



National Aeronautics and
Space Administration

**Stennis Space Center
2004 Implementation Plan**



Letter from the Director

People who visit our center describe it as a community...a unique community that is home to over 30 Federal, state, academic, and private organizations and nearly 60 technology-based companies. We believe that our Federal and Commercial City is a public-private partnership model that others are only beginning to emulate. Partnerships mean that both parties have resources at risk and stand to benefit from the association. Our partnerships with our NASA Enterprises, local agencies, and commercial clients are founded on mutual respect, teamwork, and integrity. We strive to make these characteristic values evident by the way we treat our fellow employees, contractors, and others who work at Stennis Space Center.



We have coined a mission statement that describes us as the Nation's partner of choice for propulsion testing. For over 40 years, Stennis Space Center has tested the propulsion systems that have taken Americans and our international partners into space. After the recent Columbia accident, we know only too well the risks associated with space travel and the importance of dependable propulsion systems on our space vehicles. We will respond to the Columbia Accident Investigation Board (CAIB) Report and NASA's Implementation Plan for Return to Flight and Beyond with only the highest levels of personal excellence from our test community. We realize that only the best test program is worthy of those who carry our space exploration dreams forward.

We are personally committed to improving our citizens' quality of life through investments in Earth Science Applications. These investments are focused on helping farmers grow more food at less cost, helping emergency workers respond more effectively during homeland security activities, and managing the Nation's coastal resources more effectively.

We provide an atmosphere at Stennis Space Center for our employees to grow and learn. Our people are our priority and we will continue to invest in their education and experience base. Our education programs not only assist our current employees but also encourage our future employees from all walks of life. The Stennis future workforce, now in grade school and college, will experience a richer curriculum based on technologies and research resulting from our propulsion test and remote sensing work. Our goal is to encourage students to invest their time in the sciences and mathematics so we will be able to invest compelling and captivating work in them.

The Stennis mission continues as a model of teamwork... now and for the future.

Michael U. Rudolphi
Interim Director

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View of the Pearl River basin forming
the western boundary of Stennis
Space Center (May 31, 1963)



I. Center Overview

Stennis Space Center, a unique Federal and commercial city, is home to the National Aeronautics and Space Administration (NASA), its contractor team, over 30 other Federal/state organizations and nearly 60 technology-based companies. This synergy leads to the sharing of costs, services and technical capabilities that make Stennis a national model of teamwork and government cost effectiveness. This multidisciplinary Federal facility has a workforce of 4,600, including 1,700 scientists and engineers engaged in rocket propulsion testing, earth system science, and national defense programs.

PROPULSION TESTING

As NASA's Program Office for Rocket Propulsion Testing, the Stennis Propulsion Test Directorate manages all of the Agency's rocket propulsion test assets, coordinates activities and resources, develops testing and facility investments, consolidates plans, and determines where tests are performed within the Agency. Stennis Space Center maintains modern, state-of-the-art propulsion test facilities; three test stands provide engine systems testing; and the versatile E-Complex serves as a developmental rocket engine component test facility for engines powering future launch vehicles.

In addition, Stennis Space Center chairs the Rocket Propulsion Test Management Board (RPTMB), the principal implementing activity for NASA's rocket propulsion testing efforts and The National Rocket Propulsion Test Alliance (NRPTA), an agreement between NASA and the Department of Defense (DoD) to shape the govern-

ment's rocket propulsion test capability to efficiently meet national test needs through intra- and inter-agency cooperation.

EARTH SCIENCE APPLICATIONS

NASA's Vision to improve life here starts with the Earth Science Enterprise's (ESE) study of Earth from space. The Earth Science Applications Directorate seeks to understand and protect our home planet by advancing Earth-system science. Dedicated to understanding the total Earth System and the effects of natural and human-induced changes on the global environment, the ESE's efforts are coordinated through three divisions:

- The Research Division studies and models the Earth system to learn how it is changing and to understand how these changes will affect life on Earth.
- The Engineering Division develops advanced tools to enhance the performance and the results of Earth observation missions.
- The Deployment Division applies the benefits of Earth science information and technology to society and to the economy.

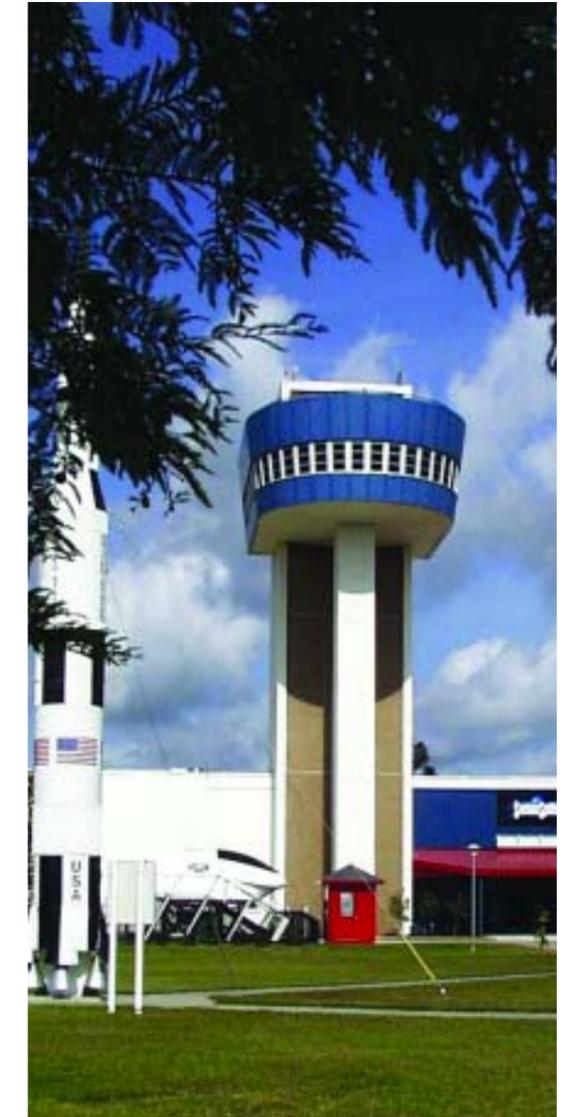
The Deployment Division supports the Directorate by contracting with competitively selected partner organizations and implementing projects, which fulfill program priorities established at NASA headquarters along four areas: resource management, disaster management, community growth and infrastructure, and environmental assessment.

EDUCATION PROGRAMS

The programs provided by the Stennis education office are integral to the Center community. Its primary focus is to inspire the next generation of engineers, scientists, and astronauts to study math and science and consider a career with the National Aeronautics and Space Administration. Through the Educator Resource Center and the Mississippi Interactive Video Center the Education Office at Stennis is helping educators integrate state-of-the-art technology into their classrooms by providing computer software, videotapes, and other materials. In addition, the National Workforce Development Education and Training Initiative provides remote sensing content to students thus ensuring U.S. competitiveness in the remote sensing industry.

The following sections describe the alignment of SSC assignments with the strategic objectives of the Enterprises and the NASA Vision, Mission, and Strategic Goals. Section II addresses SSC contributions to the Space Flight Enterprise and elaborates on contributions to other agency program elements. Section III discusses current SSC capabilities with special emphasis on unique facilities and expertise for testing and validating propulsion and remote sensing systems. Section IV emphasizes SSC support to the strategic objectives of the Space Flight, Earth Science, Education, and Aerospace Enterprises. This section also deals with our plans for future workforce development and real property development. In section V, a summary of SSC contributions to NASA implementing

strategies is discussed. This document covers SSC activities through 2006. Fiscal year 2004 plans are detailed in the document attached to the back cover.



Stennis Space Center Visitor Center and Weekday Education Program Facility



II. Center Alignment with NASA Strategic Plan

Space Flight Enterprise

As a member of the OneSpaceFlight team, Stennis Space Center manages the Rocket Propulsion Test Program for the Space Flight and Aerospace Technology Enterprises. Through the end of this decade and beyond, NASA's Space Shuttle Program will rely on Stennis to test and certify propulsion systems' performance. Cooperative programs with the Department of Defense and private sector focused on orbital space planes and next generation space vehicles are central to the Stennis mission as the Nation's partner of choice for rocket propulsion testing.



II. Center Alignment with NASA Strategic Plan

Earth Science Enterprise

To improve our citizens' quality of life, Stennis Space Center translates the scientific breakthroughs of the Earth Science Enterprise into practical applications for farmers, foresters, coastal zone managers, and emergency response personnel. The Earth Science Applications theme uses the science data and knowledge base resulting from global climate change research to enhance Earth resource management decisions made by Federal agencies. Stennis is the performing center for five of the twelve national applications addressed by these agencies including:

- *Agricultural Efficiency*
- *Homeland Security*
- *Disaster Management*
- *Coastal Zone Management*
- *Community Growth*

II. Center Alignment with NASA Strategic Plan

Aerospace Technology Enterprise

To ensure continued access to space in the coming decade, the Aerospace Technology Enterprise is working on second-generation reusable launch vehicles. The technology roadmap, focused on critical vehicle components, pays special attention to robust, reusable rocket engines, advanced crew escape systems and thermal protection systems. Stennis Space Center is responsible for testing critical reusable engine components over the next several years. The Center's Technology Development Team is preparing wireless engine diagnostics systems for the ground-based tests of selected engine architectures. In addition, Innovative Technology Transfer Partnerships and Small Business Innovation Research projects sponsored by the Enterprise will address technology needs of both propulsion testing and remote sensing applications.

*Atomic absorption spectroscopy
experiment for Space Shuttle Main
Engine plume diagnostics supporting
overall vehicle health management*



II. Center Alignment with NASA Strategic Plan

Education Enterprise

To prepare our next generation of explorers, NASA's Education Enterprise is focused on inspiring students to elect careers in science, technology, engineering, and mathematics. Drawing on examples gleaned from rocket propulsion testing and remote sensing applications, Stennis Space Center contributes to the Enterprise vision by using the R&D results to improve teaching and learning in all age groups. These education initiatives take full advantage of NASA personnel and facilities to attract a diverse set of potential NASA employees during the formative years of their pre-college education.



SSC Alignment with the NASA 2003 Strategic Plan		Enterprises											Space Flight Capabilities							
		Science, Aeronautics, and Exploration											Space Flight Capabilities							
		Space Science					Earth Science		Biological & Physical Research			Aero Tech	Ed	Space Flight			Aerospace Technology			
NASA MISSIONS	NASA GOALS	NASA THEMES	Solar System Exploration (SSE)	Mars Exploration (MEP)	Astronomical Search for Origins (ASO)	Structure & Evolution of the Universe (SEU)	Sun-Earth Connection (SEC)	Earth System Science (ESS)	Earth Science Applications (ESA)	Biological Sciences Research (BSR)	Physical Sciences Research (PSR)	Research Partnerships & Flight Support (RPFS)	Aeronautics Technology (AT)	Education Programs (EP)	International Space Station (ISS)	Space Shuttle Program (SSP)	Space and Flight Support (SFS)	Space Launch Initiative (SLI)	Mission & Science Measurement Technology (MSM)	Innovative Technology Transfer Partnerships (ITTP)
Understand and protect our home planet	1	Understand Earth's system and apply Earth system-science to improve the prediction of climate, weather, and natural hazards.	Dark Blue				Dark Blue	Dark Blue	Black Dot						Light Blue	Light Blue	Light Blue			
	2	Enable a safer, more secure, efficient, and environmentally friendly air transportation system.											Dark Blue							
	3	Create a more secure world & improve quality of life by investing in tech & collab with other agencies, industry, & academia.							Light Blue	Black Dot	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Light Blue		Light Blue	Dark Blue		Dark Blue
Explore the universe and search for life	4	Explore the fundamental principles of physics, chemistry, and biology through research in the unique natural laboratory of space.								Dark Blue	Dark Blue				Light Blue	Light Blue				
	5	Explore the solar system and the universe beyond, understand the origin and evolution of life, and search for evidence of life elsewhere.	Dark Blue	Dark Blue	Dark Blue	Dark Blue											Light Blue			
Inspire the next generation of explorers	6	Inspire and motivate students to pursue careers in science, technology, engineering, and mathematics.	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	White Dot	Light Blue	Light Blue	Light Blue	Light Blue	Dark Blue	White Dot	White Dot	White Dot	White Dot	White Dot	White Dot
	7	Engage the public in shaping and sharing the experience of exploration and discovery.	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	White Dot	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	White Dot	White Dot	White Dot	White Dot	White Dot	White Dot
Enabling goals	8	Ensure the provision of space access and improve it by increasing safety, reliability, and affordability.													Dark Blue	Dark Blue	Dark Blue	Dark Blue		
	9	Extend the duration and boundaries of human space flight to create new opportunities for exploration and discovery.		Light Blue							Dark Blue	Dark Blue			Dark Blue	Light Blue	Dark Blue	Light Blue	Light Blue	
	10	Enable revolutionary capabilities through new technology.											Dark Blue				Dark Blue		Dark Blue	Black Dot

Color and Symbol Key:

Dark Blue = NASA Primary Contribution Light Blue = NASA Supporting Contribution Black Dot = SSC Primary Contribution White Dot = SSC Supporting Contribution



III. Stennis Space Center Capabilities

A. Stennis Space Center Portfolio Management

Space Flight Enterprise Leadership Council

As one of four NASA Centers comprising the Space Flight Enterprise, Stennis Space Center serves on the Enterprise Leadership Council chaired by the Associate Administrator for Space Flight. The Council ensures that the Enterprise and associated NASA Centers meet their respective programmatic and institutional responsibilities as they execute assigned missions. Council members develop and implement long-term Enterprise investment strategies that sustain safe working environments and ensure adequate core capabilities for future missions.

Program Management Council

The purpose of the SSC Program Management Council (PMC) is to provide an executive forum to address strategic center issues, resource allocations, and project implementation issues. The Center's integrated management system assures that assigned projects are managed according to the engineering and management practices prescribed in NPG 7120.5. The SSC PMC supports the Center Director in:

- a. Assuring that the Center functions as an integrated system in planning, approving, and implementing its mission to meet its strategic objectives and commitments within the available resources.
- b. Meeting functional management responsibilities including project management policy, process development, maintenance, and oversight.

The PMC approves initial program or project baseline performance and cost estimates to proceed from formulation into implementation. These original estimates are used in subsequent variance analyses as the basis for approving changes to the project baseline. The project plan is the primary vehicle used to document requirements for configuration management and tracking purposes.

Program and projects correlate current facility capabilities baselines against project requirements and address the need for additional modifications or construction of facilities. Anticipated facilities' utilization considers the full-cost institutional impact of the projects lifecycle on Center infrastructure maintenance or other project-related liabilities. Major hardware acquisitions or construction projects required by the project plan are approved for implementation by the PMC.

Program and project managers address the activities and steps to be taken to ensure safety of the public, the workforce and high-value equipment and property in all project plans. The plan addresses both hardware and software aspects of the project, and identifies all activities, such as safety, reliability, maintainability, quality assurance, environmental-related impacts, surveillance, and failure reporting. The Center Director and the PMC approve all project plans. Variances above 10% of the project's baseline estimates automatically invoke PMC and Center Director action to mitigate.

*Stennis Space Center
Administrative Complex*

Rocket Propulsion Test Management Board

All rocket propulsion test assignments for NASA funded programs are directed by NASA's Rocket Propulsion Test Management Board (RPTMB), which was established in 1996 to manage NASA's rocket propulsion test assets, activities, and resources. Program implementation has been assigned to the Rocket Propulsion Test Program Manager at Stennis Space Center (SSC). The Board's charter is to evaluate test program facility needs, prioritize facility improvements, and make test assignments. The RPTMB consists of four NASA rocket propulsion test sites: Stennis Space Center, Marshall Space Flight Center, Johnson Space Center's White Sands Test Facility, and Glenn Research Center's Plum Brook Station. Each possesses unique test facilities that are critical to meeting NASA's propulsion test requirements. The RPTMB also leads an integrated and collaborative Technology Development and Transfer activity which shares information and data among the four NASA Centers.

National Rocket Propulsion Test Alliance

The National Rocket Propulsion Test Alliance (NRPTA) was officially sanctioned in a Memorandum of Agreement between NASA and the DoD signed in Jan. 1998. The Alliance was established to shape U.S. Government rocket propulsion test needs through intra- and inter-agency cooperation. The NRPTA is co-chaired by NASA and the DoD. All activities of the NRPTA are governed by the NRPTA Operating Procedure (NRPTA-001), which details the guide-

lines and processes used. The NRPTA encompasses the four NASA test centers along with four DoD sites (Army Technical Test Center, Redstone Arsenal, Arnold Engineering Development Center, Naval Air Warfare Center, and Air Force Research Laboratory). One of the primary goals of the NRPTA is to avoid duplication of Government-owned rocket propulsion test facilities. This duplication avoidance applies to both the construction of new facilities as well as investments in existing facilities.

Stennis Space Center Executive Council

Over the past thirty years, Stennis Space Center has evolved into a multi-agency, multidisciplinary Federal and commercial city hosting over 35 Federal, state, university, and private agencies. This consortium serves many collaborative purposes including reduced operating costs resulting from sharing common services, facilities and infrastructure. As the NASA host for the consortium, Stennis Space Center avoids approximately \$7.5 million per year in operating costs.

The Stennis Space Center Executive Council (Council) is comprised of the senior managers of the major Federal agencies, state agencies, universities, and private companies residing within the Center's administrative complex. The Council functions as a sounding board for new programs and facilities being considered at the Center and fosters communication on topics of mutual concern such as occupancy and lease rates.



III. Stennis Space Center Capabilities

B. Stennis Space Center Workforce

The SSC workforce has dramatically changed over the past decade. From FY 1994 to FY 2003, SSC achieved a 42-percent increase in its civil service complement. This increase is a result of continued growth in mission assignments and growing infrastructure of this unique Federal and commercial city. To align the human capital strategy with these expanded missions, SSC has developed a strategic human capital architecture built on five pillars derived from the NASA Strategic Human Capital Plan—Strategic Alignment, Strategic Competencies, Learning, Performance Culture, and Leadership.

SSC's long-term workforce is managed strategically through the alignment of recruitment, development, and the future intake pipeline with the Agency Strategic Plan to ensure optimal contribution of the workforce to mission success. SSC has benefited from an unusually low attrition rate over the last three years of 2.4%, with an average workforce age of 44.7 years, the youngest in the Agency.

By the end of 2003, 8% of the workforce will be retirement eligible. Our core science and engineering workforce is only 5% retirement eligible compared to a NASA-wide level of 15 percent. Within five years, approximately 17% of SSC's workforce will be eligible to retire compared to the Agency level of 25 percent. SSC continues to infuse new talent and diversity with fresh-outs constituting one-third of the hires.

SSC fosters a civil service workforce comprised of diverse occupations, educational backgrounds, ethnicity, and national origins.

Figure III-1 illustrates SSC's current workforce by occupational category.

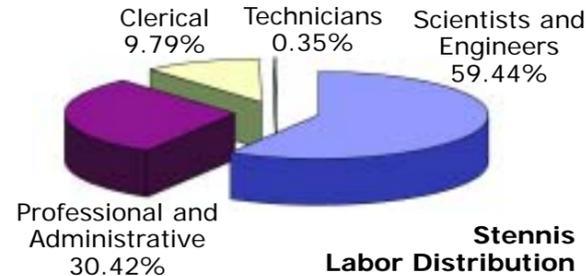


Figure III-1

Figure III-2 illustrates SSC's efforts toward building a diverse workforce that mirrors the Nation.

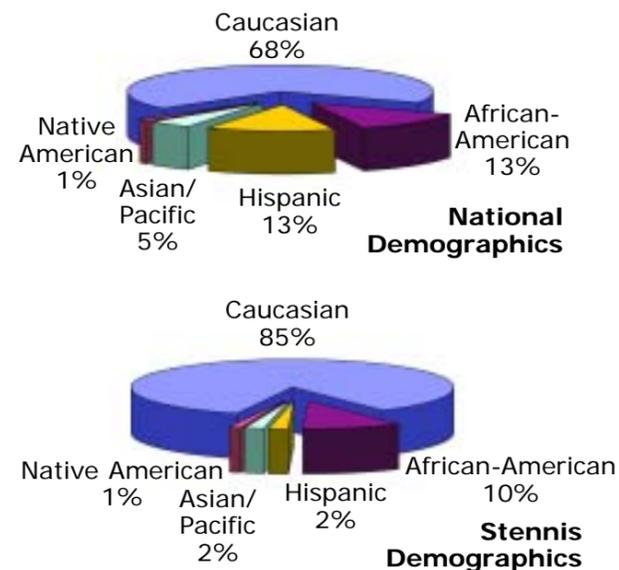


Figure III-2

Figure III.3 illustrates the educational composition of the workforce.

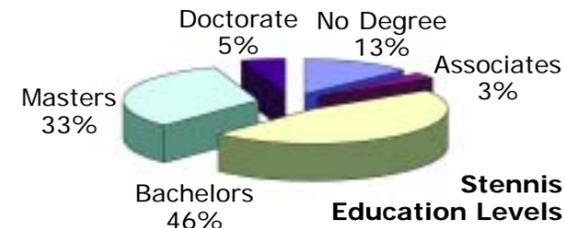


Figure III-3

With the NASA Competency Management System, we have systematically examined the critical workforce competencies that will enable SSC to accomplish its assigned missions over the next five years. The following core competencies must be maintained and enhanced within the SSC workforce:

1. Propulsion Systems and Testing – Essential knowledge, capabilities, and expertise required to perform developmental, design, analysis, modeling, and operations of propulsion test facilities and systems.
2. Earth Science Applications Research – Essential knowledge and capabilities to understand the total Earth system and the effects of natural and human-induced changes on the global environment.
3. System Engineering – Essential knowledge and capability focused on project life-cycle management from project concept through requirements definition, cost analysis and trades, and performance validation.
4. Program/Project Management — Essential knowledge, capabilities, and practices necessary to oversee

Space Shuttle Main Engine, rocket propulsion test, and Earth science applications activities.

Other professional competencies that remain critical and essential to the SSC infrastructure include facilities planning and operations, acquisition management, and resources and financial management. These skills are especially important given SSC's history and concept of operations that contracts the majority of technical, production, operations and maintenance to aerospace and Government service vendors.

SSC's business model requires contractor "touch labor" and project execution with overall project management administered by NASA civil servants. The current contractor to civil servant ratio of 4.5 to 1 challenges our leadership team to maintain the proper balance between the demands for outsourcing technical operations and maintenance to contractors and providing requirements development, contract administration, and technical oversight by civil servants.



III. Stennis Space Center Capabilities

C. Stennis Space Center Facilities

In October 1961, the site which is now the John C. Stennis Space Center (SSC) was selected to be the static test facility for the launch vehicles anticipated for the Apollo lunar landing program. The SSC, located in Hancock County, Mississippi, is approximately 45 miles northeast of New Orleans, Louisiana. Four decades ago the decision to build the rocket test facility was based on the area's relative isolation and proximity to the navigable waters of the Pearl River adjoining the Gulf of Mexico. The site's isolation allowed the U.S. Government to acquire the 13,800 acres for test and administrative facility construction and an additional 118,193-acre restrictive easement to provide an acoustic buffer zone around the facility. To preserve the buffer zone, the restrictive easement prohibits construction or maintenance of structures for human habitation. The buffer zone, which is subject to intense sound pressure levels, shock waves, and noise resulting from full power and duration engine firings, guarantees NASA and other U.S. Government agencies an irreplaceable national rocket test facility. The total area encompassed by SSC, 138,781 acres, comprises 38% of NASA's total land holdings and is valued in excess of one billion dollars. The Mobile District Corps of Engineers functions as NASA's land management agent for land interests in the buffer zone.

With the current wetlands regulatory framework in mind, SSC provides a 115-acre wetland mitigation area in the buffer zone that addresses compensatory wetlands mitigation for 50 acres of wetland impacted within the test and

administrative complex. An additional 385 acres of wetlands immediately adjacent to the mitigation area has been set aside for wetlands potentially impacted by future developments.

SSC's real property profile includes approximately 189 administrative and laboratory buildings with a current replacement value of \$400 million. Other structures, including facilities in the engine test complex are valued at \$1.055 Billion. Together these constitute 7.6% of NASA's real property portfolio, with a total value of \$1.455 Billion. Figure III-4 depicts the key facilities of SSC.

The SSC Facility Maintenance Program ensures facility availability to address agency mission assignments in rocket propulsion test, remote sensing and education. A comprehensive analysis of SSC facilities' condition revealed approximately \$264 million in deferred maintenance, which represents 17.6% of current replacement value (CRV). SSC's backlog maintenance annual report (BMAR) shows a standing maintenance requirement of \$82 million. Of the \$82 million, propulsion test facilities has a backlog of \$32 million with base facilities and infrastructure showing around \$50 million.

Annual investments in core capabilities are made through the NASA Construction of Facilities (CoF) and Maintenance Program. These requests typically address facilities maintenance and improvements. SSC is working with the Space Flight Enterprise Institutional Program Office (IPO) to address the BMAR level, one of the highest in the agency.

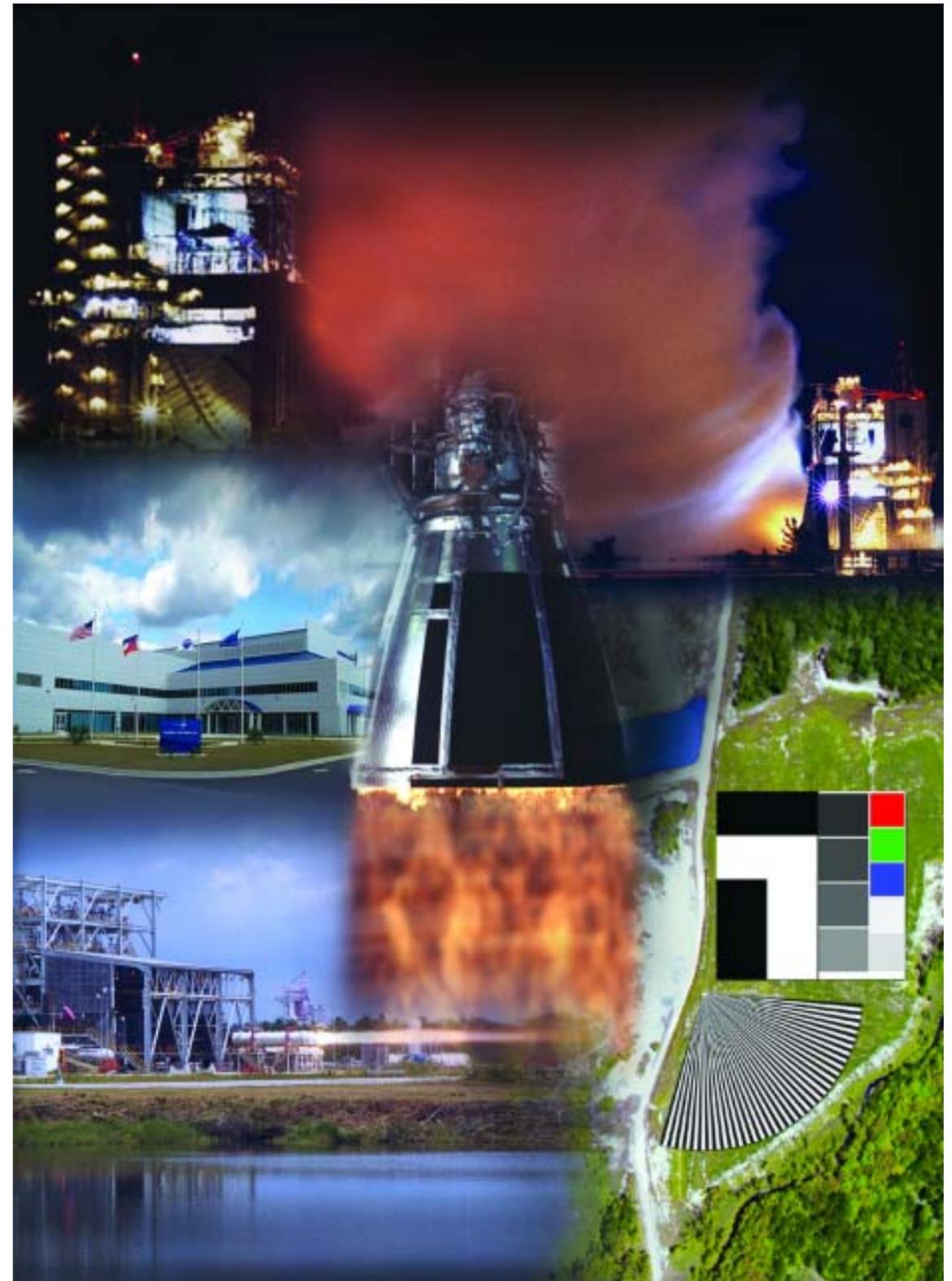


Figure III-4: Clockwise from upper left: A-1 test stand, A-2 test stand, Remote Sensing Verification and Validation Facility, Advanced Component Test Facility with B-Complex in the background, and Lockheed Martin Mississippi Space and Technology Center. The center image, a Boeing RS-68 engine, is tested on the B-1 test stand.



IV. Strategic Capabilities for the Future



Space Shuttle Main Engine

A. Contributions to the Space Flight Enterprise

COMMITMENT TO FLIGHT

The Space Flight Enterprise mandate is to provide risk-managed access to space for other NASA Enterprises as a means to further exploration and discovery. The Space Shuttle has been the foundation of NASA's human access to space for over 20 years. As we return to flight in 2004 and complete International Space Station (ISS) construction within the next five years, we will continue to enhance the Shuttle fleet's capabilities through the Shuttle Service Life Extension Program (SLEP). Through the end of this decade and beyond, NASA's Space Shuttle Program will rely on the Rocket Propulsion Test Program (RPTP) to test and certify enhanced Space Shuttle propulsion systems resulting from the SLEP. Managed by Stennis Space Center, the RPTP provides the facilities to test all Space Shuttle Main Engines (SSME) as well as the Orbital Maneuvering System (OMS) and Reaction Controls System (RCS). Extensive testing ensures that safe and reliable launch systems are ready to access the ISS for continued scientific operations.

CORPORATE FOCUS

As NASA's key provider of space flight services, the Space Flight Enterprise addresses the flight support needs of other NASA Enterprises along with the Department of Defense and other Government agencies. SSC manages the rocket propulsion test services for the Space Flight Enterprise and oversees 24 world class test positions across four NASA Centers including Marshall Space Flight Center, Glenn Research Center's Plum Brook Station, and Johnson Space Center's White Sands Test Facility. In addition to NASA engine development programs, the RPTP provides test facilities, technical support, and special test equipment for Department of Defense and commercial customers. The RPTP is a charter member of the National Rocket Propulsion Test Alliance with the Department of Defense. This Alliance leverages DoD and NASA test capabilities when additional engine test capacity is required to meet national needs.



MANAGEMENT EXCELLENCE

To return the greatest value to the American public, the Space Flight Enterprise will employ a well-balanced approach to managing our portfolio of capabilities, achieving both technical and management excellence. Building on a legacy of systems engineering excellence, we will apply the same systems discipline to integrate space flight facilities, human capital and finances. In response to the Enterprise emphasis on integrated portfolio management, the RPTP will begin consolidating test operations at SSC and MSFC. Beginning in 2004, test operations and test project management will be combined into one Test Operations Contract (TOC). By combining the work of two Centers into one contract, the RPTP provides long-term workforce stability and protects a nationally important skill set for future propulsion development and testing. The RPTP continues to enhance the core rocket test capability by incorporating new technologies and methodologies, eliminating surplus facilities and consolidating operations between test facilities. Further consolidation of NASA test facilities is expected to greatly improve the Nation's return on capital investments in space flight.

REACHING FOR A VIBRANT FUTURE

NASA's Integrated Space Transportation Plane (ISTP) frames an investment strategy that not only extends the Space Shuttle's operational lifetime but also ensures future options for NASA space transportation and exploration. Within ISTP, the strategic objectives for the United State's future in space flight are addressed by the Space Launch Initiative (SLI). This initiative focuses on America's next generation launch technology to enhance commercial development of space as well as civil exploration and National security programs. SLI's emphasis on flight risk-reduction focuses attention on Stennis Space Center's propulsion test role. The next-generation launch technology objectives deal with reusable, robust propulsion systems. These systems will increase the vehicle's operating margins to allow routine orbit insertion at less than full thrust capacity. As the operating margins are increased, the options to return the crew and vehicle safely during a launch emergency increase, thus enhancing continued access to space.



Artist concept of orbital space plane



IV. Strategic Capabilities for the Future



Pearl River Basin

B. Contributions to the Earth Science Enterprise

Life is a common theme through the NASA Vision and improving the quality of life here on earth is the express purpose of the Earth Science Enterprise. As societal demands for food, clean water, and clean air increase so must the Earth Science Enterprise evolve to provide new scientific understanding of Earth's fragile ecosystem and translate this knowledge into practical methodologies for Earth resources management.

The long-term mission of Stennis Space Center's Earth Science and Applications Directorate is to extend the knowledge and technologies resulting from Earth science research to U.S. Government agencies, Federal, state, and local governments. During the next decade, Directorate strategies will focus on enhancing the decision support systems of the U.S. Department of Agriculture (USDA), Department of Homeland Security (DHS), National Oceanic and Atmospheric Administration (NOAA), and U.S. Geological Survey (USGS).

The Directorate will also support the Earth Science Enterprise role of inspiring the next generation of explorers. In cooperation with the Education Enterprise and the Office of External Affairs, compelling views of our planet from space will be used to transform the way science is taught in our school systems. By drawing on our portfolio of everyday applications to improve food production, manage coastal lands and fishery resources, and plan new communities, we will showcase the benefits of Earth science research for students of all ages.

C. Contributions to the Aerospace Technology Enterprise

Civil space exploration, commercial space development, and National security of space all require a safe, reliable space transportation system. During the next decade, the Aerospace Technology Enterprise will build on 20 years of Space Shuttle experience to define the development roadmap for our next generation reusable launch vehicle (RLV). The Enterprise has adopted a systematic approach to second generation RLV development and has targeted long-life rocket engines as well as advanced crew escape systems, lightweight structures, and thermal protection systems.

As the managing Center for rocket propulsion testing, SSC will play a key role in testing components of the reusable propulsion systems that will help address full-scale development decisions by fiscal year 2007. Certifying the full-scale flight propulsion systems' operating margins later in the decade will be a key factor in determining options for launch abort and crew escape during vehicle ascent. SSC expects to contribute additional engine diagnostics technology as part of the test bed for ground-validating the selected propulsion system architectures. These non-intrusive test techniques, developed in partnerships with industry and academia, will support the integrated vehicle and health management initiatives of the Aerospace Enterprise.

In addition, dual-use development partnerships will be used to address more focused technology needs of rocket propulsion testing. Special emphasis will be placed on developing advanced test technologies that will reduce costs and improve performance validation data for our test customers.



Space Shuttle launch



IV. Strategic Capabilities for the Future

D. Human Capital Strategies

Stennis Space Center's future workforce is envisioned as a direct reflection of our Nation's rich cultural and ethnic heritage. In that respect, we continue to build a work environment known not only for technical excellence and professionalism, but also individual respect, integrity, and teamwork. Our long-term Center goal for sustaining our core capabilities in rocket propulsion test, remote sensing, and educational programs is to be the employer of choice for talented individuals with diverse backgrounds of culture, capabilities, and ethnic origins.

We realize that to align our Center with strategic Agency assignments and meet

our goals of providing an inclusive workplace will require an aggressive outreach and recruitment program to our Nation's institutes of higher learning. We have used NASA's Strategic Workforce Management process as the template for identifying our core competency requirements of skill sets and experience levels. In addition, we expect to use a flexible set of human resource management tools to position a diverse set of students into our hiring pipeline. With the Agency's competency management tools, we compared our workforce competencies against the long-term requirements of our program assignments and identified several significant competency shortcomings. As SSC addresses enhanced assignments from the Space Flight, Earth Science and Education Enterprises these competency challenges include:

1. System engineering and risk analysis expertise focused on project life cycle development and management.
2. Program/Project management expertise to oversee test projects distributed over four NASA test centers as well as U.S. Air Force test centers, Space Shuttle Main Engine testing, and Earth Science Applications.
3. Budgeting management skills to meet program, project, or business requirements.

4. Acquisition and contract management capability to develop acquisition strategies for future Center activities.
5. Facilities planning and operations knowledge to support Center program needs as well as day-to-day institutional operations.

Near-term challenges associated with Return to Flight include new requirements for safety inspections, mission assurance and compliance, with added emphasis on Space Shuttle Main Engine safety and project management. New emphasis on innovative real property strategies increases demands on our core management competencies to maintain the SSC institutional base for NASA and over 35 tenant agencies.

SSC employs a collaborative, Center-wide approach to ensure that we build a talented and diverse workforce. Recruitment teams comprised of individuals from the Offices of Human Resources and Development, Equal Opportunity, and Education will address our needs by increasing fresh-out hires over the next five years. In line with Agency workforce strategies, we will place special emphasis during these recruiting trips on Hispanic fresh-outs and individuals with disabilities. Our pipeline programs consisting of summer internships, fellowships, cooperative education, visiting faculty, president's management, federal career, and NASA Contracting Intern programs are used to build and maintain a diverse and high-quality workforce.

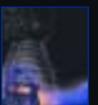
Our most important investments are being made in our current workforce. To ensure that our employees receive training, developmental experiences, and mentoring that they need to grow and perform the Center mission, we promote a variety of development programs.

Over the next five years, employee development programs are being focused on rotational assignments both internally and with other NASA Centers and Government agencies. These experiences will be designed to address our competency challenges by reshaping our employees skill sets in the shortest time possible. To foster our next generation of leaders, rotational assignments in keeping with the Senior Executive Service Career Development Program and other Agency leadership programs are encouraged.

Even though the SSC concept of operations is a model for future Agency outsourcing, we must improve our organizational agility to adapt to future program needs. We will build more flexibility into our institution to access unconventional sources for critical skills. We will diminish isolated project management structures and use integrated product development team concepts to promote a performance culture conducive to individual employee growth and learning.

Responding to Agency assignments with a flexible and agile workforce built on a value foundation of performance, integrity, and employee safety will ensure that SSC will continue to attract captivating work. By maintaining our reputation for safety, performance, integrity, and value to our customers with a flexible and agile workforce known for excellence, mutual respect, and teamwork, we will continue to attract and retain the best and brightest for future work. We believe that our plans for recruitment and employee development will prepare SSC for compelling work in this decade and beyond. Creating a workplace founded on individual respect and integrity is potentially our greatest recruitment and retention tool.

Wanda Solano – Lead electronics engineer in the development of wireless and smart sensor technologies



IV. Strategic Capabilities for the Future

E. Real Property Strategies

In keeping with the agency's contributions to the President's Management Agenda focused on cost-effectiveness and efficiencies, we will continue innovative partnerships with other Government agencies, universities, and industry to provide returns on real property holdings at Stennis Space Center. Over thirty years ago, Stennis Space Center began to reduce infrastructure costs to NASA by implementing far-reaching cost savings initiatives. SSC has used Space Act Authority to reinvent Government before the term was coined by entering into partnership, host-tenant arrangements with Federal and State agencies along with prominent universities.

Other innovative real property strategies employed at Stennis Space Center include public-private partnerships as well as enhanced use leasing in cooperation with State of Mississippi Development Agencies.

The Stennis Space Center master plan serves as the integration mechanism for real property strategies that will satisfy Agency implementation plans as well as public private partnership requirements over the next ten years.

As a result of implementing these real property strategies, Stennis Space Center has evolved into multi-disciplinary, multi-agency Center for federal, state, academic, and private organizations engaged in aerospace, oceanographic, and environmental programs as well as national defense. Along with

NASA, over 30 agencies are located at Stennis Space with an employee population numbering over 4,500. These agencies collaborate through an Executive Management Council that deals with new program initiatives and resulting construction of new facilities. The agencies share costs of common services, facilities, and infrastructure reducing costs and operating overhead for each agency. The Stennis shared service pool results in over \$7.5 million per year in cost avoidance to NASA.

Over the next decade, SSC is anticipating significant growth within the technical and administrative complex. We recognize growing demands on our network infrastructure. The anticipated network improvements will address SSC program and project requirements and will replace the SSC ATM backbone with a 10GB backbone and the network-attached equipment with GB devices. The proposed upgrades will replace 95% of the current wiring to provide GB transfer capability to the desktop. In addition, as a result of issues related to Agency document security, SSC will construct a multi-terabyte on-line storage facility for use by all NASA Centers and programs.

To address current needs to operate more efficiently, SSC will begin con-

struction in 2005 on a \$6.0 million First Response Facility that will consolidate the fire department, security, medical clinic, emergency operations center, and energy management functions. The facility's back-up power and stand-alone communications systems will allow it to function independently during severe emergency conditions. We anticipate using this facility as an emergency civil defense facility for regional and local communities.

Beginning in fiscal year 2006, SSC in partnership with the state and local community, will begin construction of a new NASA visitors center at the I-10 entrance to the Center. This initial investment of \$4.0 million into the visitors center complex will reduce the on-site visitor traffic and reduce impact on the Center security systems. The new complex is expected to significantly increase the number of visitors sharing the NASA experience in our area.



*Advanced Component Test Facility – Site of Future
Orbital Space Plane Propulsion Test*

V. Implementing Strategies Summary

To ensure sound planning and management practices, achieve Center objectives and goals, and continuously improve, SSC is committed to adopting NASA Implementing Strategies. Each of the five Implementing Strategies contains at least one objective for improvements throughout the Agency. Meeting these objectives will ensure SSC achieves the Agency mission safely and efficiently.

IS-1. Achieve management and institutional excellence comparable to NASA's technical excellence

SSC's contribution to IS 1 involves human capital, competitive sourcing, financial management, budget and performance integration, electronic government, and institutions and asset management. The Office of Human Resources and Development's partnership with the Office of Education and Office of Equal Opportunity, along with all other organizational management, ensures educational and recruitment programs attract a diverse workforce to maintain mission critical competencies. The Acquisition Management Office (AMO) continues to lead by example in the Commercial Outsourcing Program by maintaining a high ratio of Contractor workforce versus the Civil Service workforce. The AMO continues to outsource the majority of acquisitions for programs, services, and assets to meet or exceed NASA competitive sourcing targets. The Office of the Chief Financial Officer remains committed to improve, streamline and unify both the financial management and budget and performance planning and reporting systems.

The recently implemented Integrated Financial Management Program (IFMP) Travel Manager and Core Financial Modules join SSC with the Agency standardized financial and travel systems. Potential benefits include improved operating efficiencies and cost savings as center legacy systems are terminated. When implemented, the IFMP Budget Formulation Module is expected to support full cost budgeting, providing total program costs for management program planning. The Chief Information Officer (CIO) and Information Management Division support NASA's goal of an integrated and user-friendly Internet portal by continuously analyzing SSC Web sites and Web page structures for possible transfer to the Agency portal or for improvements and upgrades. This process will improve and increase Web access and usage. The Center Operations Directorate's leadership in property management can be seen in the desire to explore new opportunities and technologies in facilities and personal property management.

IS-2. Demonstrate NASA leadership in the use of information technologies

IS 2 strives for leadership in the use of information technology. NASA depends on information technology to manage, disseminate and preserve its scientific and engineering knowledge. The SSC CIO and Information Management Division's commitment to support IS 2 will leverage information technology investments to ensure the SSC mission is fulfilled. Information technology

security and reliability will continuously improve through the identification and implementation of software and system upgrades. Enhanced and cost efficient communications are expected through continuous improvements as e-Document Management, e-Applications and Electronic Work Environment are implemented. Improvements in the Wide Area Network and Local Area Network will foster improved collaboration within NASA programs.

IS-3. Enhance NASA's core engineering, management, and scientific capabilities and processes to ensure safety and mission success, increase performance, and reduce cost

Program and project managers are continuously challenged to apply innovative techniques to improve safety and performance while reducing schedule and cost. The Systems Management Office (SMO) and Program Management Council (PMC) play a vital role in ensuring IS 3 objectives are met at SSC. The SMO provides consulting services, tools, and techniques to programs and projects to enable best practices and sound engineering principles. The PMC supports IS 3 by ensuring all applicable NASA Policy Guidelines are met. The Office of Safety and Mission Assurance conducts Operational Readiness Inspections to verify designs are safe and work is accomplished safely. The Earth Science Applications Directorate utilizes peer review to advance and share knowledge of Earth system processes, systems, and applications.

IS-4. Ensure that all NASA work environments, on Earth and in space, are safe, healthy, environmentally sound, and secure

The SSC Safety Management Council, consisting of senior NASA Managers and on-site contractor General Managers, actively promotes safety awareness and the reductions of incidents at SSC. Monthly safety meetings are held at various locations across the Center. Security is another high priority at SSC. SSC continues to work closely with government and local authorities to ensure the safety and security of people, facilities, and information. The reduction or elimination of occupational health incidents and environmental health issues are another important goal at SSC. Specific health programs have been implemented and promoted across the Center to accomplish this goal. SSC has established very specific goals for the reduction in use of hazardous chemicals and hazardous waste generation.

IS-5. Manage risk and cost to ensure success and provide the greatest value to the American public

Proper management will ensure success and provide the greatest value to the American Public. This goal will be accomplished at SSC by providing tools, techniques and expertise to enable well-informed decisions by management. Improved cost estimation plays an important role in the decision-making process for programs and projects. Earned Value Management (EVM) implementation, along with risk management assessment activities will be utilized to achieve IS 5.





The NASA Vision

To improve life here,
To extend life to there,
To find life beyond.

The NASA Mission

To understand and protect our home planet,
To explore the universe and search for life,
To inspire the next generation of explorers
... as only NASA can.



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