMP) is the companion document to Real Property Management Plan (RPMP). While the Real Property Management Plan addresses what we are doing, the Real Property Asset Management Plan addresses how we are doing it, containing detailed action plans for the goals and improvement initiatives identified.

Facilities requirements tools are utilized in order to access, measure, and objectively evaluate the facilities inventory. A wide range of enabling and analysis tools are utilized to ensure that NASA seeks alternatives to new construction where feasible. When new construction is needed, these tools enable planning, design and construction that ensures that new facilities are of the right size and type, are safe, secure and environmentally sound; operate efficiently and effectively, and provide sustainable quality workplaces.

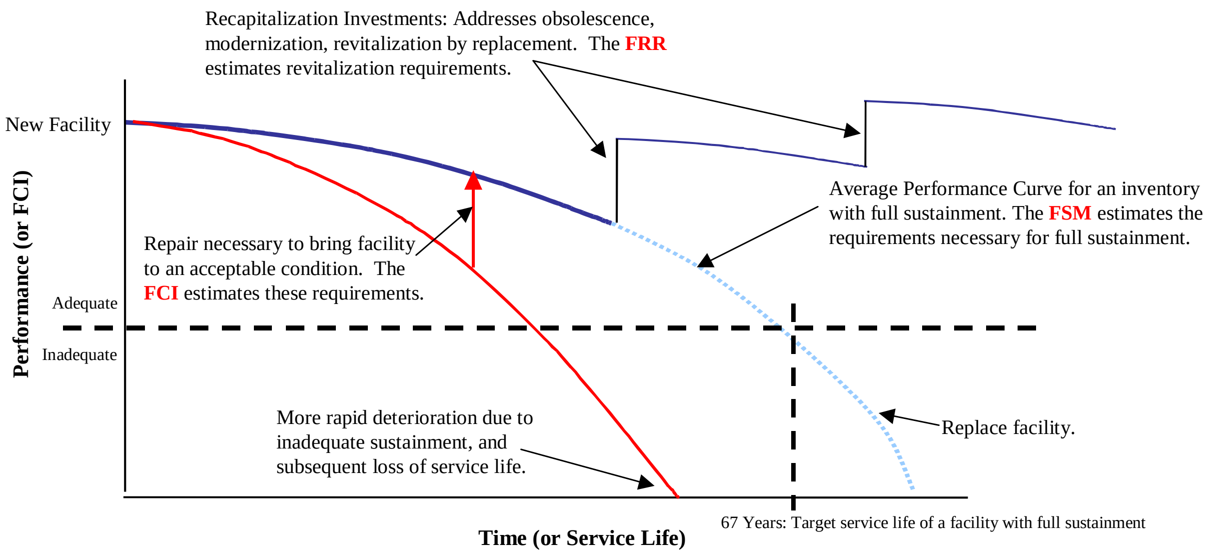
NASA’s facilities strategy is to invest in facility maintenance, repair, replacement and demolition/disposal to ensure that our infrastructure will fully enable current and future missions. With certainty, a Center’s basic utility distribution and infrastructure systems must be capable of supporting these critical facilities. Thus, NASA invests in sustainable operations, design and construction. Additionally, in FY 2004, NASA instituted a Demolition Only Fund for FY 2004 thru FY 2007; in FY 2006 this fund was expanded to include FY 2008. The Demolition Only Program’s purpose is to fund the demolition of unused and obsolete facilities that are not required for the current strategic objectives. The removal of these structures eliminates potential safety and environmental liabilities as well as public eyesores. Additionally, associated operations and maintenance funding allocated for these structures is directed to higher priorities.

The Facilities Requirements Tools are defined and illustrated in the Facility Life Cycle Performance Curve, Figure III-A. This diagram illustrates the typical life cycle of a facility and the means which may be employed to extend the life of a facility. On the Y-axis is the Performance or Facility Condition Index (FCI) of the building; on the X-axis is Time or the Service Life of the Facility. The first curve (red) represents a new facility which has not had the proper repairs, and in which subsequent deterioration foreshortens the life of a facility. The second curve (blue) represents a facility which has had the proper repairs (vertical red arrow) to sustain the FCI of the facility to the target age of 67 years. The amount needed to sustain facilities for their useful life is called the Facility Sustainment Metric (FSM). The third and following partial curves (purple) represent recapitalization of investments in which modernizations or Repair-by-Replacement has occurred to extend the facility beyond the average target age. The Facilities Revitalization Rate (FRR) (black vertical bar) is the amount needed to revitalize facilities to this standard. Visually portrayed in this diagram is the reason that “the best defense is a good offense”; that is, regularly scheduled sustainment is paramount. When proper sustainment does not occur, facilities costs are exacerbated exponentially.

In addition to FCI, FSM and FRR, NASA tracks facilities utilization, operations and maintenance costs and mission dependency of facilities in its Real Property Inventory Database.

Facility Requirements Tools

Facility Life Cycle Performance Curve



FSM: Facility Sustainment Model; FCI: Facility Condition Index;FRR: Facility Revitalization Rate

Also measure and use facility utilization, O&M costs, and mission dependency.

NASA Mission and Strategic Goals (Figure III-A)

IV. The Construction of Facilities Program Process

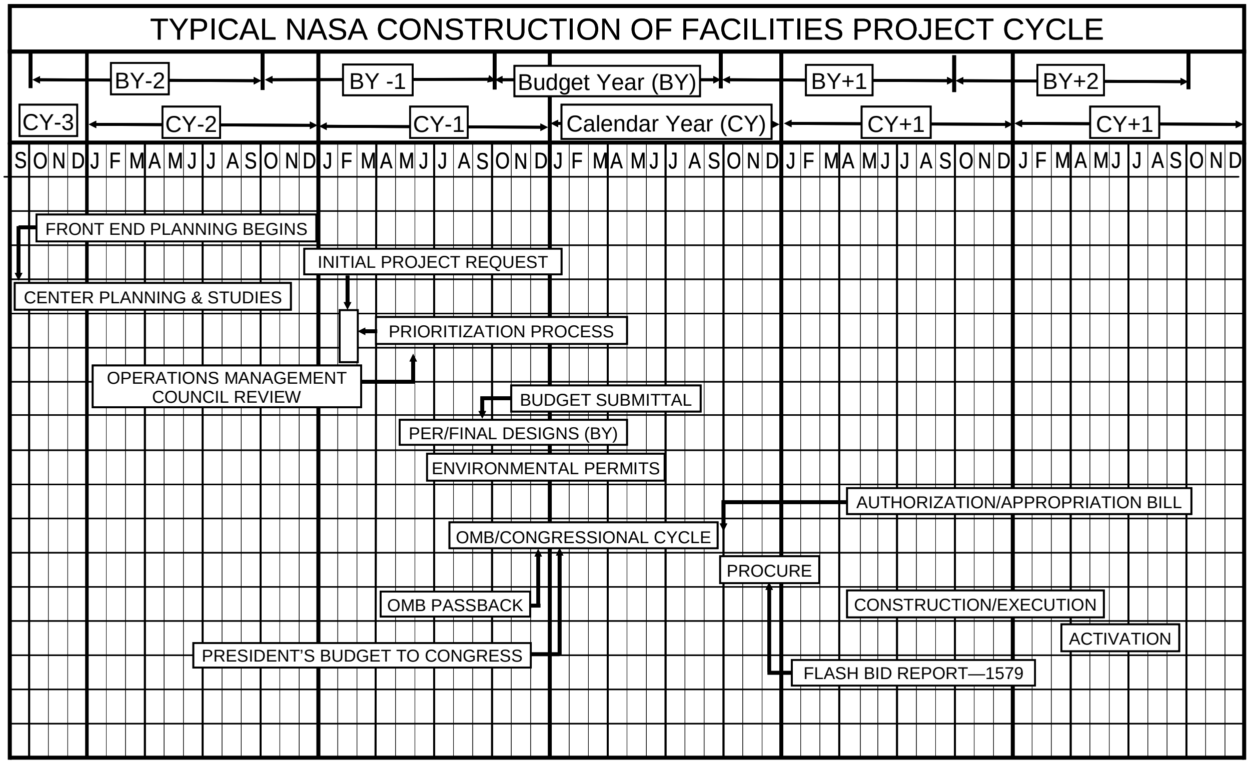
This section addresses capital project planning, and assessment of the Capital Facilities Investment Program (design, construction and repair, or traditional CoF) at the following ten NASA Centers:

- **Ames Research Center:** Ames, Crows Landing Facility near Modesto, CA, Camp Parks Facility near Pleasanton, CA, and Moffett Federal Airfield, CA
- **Dryden Flight Research Center:** Dryden
- **Langley Research Center:** Langley
- **Glenn Research Center:** Lewis Field and Plum Brook Station in Sandusky, Ohio
- **Goddard Space Flight Center:** Goddard, Multiple Spaceflight Tracking and Data Network (STDN) sites, Wallops Flight Facility in Wallops Island, VA (including off-site facilities)
- **JPL:** JPL, Table Mountain in Wrightwood, California, and Deep Space Network Sites (Goldstone, Canberra, and Madrid)
- **Johnson Space Center:** Johnson, White Sands Test Facility in Las Cruces, NM (including Space Harbor), and Space Network (TDRSS) locations.
- **Kennedy Space Center:** Kennedy, Cape Canaveral Air Force Station in Florida, Transatlantic Landing Sites, and Vandenberg Air Force Base
- **Marshall Space Flight Center:** Marshall, Michoud Assembly Facility, Santa Susanna Field Laboratory in California, the Assembly & Refurbishment Facility (ARF) and related MSFC Facilities (SRB element)
- **Stennis Space Center:** Stennis (without tenants)

NASA is developing an Agency-wide five-year Capital Facility Investment Program (CFIP) that is in accordance with the Agency mission, vision and strategic plan, and meets external requirements. The CFIP is a Center planning tool which identifies capital expenditures/projects over the upcoming five years. In NASA's FY 2007 Facility Data Call to Centers for development of the FY 2009 Facilities Budget, an unconstrained listing of facility project requirements is required which will be distilled into the NASA Agency-wide five-year facility plan. This Agency-wide plan will include those projects that support the NASA mission and priorities and can be funded. A Center's CFIP plan identifies facility project needs that are projected to be required to achieve assigned mission objectives, to provide institutional support, and to revitalize existing facilities. A project's inclusion in the CFIP does not, in and of itself, commit Headquarters to funding it or the Center to accomplishing it. Available funding and /or changing mission requirements may require some projects to be deferred beyond the years in which they are initially programmed for accomplishment in the CFIP. CFIP plans will be updated annually based upon improved information about mission requirements, existing facilities, budget adjustments, advances in R&D, and mission changes.

The Capital Facility Investment Program includes both Institutional and Program Direct projects. Programs generally fund all Construction of Facilities (CoF) projects, including facilities planning and design (FP&D), Minor and Discrete projects, for the facilities in which they are the primary beneficiaries. In cases where there are multiple beneficiaries, funding responsibility is directly assigned on a pro-rata allocation to each of the benefiting programs in accordance with full cost principles. There is a NASA Agency fund for all Institutional CoF projects within the Institutional Investment Account.

In Figure IV-A, below, NASA Construction of Facilities Project Cycle, the typical facilities cycle for Conventional Design-Bid-Build Projects is portrayed. The construction planning process starts several years in advance, with design being funded two budget years prior to construction start. (*Note: This process can be expedited with Design-Build Projects; however, facilities requirements must be completely* *defined in a Facilities Requirements Document for the Design-Build process to be effective. Construction documents in Design-Build are performance rather than prescriptive as they are in Design-Bid-Build.*)

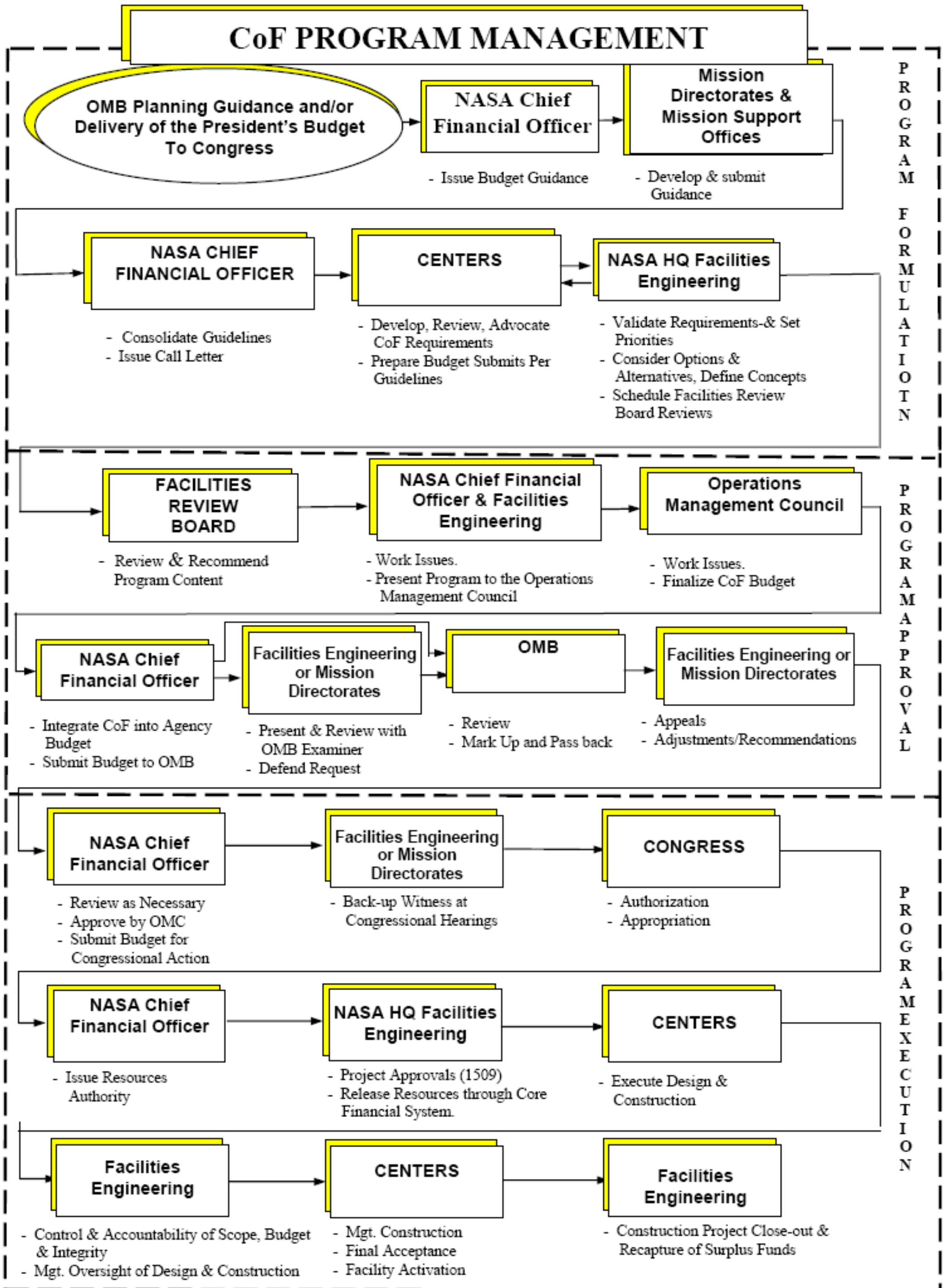


NASA Construction of Facilities Project Cycle (Figure IV-A)

The CoF program is developed through a process involving both internal and external stakeholders. This development process is described in the following paragraphs and depicted in Figure IV-B, NASA Construction of Facilities (CoF) Program Management Flow Chart which depicts the Program Formulation, Approval and Execution.

Focusing on internal Program Formulation, NASA Budget Guidance is issued from NASA's Chief Financial Officer that considers: OMB guidance and/or the President's budget to Congress and other policy guidance (including NASA Strategic Plan, Performance Plan, Administration and Congressional direction, applicable policies, and NASA Administrator's direction). Program development includes not only the formulation of the proposed facility projects but also the management and approval of the projects for inclusion in the Agency's budget submittal.

These specific guidelines are incorporated in the NASA Headquarters Data Call to the Centers and programs requesting specific facility project requirements. Centers, programs, and projects evaluate their requirements. Centers submit their CoF project requirements developed in accordance with the NASA Budget Guidance, Data Call and Policy Directives to NASA Headquarters Facilities Engineering and Real Property Division (FERPD).



NASA Construction of Facilities (CoF) Program Management Flow Chart (Figure IV-B)

Upon completion of reviewing requirements for Agencywide priority, which includes Risk Assessment and compliance with NASA Policy, the Director of FERPD makes a recommendation to NASA

Leadership for NASA CoF Project Funding. The project requirements submitted by the Centers (NASA Minor and Discrete Projects), or Capital Improvements Plan projects, are the projects that implement the plan necessary to get the Center to its desired end state, based on its long term plans in support of NASA missions. These are the projects that must be consistent with, and effect, the Center Master Plan *(Center Master Planning detailed on Page 26.)*

Implicit in each Center Director's Construction of Facilities project submission is the assumption that NASA Project Requirements (NPR) will be met. Examples of project requirements include Deferred Maintenance (DM) reduction due to the project; Facilities Condition Index (FCI); demolition or temporary structure removal involved; health, security, environmental, and/or safety hazards to be corrected (including Risk Assessment Code); sustainable design features to be incorporated and U.S. Green Building Council, Leadership in Environmental and Energy Design (LEED) Certification intent; Project Definition Rating Index (PDRI) score and interval of performance; consistency with Center Master Plan; economic payback, Historic/Preserve America initiatives, Americans with Disabilities Act (ADA) in public areas / Uniformed Federal Accessibility Standard (UFAS) in work areas, Facility Criticality, Facility Utilization, Facility Status and Operational Cost (Utilities and Maintenance).

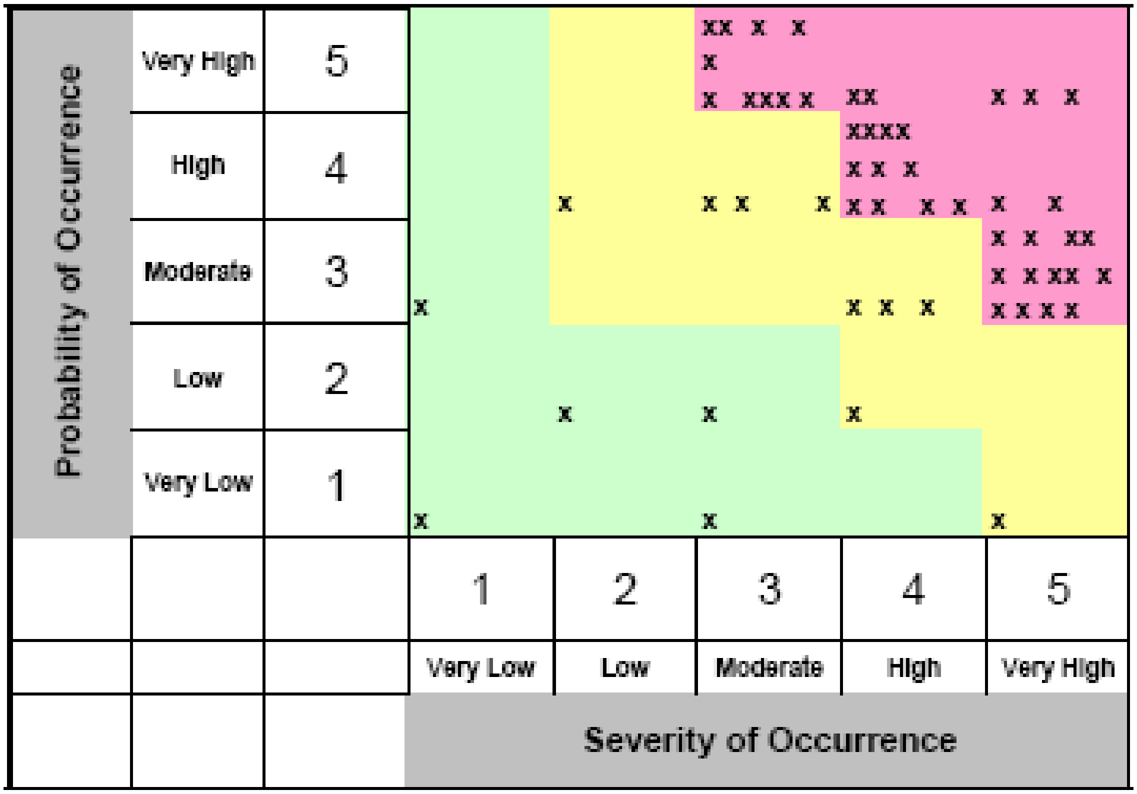
Life Cycle Cost Analysis are required for all projects. ECONPACK Economic Analyses are required for all budget year projects equal to or greater than $5 Million. A Business Case Analysis is required for all Program Direct Discreet Projects.

CoF Agency-wide Prioritization Process for Institutional Projects:

Additionally, Institutional Projects compete for resources in a CoF Agency-wide prioritization process in which the risk to the Agency of not doing the project is evaluated.

Below, in Figure IV-C, Construction of Facilities Risk Assessment Matrix, projects are plotted in a 5x5 risk assessment matrix. The X axis represents the Severity/Consequence of Occurrence and the Y axis represents the Probability of Occurrence. Each "x" on the chart denotes a potential project, plotted from X and Y coordinates. (*Note: the distribution of projects portrayed is notional.)* Definitions of the Severity and Probability are shown in Figure IV-D&E, Construction of Facilities Risk Assessment Severity/Consequence and Construction of Facilities Risk Assessment Probability Definitions, respectively.

For example, a project is needed as "frequent major system failures (more than three) occur annually" and "system failure will shut down or have major impact on mission efforts on the Center". On Figure IV-D, the Severity/Consequence of Occurrence Chart, the Mission Consequence for the project would be a score of "Very High" or "5". Looking at Figure IV-E, on the Probability of Occurrence Chart, the Failure Rate for the project would be a score of "Very High" or "5". Thus, the project would be plotted on Figure IV-C, with X coordinate of "5" and a Y coordinate of "5", the highest category for project funding (red zone).



Construction of Facilities Risk Assessment Matrix (Figure IV-C)

Consequence of Occurrence (DRAFT)

	Very High	High	Moderate	Low	Very Low
Mission Consequence	System failure will shut down or have major impact on mission efforts on the center.	System failure will cause minor delays in major mission.	System failure may indirectly impact mission. Contingent plans will mitigate any delays but may lead to cost increase.	System failure may have minor impact on mission.	System failure has no impact on mission.
or					
Property Damage	System Failure could lead to more than $5 million in damage to facilities or federal property.	System failure could lead to more than $1- million to $5-million in damage to facilities or other federal property.	System failure could lead to more than $500k to $1-million in damage to facilities or other federal property.	System failure could lead to minor damage ($100k - $500k) to property.	System failure could lead to insignificant damage (<$100k) to property.
or					
Personnel injury or Health	System failure could lead to loss of life or permanently disabling condition.	System failure could lead to severe occupational illness.	System failure could lead to minor occupational injury or illness.	System failure could lead to the need for minor first aid treatment.	System failure is unlikely to lead to an injury.
Score	5	4	3	2	1

Construction of Facilities Risk Assessment Severity/Consequence Matrix Definitions (Figure IV-D)

Probability of Occurrence (DRAFT)

	Very High	High	Moderate	Low	Very Low
Current Requirements	System no longer is safe and will not support current requirements. System needs to be replaced	System no longer meets technical requirements or codes. Reliability is highly questionable. Significant corrective work or component replacement is required.	System meets minimum technical requirements. Reliability is questionable and repairs may have minor impact on users. Corrective work is required.	System meets requirements and codes. The system functions as intended. Minor corrective work is required.	Meets current codes and technical requirements. The system is functional and reliable.
or					
Failure Rate	Frequent major system failures (more than 3) occur annually. .	One or two failure events occur annually. System occasionally unable to function as intended. System failure probable.	System not always functional and reliable. System failure is occasional.	System is functional with expected reliability. System failure is remote, but possible in the life of the system.	System is safe, reliable and meets all codes. System failure highly improbable.
or					
Obsolescence	Critical components are obsolete. OEM no longer supports system. No replacement parts exist.	Components are obsolete. OEM no longer supports system. Replacement parts must be manufactured or cannibalized to support repairs.	Parts are no longer manufactured, or manufacture is limited. Parts are only available through remaining stocks or require long lead-time to acquire.	Critical parts are still available; however shrinking supplier base and obsolescence threatens future supply.	Components are available from OEM or other suppliers.
or					
Natural or Man-made Disasters	The probability of an occurrence that could exceed facility or system limits exceeds 15% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is between 10% and 14% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is between 5% and 9% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is less than 5% in 25 years (or system life if less than 25 years).	The probability of an occurrence that could exceed facility or system limits is negligible (less than 1%) in 25 years (or system life if less than 25 years).
Score	**5**	**4**	**3**	**2**	**1**

Construction of Facilities Risk Assessment Matrix Probability Definitions (Figure IV-E)

NASA Center Master Plans
and
NASA "Portfolio" for Capital Improvement

NASA has recently embarked on a $6.3M strategic initiative to update, formalize, and unify all Center master plans under the oversight of the Facilities Engineering and Real Property (FERP) Division. The Center master plans will propose a 20-year view for making strategic decisions about facilities and equipment that will ensure the creation of efficient, sustainable, and affordable facilities that are capable of being responsive to and supportive of the Agency's mission in the long term.

The development, approval, and evolution of the NASA Center master plans is a multi-year process pursuant to specific guidance. Development of a Center master plan and the plan for its implementation is an iterative process involving close consultation between Centers and Mission Directorates, a review process involving Center presentations to FERP and Mission Directorates, and finalization of a Center master plan and approval by FERP. Approval of a Center master plan represents approval of the overall concept and plan, and does not represent assurance that any specific project will be funded. Following signature of the final master plan by a Center Director, it becomes the primary roadmap for ongoing Center development to support NASA's goals and mission.

At this time, four Centers have approved master plans. Four additional Center master plans are expected to be approved by Headquarters in 2007. The remaining two Centers are expected to develop master plans for Headquarters review and approval within the next two years. Center master plans will be updated on a continual basis and reviewed no less than every three years to ensure they continue to support the Center's concept of development in support of the NASA mission.

The strategic initiative to update, formalize and unify all Center master plans will enable NASA to consolidate and integrate the capital improvements proposed by the Centers for use in Agency-level planning via a consolidated, web-based portfolio. This portfolio will serve as a resource of information regarding NASA facility land use, constraints, and opportunities, utilizing Geospatial Information Systems platforms where appropriate. The consolidated portfolio will be ready in 2007. As Center master plans are completed or updated and approved, the portfolio will be updated. While accomplishment of specific proposed projects set forward in the Center master plans is necessarily subject to Headquarters approval based on evolving NASA mission requirements and the availability of funds, the master plans will provide an invaluable internal framework for conducting advanced facilities planning.

Finally, a 20-year Capital Investment Program Plan (CIPP), including funding resources, will be developed for each Center and rolled up to an Agency-level plan, indicating existing facility sustainment and improvements, as well as new or eliminated Center capability. This plan will reside within the above mentioned Agency portfolio and will be a roadmap for development. In consonance with the President's Management Agenda for responsible stewardship of all capital assets, NASA's CIPP will include an overview of all facility investments; thereby also capturing Center expenditures. The broad categories, or project groups, for the CIPP are Sustainment, Renewal and Transition (not to be confused with the NASA Transition activity as previously defined), as follows:

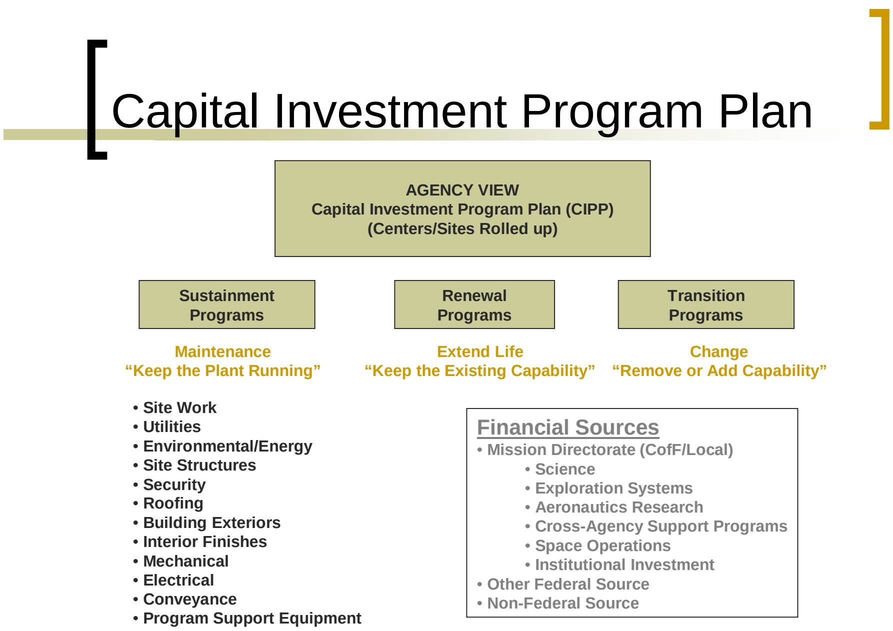
<u>Sustainment</u>: Sustainment programming shall consist of projects in groups, generally by systems that repair or replace existing systems, to maintain the physical facilities. SCAP is a potential source of funds for maintaining existing capabilities in facilities.

Renewal: Renewal programs shall consist of projects in a group, generally of a specific facility or area, that tend to maintain the "status quo" capability at a Center. Such programs may be focused on:

1. Renovations of existing facilities to modernize them,
2. Consolidations of facilities to improve efficiencies and operational relationships,
3. Demolition of facilities not needed or costly to maintain in readiness and
4. New construction replacing existing facilities but maintaining existing capability.

Transition: Transition programs shall consist of projects in a group, generally of a specific facility or area, that tend to significantly increase, decrease, eliminate or create capability at a Center. *(Note: The term "Transition" here denotes a category of Capital Investment Program Plan programs, e.g. a subset of the broader NASA Transition effort.*)

These categories for NASA's CIPP are displayed in Figure IV-F, below. Each Center is divided into area developments that may cross-cut the three broad categories. Funding sources are categorized into specific programs (e.g. Science, Exploration Systems, Aeronautics Research, Cross-Agency Support Programs, Space Operations or Institutional Investments), Non-NASA Federal Funding, and Non-Federal Funding. The three project groups for CIPP are characterized as follows:



Capital Investment Program Plan (Figure IV-F)

V. FY 2008 NASA Facilities Projects

Budget Assumptions of the Facilities Plan for FY 2007-2008 are consistent with the authorizations provided in Title II of the NASA Authorization Act 0f 2005, including funding levels of maintenance and repair.

This Section provides the CoF Project level detail evolved from the CoF Program strategy and processes described in prior sections of this report.

NASA Construction of Facilities
(New Construction, Renovation, Modification, Refurbish, or Upgrade)

The FY 2008 Construction of Facilities Institution Projects List and FY 2008 Construction of Facilities Program Direct Project List are provided as Appendices D and E, respectively.

NASA's Demolition Account

The FY 2008 Demolition Only Project List is provided as Appendix F. (Note that the Estimated Annual Maintenance and Utilities Costs for FY 2008 are estimated cost avoidances which are expected to be obtained when demolition is complete.)

Strategic Purpose: These projects eliminate unused and obsolete facilities that are not required for the current strategic objectives. Abandoned facilities become eyesores on the Centers, and can be safety hazards presenting potential liabilities. Abandoned facilities must still be maintained at minimal levels to prevent increasing safety and environmental hazards. These recurring maintenance costs exacerbate the limited maintenance dollars needed for NASA's Centers. Demolition projects reduce Deferred Maintenance (increasing the Agency/Center Facilities Condition Index) thus improving the overall health of the Agency/Center facilities infrastructure.

There is little incentive to demolish old, underutilized facilities as demolition requires upfront funding. Many of these facilities are unusable and would require significant investments to revitalize. In FY 2004, NASA funded a four year Demolition Account (FY 2004-FY 2007) at $10M per year. In FY 2006, the Account was funded for $15M in FY 08.

Return on Investment: Based upon DoD experience during Base Closure, NASA estimates an average payback at approximately 7 years. In FY 05, NASA's Demolition Program and its transfer of excess facilities accounted for a Deferred Maintenance (DM) Reduction of $98M. Glenn Research Center eliminated $40M of their DM estimate through the demolition of unneeded facilities. In addition, NASA estimates that facility demolition to date has resulted in the reduction of over $3 million in operations and maintenance costs per year.

Facility Disposal Plan

NASA has identified approximately 1 million square feet of facilities that will be available for closure within the next 4 years. Once these facilities are removed from NASA's active inventory, they will be evaluated for demolition, transfer to another agency, or other means of disposal as funding permits.

NASA has identified 2 sites that will have no strategic value upon completion of the Space Shuttle Program. These 2 sites are the Orbiter manufacturing facility at Palmdale, CA and the Santa Susanna Field Laboratory adjacent to San Fernando Valley, CA. NASA is currently developing disposal plans to remove these two sites from the NASA inventory at the end of the Space Shuttle Program. NASA is negotiating with the Air Force to return the Palmdale site to Air Force programs. The Agency is also working with GSA to develop a disposal strategy for Santa Susanna. Transferring Palmdale to Air Force programs will reduce NASA's inventory by an estimated $35 million and reduce NASA's deferred maintenance by $.6 million. Disposing of Santa Susanna will reduce NASA's facility inventory by an estimated $98.6 million and reduce NASA's land holdings by 41 acres.

To reiterate, NASA's real and personal property needs, emphasizing facilities and capital assets, will be evaluated based upon fulfillment of direct or anticipated program and mission requirements.

NASA will identify, evaluate, and address real property and other assets and requirements as an integral part of Agency planning activities. One of the primary mechanisms for accomplishing this is the Strategic Capabilities Assessment DataBase (SCADB) which has been developed and maintained to identify the cross-Agency Shuttle "last need" and Constellation "first need" dates for all real and personal property assets, including facilities. Since NASA intends to use Space Shuttle facilities whenever possible to support Constellation programs, this database will be an integral element in Transition disposition activities. As the Space Shuttle Program develops program closeout requirements, the program is identifying "last need dates" for program facilities. As the Constellation Program develops its ground facility requirements, Constellation program is identifying Space Shuttle facilities that are required to support Constellation ground operations. From 2007 through 2010, the Constellation Program will continue to identify facilities required to support its missions. Facilities that are no longer required for Space Shuttle Program, cannot support Constellation Programs, and cannot be used to support other NASA programs will be identified for closure. NASA will develop disposal plans for these facilities once they are identified.

Facilities Plan for Supporting NASA's Constellation Program

To meet the challenge of developing and testing the new Ares and Orion Vehicles while meeting the Space Shuttle Program mission requirements, NASA intends to maximize the use of existing ground facilities and minimize facilities modifications during the early stages of the Constellation Program. By maximizing the use of existing facilities and minimizing ground infrastructure modifications, NASA will be able to support both programs side by side and minimize the impact to operations for either program. This approach will also reduce the first cost ground infrastructure requirements for Constellation, allowing the program to focus more funding on development of vehicle systems and assuring safe and successful flights. NASA will continue to repair and maintain existing facilities identified as necessary to support the Constellation missions.

Kennedy Space Center, vehicle processing and launch facilities:

Vehicle Assembly Building - NASA intends to reutilize one high bay area of the Vehicle Assembly Building (VAB) for assembly of the Crew Exploration Vehicle and Ares 1 launch vehicle. The VAB will be modified to support vertical assembly of the new vehicle concurrent with the last phases of the Space Shuttle Program. The primary modifications to the facility will be to alter the VAB assembly work platforms to accommodate the new vehicle configuration. Since the new vehicle will be utilizing Space Shuttle systems, the VAB already has the necessary utility capacities and auxiliary equipment to support vertical assembly.

Operations and Check-out Facility (O&C) - NASA has determined that this facility has long term value for operations at Kennedy Space Center. NASA will renovate the office and laboratory area of this facility. The contract for the design and construction of the Crew Exploration Vehicle (CEV) has been awarded and the contractor will be performing the final assembly of the Vehicle(s) in the O&C.
The high bay area will be modified to support Crew Exploration Vehicle processing.

Launch Complex 39 - the decision to fly the Hubble Space Telescope mission in FY08 has changed the strategy for transferring Pad B from Shuttle to Constellation. Since Pad B must remain operational for the Shuttle Program to support a Launch-on-Need rescue mission, modifications to the Pad will be limited so as not to preclude a shuttle launch. These modifications will begin in FY07. The Pad will be transferred to Constellation after the Hubble Space Telescope mission in approximately October 2008. Launch Pad A will be transferred to Ares launch vehicle use and modified after the last Shuttle mission."

Launch Control Center – The Launch Control Center will be used to support Constellation Program launches. To accommodate both Space Shuttle and Constellation vehicles simultaneously, Firing Room #1 will be modified for Constellation systems while the remaining firing rooms will be used by the Space Shuttle Program until the Space Shuttle's last flight. No decision has been made regarding whether or not "Modification of the remaining 3 firing rooms will take place. Constellation will modify additional firing rooms (other than Firing Room 1) only if required, and if this occurs, it will take place after the end of the Space Shuttle Program.

Hangar AF – Hangar AF is used for post flight processing of the Solid Rocket Boosters. NASA will continue to use Hangar AF to process solid rocket boosters for the Ares launch vehicle. To support Ares booster processing, the Hangar AF complex will be modified to support the longer boosters.

Vertical Processing Facility (VPF) – Constellation is currently conducting trade studies to determine if the Vertical Processing Facility can be modified to meet Constellation requirements for vertical processing of hazardous substances or if a new processing facility will be required. NASA is maintaining the VPF in mothball status until these trade studies are completed. Based on the outcome of these trade studies, VPF will either be modified to meet Constellation requirements, or replaced by a new facility.

Propulsion Test Facilities at Stennis Space Center:

A Test Complex – The A Test Complex will support development and certification testing of the J-2X main engine used in Constellation vehicles. Space Shuttle Main Engine testing was completed on Test Stand A-1 and the stand was turned over to the Constellation Program in November 2006. NASA anticipates modifying the stand to support J-2X testing starting in FY 2007. Test Stand A-2 will support Space Shuttle Main Engine testing through FY 2009. Following the completion of Space Shuttle Main engine certification testing on Test Stand A-2, the stand will be modified to support J-2X engine testing.

B Test Complex – In FY 2008, NASA will begin modifying the B-1 Test Stand to support J-2X testing. The B-2 Test Stand will also be brought out of a mothballed condition to support Ares stage testing.

Mississippi Army Ammunitions Plant – Stennis Space Center will acquire the Mississippi Army Ammunitions Plant from Department of Defense as a result of the latest Base Realignment and Closure action. Stennis plans to utilize the facility to support future test programs, including the J-2X development program.

Simulation, Training, Development, and Mission Support Facilities at Johnson Space Center:

Avionics Integration Laboratory - To support development of Crew Exploration Vehicle Avionics Systems concurrent with operation of Shuttle Avionics systems, a new Avionics Integration Laboratory will be constructed at Johnson Space Center.

Mission Control Center – The Johnson Space Center Mission Control Center will be modified to support mission control for Constellation missions.

Western Aeronautical Test Range at White Sands Missile Range, New Mexico:

Launch Abort System Launch Test Complex – To support the system testing of the Crew Exploration Vehicle Launch Abort System, NASA will establish a launch test complex at the Western Aeronautical Test Range.

Crew Exploration Vehicle Landing Sites:

NASA is currently evaluating potential landing sites for the Orion Crew Exploration Vehicle. NASA intends to utilize existing federal sites for Orion landing operations. NASA will utilize existing federal facilities to the maximum extent possible to support landing operations. Once the landing sites are selected, NASA will determine the requirements for modifying existing facilities or constructing new support facilities if necessary.

Test Facilities:

NASA is developing the test and validation plan for the Constellation Program vehicles. NASA is evaluating existing NASA and DoD test facilities with the intent of utilizing existing test facilities and minimizing test facility modification or new test facility acquisition.

NASA is in the process of reactivating the Structural Dynamics Test Stand at MSFC. This facility is the only facility in the U.S. capable of full scale ground vibration testing of the Ares launch vehicle. The facility was used for development testing for Apollo and Shuttle space craft and will be modified to support the Ares configuration. Additional MSFC facilities which will be modified in FY 07 and FY 08 include the Structural Strength Facility, Cryogenic Structural Test Facility, TPS Development Facility and Advanced Engine Test Facility.

NASA continues to utilize the Landing and Impact Research (LandIR) Facility at LaRC. The center-piece of this facility is a 240-ft. high gantry for impact and landing dynamics testing of sub- and full-scale vehicles under combined velocity conditions with multi-terrain capability. LandIR, originally the "Lunar Landing Research Facility," was used to train astronauts for landing on the moon during Apollo. Currently, NASA is conducting various tests for Orion CEV Crew Module Landing Tests including landing system tests of full-scale airbags and crushable structures, soil characterization tests and vehicle soil interaction tests for model development and verification, and full-scale and sub-scale testing with and without landing attenuation system. Retro-rocket testing is planned for early FY08. Additional future testing needs are currently being evaluated.

NASA is evaluating the use of several facilities at the US Air Force Arnold Engineering Development Center (AEDC) to support development testing of the Orion Crew Exploration Vehicle and the Ares Upper Stage. By utilizing AEDC facilities, NASA is leveraging US test capabilities and avoiding construction of redundant capability. Utilizing Air Force test facilities supports NASA's aggressive development schedule by avoiding delays associated with designing and constructing new test facilities. In addition, utilizing existing Air Force facilities will reduce facilities construction and operating costs.

Several AEDC facilities provide unique capabilities. NASA will take advantage of these unique capabilities to avoid construction of redundant capabilities in the United States or avoid the use of foreign test assets. AEDC facilities that would provide unique test capabilities for Orion or Ares programs include AEDC Tunnel 9 Hypervelocity Wind Tunnel and Tunnel 16T/S Transonic and Supersonic Propulsion Test Facility. Modifications to these facilities would be limited to configuring the facilities to meet specific test requirements.

Several AEDC facilities may be considered as alternatives to NASA test facilities. NASA is evaluating the availability and overall testing costs of various NASA and AEDC facilities to identify best value test facilities to meet Ares and Orion testing needs. Facilities will be determined based on overall cost and the ability to meet Constellation test schedules without interfering with other program schedules. AEDC test facilities under review include the J-4 Propulsion Facility, Mark 1 Chamber, and Tunnels A/B/C. At NASA, the GRC B-2 facility, the Stennis Space Center A-2 facility, the Johnson Space Center (JSC) Chamber A facility, Glenn Research Center's (GRC) Space Power Facility (SPF), the Improved Hot Gas Facility located at Marshall Space Flight Center, and Langley Research Center Mach 6 and Mach 10 tunnels. Modifications costs will be a factor in test facility selection. The selected facilities will be modified to meet specific test requirements.

NASA intends to utilize the National Full Scale Aerodynamic Facility at Ames Research Center to obtain wake profiles for the Orion Command Module (CM). No other facility in the country possesses this capability. The facility will be modified to meet specific test requirements.

Bibliography

1. **2006 National Aeronautics and Space Administration (NASA) Strategic Plan**, "Building Strong, Healthy NASA Centers', pg. 23 and "Strategic Management of Capital Assets", pg. 27 & 28.

2. **National Aeronautics and Space Administration Real Property Management Plan, November 2004**.

3. **National Aeronautics and Space Administration (NASA) Real Property Asset Management Plan, December 31, 2005.**

4. **National Aeronautics and Space Administration (NASA) Policy Documents (NPD) 8820.2C**, **Design and Construction of Facilities**, June 13, 2006 **and NASA Policy Requirements (NPR) 8820.2E, Facility Project Implementation Guide**, October 7, 2003.

5. **National Aeronautics and Space Administration (NASA) Policy Requirement (NPR) 7120.5C, Program and Project Management Processes and Requirements**, 2006.

6. **NASA Headquarters and Centers Websites, http: www.nasa.gov.**

Appendix A - Definitions

Construction: Construction is the erection, installation, or assembly of facilities required to support new capability; improvements, including additions to facilities intended to remain attached or annexed such as sidewalks, parking lots, driveways, etc., and upgrades to facility systems solely to support new capability or increased capacity; and alterations to facilities that change the original intended purpose and/or capacity of the facility (e.g., remodeling a warehouse or portion thereof into office space).

Demolition Only Projects: Projects that are purely demolition (that is, not a part of a construction project). The intent is to demolish older, excess facilities, thereby reducing costs, eliminating safety and environmental hazards, and reducing eyesores throughout NASA. Demolition projects will reduce our Deferred Maintenance (increasing the Agency/Center Facilities Condition Index) thus improving the overall Agency/Center facilities infrastructure which accomplishes one of our Strategic Initiatives of "Ten Healthy Centers".

Discrete and Minor Projects: Discrete projects are those that are above the designated minor/discrete funding threshold. Discrete projects are those that are $5 million and above. Minor projects are $500 thousand and above, but below $5M.

Repair: "Repair" is the facility work required to restore a facility or component thereof, including collateral equipment, to a condition substantially equivalent to the originally intended and designed capacity, efficiency or capability. It includes the substantially equivalent replacement of utility systems and collateral equipment necessitated by incipient or actual failure, and work required to enhance, alter, or adjust a facility or component thereof to be more effectively used for its present purpose. For example, bringing facilities up to current codes can be designated as repair. Interior arrangements (such as office reconfigurations) and restorations may be included as repair, but additions, new facilities, and functional conversions must be performed as construction projects. If the function of the facility is changed (e.g., convert a warehouse to office space), or facility capacity is increased (e.g., an addition), it would be termed as "construction.

Repair-by-Replacement: When repair cost exceed a significant percentage of the total value of the project, such as in a structure that is severely deteriorated or that has obsolete building systems, it is often most cost effective to demolish the structure and re-build in its place. The decision to proceed with Repair-by-Replacement would be made based upon economic analysis of alternatives.

Repair/Construction Projects: It is also possible that a project can be a combination repair/construction project. For example, a new addition to a building would be construction, but replacing the roof of the existing building done in conjunction with the new addition would be repair. In these cases, Centers will provide estimates of both the repair and construction portions of the project.

Local Projects: Local projects are those below the minor projects threshold (<$500K) that are administered locally.

Sustainment (Maintenance): Facilities sustainment is the recurring day-to-day work required to preserve facilities (buildings, structures, grounds, utility systems, and collateral equipment) in such a condition that they may be used for their designated purpose over an intended service or design life. Sustainment minimizes or corrects normal wear and tear and thereby forestalls major repairs. Facilities sustainment includes all aspects of a Reliability Centered Maintenance (RCM) program (planned periodic maintenance, preventative maintenance, and predictive maintenance - testing and inspection), grounds care, trouble calls, and routine repairs. Facilities sustainment does not include operational services (e.g., fire fighting services, security guard services and custodial), or work on non-collateral equipment.

NASA Facilities: NASA Facilities include not only buildings but also launch pads, test stands, communication towers, roads and other structures that support the NASA mission.

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Appendix B - NASA Center and Facility Descriptions

AMES RESEARCH CENTER (ARC)

NASA Ames Research Center, located at the southwest end of the San Francisco Bay, is in the heart of California's Silicon Valley research cluster of high-tech companies, universities and laboratories. With over $3.5 billion in capital equipment, 2,800 research personnel and a $700 million annual budget, Ames is a leader in information technology research with a focus on supercomputing, networking and intelligent systems. Ames conducts the critical research and development for and is a leader in aerospace and thermal protection systems, nano-technology, fundamental space biology, biotechnology, and human factors research.

DRYDEN FLIGHT RESEARCH CENTER (DFRC)

The Dryden Flight Research Center is NASA's premier installation for aeronautical flight research. Its mission is to research, develop, verify and transfer advanced aeronautics, space and related technologies for atmospheric flight operations. Dryden is a tenant organization at Edwards AFB, California, on the western edge of the Mojave Desert, 80 miles north of Los Angeles. The Center has 200 facilities on 880 acres and employs approximately 1,100 personnel.

GLENN RESEARCH CENTER (GRC)

The Glenn Research Center is distinguished by its unique blend of aeronautics and space flight expertise, with research, technology and systems development experience for aeronautics, aerospace and space applications. The Center’s main site, Lewis Field near Cleveland, Ohio, is a 350-acre campus supporting a staff of over 2,500 personnel. The campus consists of over 140 buildings, including 24 major test facilities and over 500 specialized research and test facilities. The Plum Brook Station site, 50 miles west of Cleveland, offers four large, world-class facilities for space technology and capability development on a 6,400-acre campus.

GODDARD SPACE FLIGHT CENTER (GSFC)

The mission of the Goddard Space Flight Center is to expand knowledge of the Earth and its environment, the solar system and the universe through observations from space. This includes operating worldwide space flight tracking networks and unmanned scientific spacecraft. The GSFC Greenbelt Facility occupies 1,270 acres in Greenbelt, Maryland, with 33 major buildings providing more than 3,000,000 square feet of research, development and office space for 10,000 civilian and contractor personnel.

JET PROPULSION LABORATORY (JPL)

The Jet Propulsion Laboratory is located near Pasadena, California, supporting a staff of approximately 6,000. With 200 buildings on 176 acres, the Center is very constrained for space, requiring that they locate some functions, such as parking lots, offsite. Approximately 60 to 70 percent of the buildings on the Center are best classified as industrial or specialized rather than commercial, including high bay buildings and test simulators. JPL's primary missions are related to unmanned space flight, deep space exploration, and robotics.

JOHNSON SPACE CENTER (JSC)

Johnson Space Center is located in the Clear Lake City district of Houston, Texas, about 30 miles southeast of downtown. Johnson Space Center's primary mission is Human Exploration and Astro Materials. Johnson Space Center has many unique facilities that are in use to help it fulfill its mission. These include the Shuttle Mission Simulator, the Space Environment Simulation Laboratory, and, of course, the well known (MCC) Mission Control Center.

KENNEDY SPACE CENTER (KSC)

The primary mission of the Kennedy Space Center in Cape Canaveral, FL is launch operations. KSC occupies 1,051 facilities on 140,000 acres of land and water on Merritt Island on the coast of the Atlantic Ocean. However, only a small portion of the land is used by NASA: the remainder is a wildlife refuge. There are approximately 12,000 personnel who work at KSC. The 15,804-acre Cape Canaveral Air Station, operated by an Air Force Space Command, provides additional support for KSC. The facilities are scattered, and include services such as launch complexes, missile assembly buildings, and all other launch-related operations.

LANGLEY RESEARCH CENTER (LaRC)

NASA Langley Research Center in Hampton, Virginia, is a world-class research and development center for space exploration, aeronautics, science, and systems analysis. Langley employs approximately 3,300 civil servants and contractors who conduct research in 386 facilities on 800 acres of land. Over the decades, Langley has pioneered numerous aviation breakthroughs, conducted ground-breaking climate research, and contributed to space programs from Mercury and Apollo to the Space Shuttle and Space Station. Currently, Langley is a key contributor to NASA's mission to explore the moon, Mars, and beyond with human and robotic crews.

MARSHALL SPACE FLIGHT CENTER (MSFC)

The Marshall Space Flight Center, which occupies 289 facilities on 1,800 acres in Huntsville, Alabama, is one of NASA's most diversified installations. Marshall is contributing its collective expertise, as NASA executes the Vision for Space Exploration, which seeks to extend human presence across the solar system. Marshall manages the key propulsion hardware and technologies of the space shuttle, develops the next generation of space transportation and propulsion systems, oversees science and hardware development for the International Space Station, manages projects and direct studies that will help pave the way back to the moon, and handles a variety of associated scientific endeavors to benefit space exploration and improve life here on Earth.

STENNIS SPACE CENTER (SSC)

The John C. Stennis Space Center, located in Bay St. Louis in southern Mississippi, is America's largest rocket test complex for rocket propulsion testing at 13,500 acres. It has a unique waterway system (barge access for large rocket motors) and 125,000-acre acoustical buffer zone that enables testing of large-scale rocket engines and components. Stennis Space Center is a multi-agency Center with more than 30 resident agencies comprising approximately 4,500 personnel, including the U.S. Navy's 3,500 personnel.

MICHOUD ASSEMBLY FACILITY (MAF)

The Michoud Assembly Facility is a government-owned, contractor-operated component of the Marshall Space Flight Center located in New Orleans, Louisiana, sited on 830 acres of government-owned land. Michoud's mission is to support the continuing development and operations of the NASA Space Shuttle Program. With 2,000 employees, the facility features one of the world's largest manufacturing plants (43 acres under one roof) and a port with deep-water access for the transportation of large spaceflight structures.

WALLOPS FLIGHT FACILITY (WFF)

Wallops Flight Facility is a 6,000 acre NASA Center located on the narrow southern peninsula of the eastern shore of Virginia. The mission of Wallops is the primary orbital tracking station for the Mid-Atlantic region, and the sounding (research) rocket program. It has a heavily instrumented research airport capable of supporting unmanned aerial vehicles (UAV's), which also and supports NOAA and U.S. Navy flights. WFF supports more than 1,000 full-time NASA employees, more than 300 Navy personnel and approximately 100 NOAA employees. WFF is operated by its parent center, Goddard Space Flight Center.

WHITE SANDS TEST FACILITY (WSTF)

The NASA White Sands Test Facility (WSTF), located on the west slope of the San Andres Mountains between Las Cruces, New Mexico, and the White Sands Missile Range, is a component of the Johnson Space Center in Houston, Texas. WSTF provides a wide variety of test and laboratory Research and Development support to all NASA Centers, the Department of Defense, other government agencies, and private industry.

Appendix C - NASA Program Requirement (NPR) 7120.5C, Program and Project Management Processes and Requirements

Paragraph 3.2.1.2.f Analyze project infrastructure needs.
Working with the real property and industrial property offices, the Project Manager shall ensure that a comprehensive analysis of project infrastructure (real property/facilities, aircraft, personal property, and information technology IT) needs is performed. This analysis should include infrastructure required for: staff office space, test (including ground and flight facilities) and integration functions, research facilities, data systems, logistics and maintenance facilities, aircraft, and personal property and equipment.

1. The Project Manager, in coordination with the cognizant Center functional office, shall assess existing Agency wide capabilities to meet infrastructure needs, and also assess whether facilities in other Government agencies, industry, academia, and international organizations can be utilized to reduce project LCC and risk. The Project Manager should work with the Program Manager, the MDAA, OCE, CIO, the Office of Infrastructure, Management, and Headquarters Operations, and other Headquarters offices to identify means of meeting infrastructure requirements through synergy with other programs and projects, thus avoiding costly duplication of supporting infrastructure.
2. A **business case** justification shall be performed for any proposed acquisition or major modification of infrastructure (e.g., facilities, IT).
3. The **business case** shall include full life cycle cost (including operations, sustainment, and disposal), benefit estimates, alternatives and sensitivity analyses, and risk assessments. (For more information on full cost and practices, see Volume 7 of the NASA Financial Management Requirements.)
    i. The business case shall be approved by the cognizant MDAA and by the cognizant NASA Headquarters functional office, or their designee(s).
    ii. First in coordination with the cognizant Center functional office, and then with the Headquarters Office of Infrastructure, Management, and Headquarters Operations, and/or the CIO, as appropriate, the Project Manager shall develop plans for any necessary upgrades or new developments, including those needed for environmental compliance (see paragraph 3.2.1.2j), and then document them in the Project Plan, Part 2, Resources.
4. The Project Manager shall comply with the provisions of NPD 7900.4 and NPR 7900.3, *Aircraft Management Operations*, before entering into agreements to procure or operate aircraft that might be necessary to the success of the project. The Project Manager shall directly coordinate with Center Chief of Flight Operations or the Headquarters Aircraft Management Office during the planning stage.

Appendix D – FY 08 Construction of Facilities Institutional Project List (Procurement Dollars)

Center	Project	Repair Cost ($000)	Construction Cost ($000)	Total Cost ($000)
ARC	N258 (NASA Advanced Supercomputing Facility) Electrical Supply Reliability Improvement Phase IA		2,600	2,600
ARC	Replace Steam Vacuum System Cooling Tower at N234A		4,800	4,800
ARC	Restoration Electrical Distribution System Phase 7A		3,200	3,200
DFRC	Construct Consolidated Information Technology Center		4,950	4,950
DFRC	Repair B4853 Fire Pumping Station	1,500		1,500
DFRC	R&M Storm Drainage Facilities	500	500	1,000
DFRC	Repair Paving: Thompson Ave & Radar Site Roadways	1,600		1,600
GRC	Security Requirements for Lewis Field Main Gate Area, Phase 1	3,000		3,000
GRC	Repair Sewer Systems, Phase 8	900		900
GRC	Repair Water System, Plum Brook Station, Phase 2	2,300		2,300
GRC	Repair Steam Regulator Stations, Phase 1	1,000		1,000
GRC	Repair Parking Lots & Roads, Phase 3	1,700		1,700
GSFC	Repair of Airfield Lighting and Control Systems, Wallops	1,200		1,200
GSFC	Restoration of Site Steam Distribution System, Phase VI, Greenbelt	3,000		3,000
GSFC	Replace Central Power Plant Equipment, Building 24, Greenbelt	1,200		1,200
GSFC	Repair Roofs, Various Buildings, Greenbelt & Wallops	1,600		1,600
GSFC	Upgrade Fire Alarm Systems, Various Buildings 1, 6, & 7, Greenbelt	1,500		1,500
GSFC	Repair of Storm Drainage Structures, Wallops	1,200		1,200
GSFC	Repair Central Power Plant Equipment, Building 24, Phase 1B	2,300		2,300
JPL	Upgrade Sewage Lift Station, B224	850		850
JPL	Fire Suppression Systems, Various, TMO	750		750
JPL	Replace HVAC System, SFOF, B230	2,500		2,500
JPL	Re-roof B107, 111, 156, 161, 202, 234, 251, 264, 277, 301, 303, Phase 1A	2,400		2,400
JPL	Upgrade 2.4kV Electrical Distribution to 16.5kV, Phase 7	1,650		1,650
JSC	Construct New Office Facility, Phase 2 of 2		12,000	12,000
JSC	Replace Underground Natural Gas System, JSC	3,600		3,600
JSC	Repair and Upgrade 100 and 400 Area, Phase 1A WSTF	1,500		1,500

JSC	Upgrade Central Heating and Cooling Plant and Assoc. Equipment, (24)	4,000		4,000

FY 08 Construction of Facilities Institutional Project List (Continued)

Center	Project	Repair Cost ($000)	Construction Cost ($000)	Total Cost ($000)
JSC	Replace Electrical Equipment, Avionics Systems Laboratory (16)	1,000		1,000
JSC	Upgrade Emergency Power Bldg. (48)	3,500	500	4,000
JSC	Repair Sprinkler and Fire Alarm Systems, Various Buildings, Phase IIA	2,500		2,500
KSC	Renovation of Operations & Checkout Building, Phase 3 of 5	11,000		11,000
KSC	Revitalize Engineering Development Laboratory	3,000		3,000
KSC	Revitalize Prototype Shop	2,500		2,500
KSC	Replace Air Handlers, KSC Hq, Phase 1A	3,000		3,000
KSC	Replace Seawalls, NASA Causeway	4,600		4,600
LaRC	New Town - Admin Office Building 1		28,800	28,800
LaRC	Rehab of Building 1251	4,800		4,800
LaRC	Rehab of Building 1268	800		800
LaRC	Rehabilitation of HVAC Systems, B1232 / B1244, Phase 1A	1,600		1,600
LaRC	Rehab of HVAC Systems, B1202 / B1208	1,800		1,800
LaRC	Replace Electrical Power Cables, B1266	1,900		1,900
LaRC	ADA Upgrades, Various Facilities, Phase IV	1,300		1,300
MSFC	Construct Replacement Building 4602		30,000	30,000
MSFC	Replace and Repair Roofs at Various Buildings, Phase 3 (4708)	3,000		3,000
MSFC	Upgrade Utility Control System (Site Wide) Phase 2	1,400		1,400
MSFC	West Test Area Industrial Water System Refurbishment, Phase 1A	3,500		3,500
MSFC	Construct Additional Bays (4604)	1,500		1,500
MSFC	Replace Asbestos Siding and Provide Energy/Safety Upgrades to Bldg Systems (4705), Phase 2	8,900		8,900
SSC/M	Rehabilitation of HVAC Systems Various Locations	2,100		2,100
SSC/M	Repairs to High and Low Voltage Electrical Systems	3,000		3,000
SSC/M	New Cryogenic Control Building		1,300	1,300
			Total =	**197,100**

Appendix E – FY 08 Construction of Facilities Program Direct Project List (Procurement Dollars)

Center	Project	Cost ($000)
GSFC	Construct Exploration Sciences Building	20,000
JPL	Construct Flight Projects Center	14,200
JPL	Revitalize Water Transmission and Distribution System at GDSCC (Deep Space Network)	625
JPL	Replace Building G-86 HVAC Equipment &MCC at GDSCC (Deep Space Network)	835
JPL	Upgrade Fire Protection at Echo and Mars sites at GDSCC (Deep Space Network)	650
JPL	Replace Generator Switch Gear at GDSCC (Deep Space Network)	700
JPL	Modify Electrical Distribution System at CDSCC (Deep Space Network)	300
JPL	Replace "B" Bank Generator Switch Gear at CDSCC (Deep Space Network)	690
JSC	Construct CEV Avionics and Integration Lab	22,000
KSC	Modify Vehicle Assembly Building	31,200
KSC	Replace Roof and Doors, B836, Vandenberg AFB (Launch Services)	2,200
KSC	Revitalize Roof and Gutters, PHSF (Launch Services)	1,400
KSC	Revitalize HVAC System, PHSF (Launch Services)	1,100
MSFC	Modify Dynamic Test Stand 4550	5,000
MSFC	Modify Structural Strength Test Facility, Building 4572	1,500
MSFC	Modify Cryogenic Structural Test Facility, Building, 4699	1,000
MSFC	Modify TPS Development Facility, Building 4765	2,100
SSC	Modify A-1 Propulsion Test Facility	6,600
SSC	Modify J-2X Engine Assembly and Warehouse, Building 9101	700
SSC	Modify B-2 Propulsion Facility	3,300
	Total =	**116,100**

Appendix F – FY 08 Demolition Only Project List (Demo Costs are Procurement Dollars)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
ARC	14' Wind Tunnel Facility	N218	5,000	102	30
ARC	Crop Growth Facility	N214	57	21	20
ARC	Modular Office Building	T27-A	86	26	60
ARC	Modular Office Building	T27-B	86	23	60
ARC	Modular Office Building	T20-F	58	19	20
ARC	Office Trailer	T6-C	10	1	20
ARC	Office Trailer	T6-D	17	5	20
ARC	Office Trailer	T12-A	20	9	8
ARC	Office Trailer	T6-B	10	2	20
ARC	Office Trailer	T28-B	12	6	20
ARC	Office Trailer	T28-A	12	4	20
ARC	Office Trailer	T3-B	12	6	20
ARC	Office Trailer	T20-C	17	7	20
ARC	Pressurized Ballistic Range	N209	35	0	64
ARC	Recycle Office Trailer	T127-D	6	15	20
ARC	Underground Ballistic Range	N208	53	0	64
DFRC	Demolition of Facility B4819	4819	29	5	5
GRC	Demolish Unused Research Test Cells	5, 23, 37	2	0	0
GRC	Demolition of Abandoned Structures at SPF Site, Plum Brook Station	1452, 1431, 8336	1,000		
GSFC	C-015 Projects, WFF	C-015	123	8	6
GSFC	D-101 Optical Lab, WFF	D-101	44	4	3
GSFC	H-030 Four Car Garage / WEMA, WFF	H-030	28	2	0
GSFC	V-065 WEMA Recreation Facility(GS Station), WFF		250	5	5
GSFC	V-070 Observation Tower, WFF	V-070	4	1	1
GSFC	W-025 POMB Maintenance Material Storage, WFF	W-025	3	1	0
GSFC	W-096 Assembly & Checkout / Mobile Shelter, WFF	W-096	56	2	1
GSFC	W-100 Scout Utility Building, WFF	W-100	6	0	0

Appendix F – FY 08 Demolition Only Project List (Continued)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
GSFC	W-105 Winch Shelter, WFF	W-105	2	0	0
GSFC	W-110 Guard House (Mark II Scout), WFF	W-110	1	1	0
GSFC	W-116 Service and Storage, WFF	W-116	2	0	0
GSFC	W-125 Scout Launcher Service, WFF	W-125	3	1	0
GSFC	W-126 Trailer Shelter, Paint, WFF	W-126	4	1	1
GSFC	W-128 Environmental Control Equip, WFF	W-128	3	1	1
GSFC	Y-038A Launch Fire Control Center, WFF	Y-038A	2	1	0
GSFC	Y-064 Electrical Distribution Center, WFF	Y-064	3	1	1
GSFC	Y-067 Radar Support Cubicle, WFF	Y-067	1	0	0
GSFC	Z-042 Launch Pad Terminal Bldg, WFF	Z-042	5	0	0
JSC	Demolish Electrical Equipment (16, 16A)	16/16A Equip.	50	2	0
JSC	Demolish Fire Suppression CO2 Systems	Site	50	500	0
JSC	Demolish Incinerator, Compressor Lean-to and Concrete Pads (B262)	262/262b (partial)	100	8	1
JSC	Demolition of two tanks next to TS401, WSTF	TS401	100	0	0
LaRC	Demolition of 30x60-ft Full Scale Tunnel, Building 643	643	4,992	500	1
LaRC	Demolition of 60 ft. Sphere Blower House	1295E	1	1	0
LaRC	Demolition of Conference Center and Anechoic Noise Facility	1218 & 1218A	130	41	13
LaRC	Demolition of Microwave-Vhf Communications Facility	1299E	5	1	0

Appendix F – FY 08 Demolition Only Project List (Continued)

Center	Title	Facility Number	Demolition Cost Estimate ($000)	Estimated Annual Maintenance Cost ($000)	Estimated Annual Utilities Cost ($000)
LaRC	Demolition of Operations Support Facility No. 1	1299A	4	1	0
LaRC	Demolition of Operations Support Facility No. 2	1299B	4	1	0
LaRC	Demolition of Operations Support Facility No. 3	1299C	3	1	0
LaRC	Demolition of Operations Support Facility No. 4	1299D	7	3	0.5
LaRC	Demolition of Refrigeration Facility	1259A	5	1	1
LaRC	Demolition of Storage Facility	1229A	45		
MAF	Office Trailer	T36-A	18	1	1
MSFC	Visitor Center/Public Affairs, MAF	943	556	55	27
SSC	Demolition of Auxiliary Cranes, A-1 and A-2 Test Stands	4120 4122	200	0	0
SSC	Demolition of Butler Building	2436	225	3	4
	Demolition Design Funds		1,443		
		Totals =	**15,000**	**1,393**	**559**