

NASA Stennis Space Center Environmental Resources Document

1.0 Description of Center

1.1 Location

The NASA John C. Stennis Space Center (SSC) is located near the Gulf of Mexico in western Hancock County, Mississippi, approximately 89 kilometers (55 miles) northeast of New Orleans, Louisiana and approximately 48 kilometers (30 miles) west of Biloxi/Gulfport, Mississippi. The facility is situated 30.38 north latitude and 89.60 west longitude at its centerpoint (1). In May 1962, the Federal government acquired approximately 56 square kilometers (13,800 acres) that constitute the "Fee Area", or confines within the gates of SSC. Within this area, NASA along with numerous Federal and State agencies have constructed administrative, research, remote sensing, and propulsion testing facilities. The latter activity is restricted to NASA and is the major function of the center (Figure 1-1). SSC has been named NASA's Lead Center for propulsion testing and many new programs are envisioned.

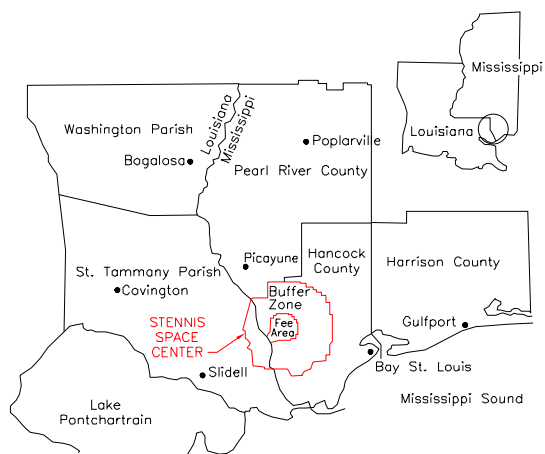
Rocket testing operations necessitated development of a "Buffer Zone" for safety and acoustic considerations. A perpetual restrictive easement on 506 square kilometers (125,001 acres) was acquired, which extends six miles in all directions of the Fee Area. The majority of the Buffer Zone is located in Hancock County, Mississippi, although portions extend into Pearl River County, Mississippi and St. Tammany Parish, Louisiana. The region is bounded on the east and west by the Pearl River and Jourdan River watersheds, respectively. At present, the government owns 30.6 square kilometers (6,808 acres) of the Buffer Zone with the remainder being held by individuals or corporations. Provisions of the restrictive easement prohibit maintenance or construction of dwellings and other buildings suitable for human habitation. Predominant land use in the Buffer Zone includes sand and gravel mining, timber production, raising livestock, and recreational pursuits such as hunting and fishing.

Several communities are situated just outside the Buffer Zone including Pearlinton, Waveland, Bay St. Louis, Kiln, and Picayune, Mississippi as well as Slidell and Pearl River, Louisiana. There are 12.1 kilometers (7.5 miles) of canals inside the fee area available to transport material within SSC. The SSC canal system links to the East Pearl River through a canal lock system. The East Pearl River links SSC to the national waterway transportation system. It is 33.8 kilometers (21 miles) from the main canal to the Gulf Intracoastal Waterway. The canal system provides a means of transporting large rocket engines, propellants and other heavy equipment and materials to the facility.

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Figure 1-1
General Location Map of Stennis Space Center

FIGURE 1-1
JOHN C. STENNIS SPACE CENTER
GENERAL LOCATION MAP
OF STENNIS SPACE CENTER



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1.2 History

SSC was constructed between 1963 and 1966 to perform development and acceptance testing for large liquid propellant rocket systems in support of the U.S. Space Program. The facility was named the Mississippi Test Facility (MTF) and later the National Space Technology Laboratories (NSTL). In May of 1988, President Reagan re-named the facility the John C. Stennis Space Center in honor of Senator John C. Stennis of Mississippi. Senator Stennis was instrumental in the establishment of the facility in the early 1960s. The designation is notable in that it elevated SSC to the status of a "field center," as opposed to its former role under the direction of the George C. Marshall Space Flight Center, Huntsville, Alabama.

From April 1966 until the early 70's, the Center was responsible for the static testing of the first and second stages of the Saturn V rocket. Three test stands (A-1, A-2, and B-1/B-2) were constructed for this purpose. During the interim period between the Apollo and Space Shuttle Programs, SSC experienced significant growth. Numerous Federal and State agencies along with several universities established operations at the Center. Coincident with this expansion was the return of rocket engine testing. The first test of the Space Shuttle Main Engine (SSME) was conducted in May 1975. Existing test stands were modified to accommodate testing of individual engines as well as clusters of three.

In 1996 SSC was officially named NASA's Center of Excellence in Large Propulsion Systems Testing and is expanding considerably. The newest test complex, which is continuing to grow, is the E-Complex. This area consists of three test stands (E-1, E-2, and E-3) which were built in the 1990s. The test stands have various capabilities including infrastructure for testing rocket motors and components with fuels such as liquid hydrogen, rocket propellant-1, jet propellant-8 and hybrids. Oxidizers that have been used for testing included liquid oxygen, gaseous oxygen, and hydrogen peroxide. Modernization and refurbishment of the A-1, A-2 and the B-1/B-2 Test Stands are ongoing. The A stands are used for testing the X-33 and Space Shuttle Main Engines. The Boeing Corporation uses the B1/B2 Test Stands for the testing of commercial endeavors.

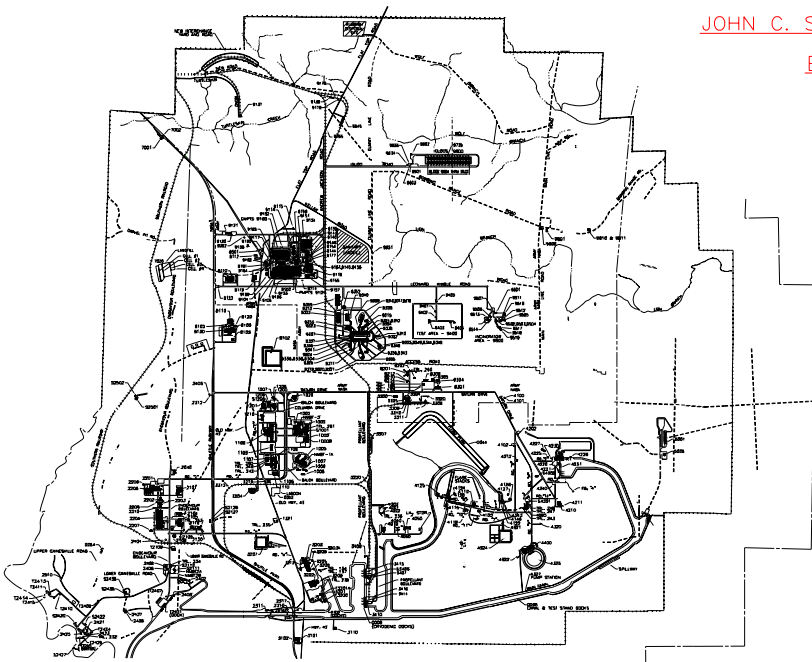
1.3 Organizations within the Fee Area

The SSC Fee Area is shown in Figure 1-2. In addition to NASA and its support contractors, there are numerous resident agencies at SSC. Since 1976, the Center has facilitated the establishment of outside operations involving Federal and State agencies. Descriptions of the various organizations are included below. Table 1-1 outlines major facilities at SSC.

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Figure 1-2
John C. Stennis Space Center

FIGURE 1-2
JOHN C. STENNIS SPACE CENTER
BUILDING MAP



SCALE: 1" = 3000'

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Table 1-1
Major Facilities at Stennis Space Center

Building No.	Building Name	Agency	Size/Description
1000, 1001	Data Handling Center	Naval Oceanographic Office	Office space
1002, 1003	Oceanography, Navy Computer Program Operations Center, Navy Administrative Support	Naval Oceanographic Office Naval Research Laboratory	Computer-plotter facilities for data storage and analysis, office space
1005	Ocean Science Laboratory	Naval Research Laboratory	Offices, Naval research laboratories
1009	Ocean Research Laboratory	Naval Research Laboratory	Offices, laboratories
1020	CHL/USM	USM	Office space, classroom and lab
1100	Administration	NASA National Data Buoy Center Naval Oceanographic Office MSC/CNMOC	Office space for 1,430, cafeteria, credit union, post office, medical center
1103	Mississippi Technology Transfer Center	Environmental Protection Agency Gulf of Mexico Program Mississippi Technology Transfer Office Space Remote Sensing Center Institutions of Higher Learning	Automation and Robotics Application Center, Federal Laboratory Consortium, Southeast Regional Clearinghouse, Space Remote Sensing Center
1105	Laboratory	Environmental Protection Agency Environmental Chemistry Laboratory Photographic Processing University of Southern Mississippi	Laboratory analysis of marine, biological, geological, biochemical, environmental (toxic wastes, pesticides) samples; some conference rooms and office space. Photographic/graphic arts service.
1110	Computer Center	NASA/TTSC	Computer services
1200	Visitor's Center, Auditorium	Visitor and Education Programs	Office space and first floor exhibits
2101	Hydrosience Center	United States Geological Survey	Office, lab, storage; electrical, electronic, mechanical equipment; supplies and materials for design and construction of instruments/equipment
2204	Warehouse	NASA/FOSC	Office space with some shops
2205	Repair and Fabrication Shop	NASA/FOSC	Industrial space, office space, some shops

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Building No.	Building Name	Agency	Size/Description
3203, 3205	Oceanographic, System Test and Development	National Data Buoy Center	Data buoy operations; industrial area, data terminal area, electronics repair, technical data repository, electronic communications
4995	Data Acquisition Facility	NASA	Analog and digital recording systems and office space; data recording facility for static engine testing
8100	Instrumentation Laboratory	Naval Oceanographic and Atmospheric Laboratory NASA/Science Laboratory	NAVAIDS Lab, computer maintenance, exhibits production, quality assurance, machine shop, fabrication, optics lab, environmental laboratory
8110	Calibration Laboratory	NASA/TTSC	Electronic equipment repair, calibration, fabrication, pressure lab, liquid flow calibration lab.
8120	Atmospheric Calibration Equipment	NASA	Calibration under simulated atmospheric conditions, wind tunnel, solar radiation lab, vibration lab, environmental lab.
TEST OPERATIONS			
"A" Test Complex 4120, 4122	A-1 and A-2 Test Stands	NASA	Two single position test stands, test control center, observation bunkers, systems (high pressure gas, water, electrical, etc.). Propellant systems include liquid oxygen, liquid hydrogen. High pressure gas includes air, helium, nitrogen.
"B" Test Complex 4220	One Test Stand, Two Positions (B-1, B-2)	Boeing Corporation	One dual position test stand, test control center, machine shop. High pressure gas includes air, helium, nitrogen. Docking and transfer for liquid propellant barges.
"E1" Test Complex 4050	E Test Complex	NASA	Twenty thousand square meter (five acre) test site will include 3 test cells, test control center, component preparation building, ultra high pressure gas generation and storage; support systems to include propellant venting systems, flare studies, barge facility, earthen berms for blast protection.
"E2" Test Complex 4001 and E2 Cell 2	E Test Complex	NASA	High temperature tests on materials for hypersonic aircraft - 2 test cells

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Building No.	Building Name	Agency	Size/Description
"E3" Test Stand 4070	E Test Complex	NASA	Small hybrid / liquid motor tests
"H1" Test Complex	H1 Test Complex	U.S. Air Force Space Based Laser	Unused at present, this test stand may be used for medium to large hybrid rocket testing.
3305	High Pressure Gas Facility	NASA/TTSC	High pressure gases for the test complexes
4400	High Pressure Water	NASA/TTSC	Power and deluge water for the A and B test complexes
8306	Engineering Operations Building	NASA	Office space

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1.3.1 NASA

In keeping with its designation as NASA's Center of Excellence in Large Propulsion Systems Testing, SSC has been assigned to develop the capabilities to test the propulsion systems hardware for future vehicles that will replace the Space Shuttle.

SSC's primary mission is to test and flight certify the Space Shuttle's main engines, which power the vehicle during its eight and one half minutes of flight prior to orbit. The engines are "hot fired", simulating various flight profiles in order to determine flight worthiness. The resultant data are analyzed to ensure that engine performance is acceptable and that required thrust will be delivered in the critical period of ascent during shuttle flights. In addition, SSC continues to perform development tests on new flight hardware for the main engine to improve performance and reduce costs. There are several facilities that support the test stands: test control centers, data acquisition facilities, a cryogenic propellant facility, an electrical power generating plant, and a 66 million gallon water storage reservoir.

SSC will also be testing propulsion hardware for future launch vehicles at the E-1 Test Facility. This flexible, three celled ground test facility is capable of a wide variety of testing including rocket engine testing using liquid hydrogen or hydrocarbon fuels, hybrid rocket motor testing, or other testing involving high flow rate, ultra high pressure gases and high pressure cryogenic fluids. This testing facility is also used for engine exhaust plume analysis, test facility design and evaluation, and data acquisition.

The E-2 test complex provides SSC with the capability to perform high temperature tests on materials for hypersonic aircraft of the future. In addition, this facility is used for cryogenic composite testing and cryogenic composite tank testing.

The E-3 Test Stand is used for small hybrid motor testing and has the capability for use as a test stand for small liquid motors.

As part of SSC's Center Operations and Support Directorate, NASA Environmental Management has the responsibility for permitting, compliance, and monitoring activities for all NASA activities and many of the resident agency activities that may affect the environment. NASA Environmental Management consists of an Environmental Officer and three Environmental Specialists who direct the activities of facility support and technical support contractors working to ensure that NASA's environmental goals are met. Site-wide environmental and industrial hygiene programs were initiated

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in 1991 in an effort to facilitate environmental compliance by tenant agencies (2, 3). The programs include environmental and industrial hygiene services that are provided by NASA to tenant agencies as part of the shared-pool operations. However, NASA does not accept responsibility for tenant or contractor compliance.

As a Federal agency, NASA is subject to provisions of the 1969 National Environmental Policy Act (NEPA). The Act has two primary objectives. The first is to promote consideration of possible significant environmental impacts resulting from proposed activities. This is ideally accomplished during the decision-making phase of the project in question. Secondly, the Act also requires that public notification be made to illustrate that the agency did, in fact, consider all possible environmental concerns during the decision process (4).

There are three levels of documentation in NEPA including the Categorical Exclusion (CX), the Environmental Assessment (EA), and the Environmental Impact Statement (EIS). Projects receiving the CX designation are judged to be of a routine nature and consequently would not be expected to elicit significant environmental changes. Activities such as building maintenance and in-kind replacement of facilities would fall into this category. EAs are performed to determine if impacts are significant. If they are found to be insignificant, a Finding of No Significant Impact (FONSI) is prepared. When the potential for impact is found, an EIS must be completed, subsequently leading to a Record of Decision (ROD). A scoping process must be included in EISs to ensure that relevant topics are appropriately addressed (4).

Besides NEPA documentation, there are NASA-specific requirements for the development of documents that outline the environmental status of each NASA field center. This Environmental Resource Document (ERD) will serve as a concise baseline description of current environmental operations at SSC. The ERD is to be updated at least every five years (4).

1.3.2 Naval Meteorological and Oceanography Command

The Naval Meteorology and Oceanography Command's mission is to collect, interpret and apply data and information for safety at sea, strategic and tactical warfare, and weapons system design, development and deployment. The command provides meteorological, oceanographic, and mapping, charting and geodesy services to increase the effectiveness of the Navy in both peacetime and in war.

1.3.3 Naval Research Laboratory

The Naval Research Laboratory (NRL), formerly the Naval Oceanographic and Atmospheric Research Laboratory (NOARL), was established at SSC in October of 1989 to function as the principal Naval laboratory performing oceanographic and atmospheric environmental research. NRL occupies research, computation, laboratory, administrative, and warehouse facilities at SSC. NRL also administers several large antennas to receive oceanographic and meteorological satellite data, a Magnetic Observatory, a Pattern Analysis Laboratory, a Map Data Formatting Facility, a water wave channel, and numerous laboratories for acoustic and optical oceanographic instrumentation, analysis and testing.

1.3.4 Mississippi Army Ammunition Plant Industrial Complex

Located in the northern portion of SSC, the Mississippi Army Ammunition Plant (MSAAP) was once used to manufacture sophisticated munitions. The plant consisted of three manufacturing complexes including the Projectile Metal Parts area, the Cargo Metal Parts area, and the Load Assemble and Pack area. MSAAP is unique among SSC tenants in that it maintains its own environmental permits. The Plant has a National Pollutant Discharge Elimination System (NPDES) permit and a Synthetic Minor Air Operating permit. It does not have a Resource Conservation and Recovery Act (RCRA) permit.

This facility was deactivated by the U. S. Congress and in 1992 was reopened as an industrial complex to commercial enterprise. It is now a thriving industrial park catering to both high-tech and industrial tenants.

1.3.5 National Data Buoy Center

The National Data Buoy Center (NDBC), part of the National Weather Service, is an agency within the National Oceanic and Atmospheric Administration (NOAA) and is supported by personnel and ships of the U.S. Coast Guard. NDBC operates automated observing systems that measure environmental conditions from remote pelagic and coastal areas. These measurements support the requirements of NOAA and other programs and are used for forecasting, public advisories and warnings, and in climate and research programs.

Environmental measurements are made by a network of moored buoys and land stations deployed in the Atlantic and Pacific Oceans, the Great Lakes, the Gulf of Mexico and the Bering Sea. Each buoy is designed to perform in the specific conditions it will encounter, whether located within a few miles

of the coast or in the deep waters of the ocean. Many of these buoys are returned to SSC for refurbishment.

1.3.6 Mississippi Laboratories of the Southeast Fisheries Center

Partially headquartered at SSC, the Mississippi Laboratories of the Southeast Fisheries Center provides information for assessment, management and conservation of living marine resources in the Gulf of Mexico, Caribbean Sea, and South Atlantic Ocean. The Mississippi Laboratories are a component of NOAA and the National Marine Fisheries Service (NMFS). Efforts are directed at identifying and resolving problems associated with the commercial fishing industry. Recently, Mississippi Laboratories has developed instrumentation for monitoring fish behavior as well as methods for using satellite imagery for tracking endangered species and mapping environmental conditions.

1.3.7 United States Geological Survey

The U.S. Geological Survey (USGS) is the principal Federal agency responsible for collecting, analyzing and archiving hydrologic data for managing the nation's water resources. USGS facilities at SSC include the Hydrologic Instrumentation facility, the Office of Surface Water and the Earth Science Information Center. The Hydrologic Instrumentation Facility has the responsibility for the design, testing, calibration, repair and distribution of all USGS hydrologic instruments. The Office of Surface Water provides technical coordination for surface water problems. Presently this office is involved in the development of computer software to be used for modeling surface water dispersion scenarios. The Earth Science Information Center provides the public with information on all types of cartographic products such as topographic maps, aerial photographs, satellite images and digital map products of the United States. Information is also available on geologic maps and reports, water supply data and Earth science publications of the USGS.

1.3.8 Environmental Protection Agency

Under the jurisdiction of the Environmental Protection Agency's (EPA's) Office of Pesticides Programs, the Environmental Chemistry Laboratory (ECL) is involved with the analysis of pesticide deposition in human and environmental samples. Using state-of-the art technology, the ECL gathers data that is used for monitoring and regulating pesticides in the environment.

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The EPA Gulf of Mexico Program (GOMP) is also located at SSC. The GOMP is an intergovernmental effort to develop a comprehensive management plan for future protection of the Gulf environment. Representatives from government and private organizations from the five Gulf states are working on management issues for natural resources in the Gulf. The ultimate goal of the project is to successfully balance human activities and preservation of the environment.

1.3.9 Technology Transfer Offices

The Mississippi Technology Transfer Office (MTTO) and the Louisiana Technology Transfer Office (LTTO) use both State and NASA resources to develop economic and technical advantages for private businesses, State agencies, and educational concerns. These offices identify and support the dissemination of technology developed at SSC as well as other Federal laboratories. They are involved in a broad range of research and technology projects including the development of remote sensing technology, Earth science research and data systems.

1.3.10 Space Remote Sensing Center

The Space Remote Sensing Center (SRSC) has established a close working relationship between NASA, universities, and private concerns to facilitate development of commercial applications for remotely sensed data. Such applications have been used to improve land use and resource management capabilities. Recently, SRSC has been developing computer models to assess crop vitality.

1.3.11 Navy's Special Boat Unit 22

The Navy's Special Boat Unit 22 is the Department of Defense's agent for conducting riverine warfare around the world. Detachments are capable of performing all mission-essential tasks necessary to conduct unit-level naval special warfare operations and support other special operations forces.

1.3.12 NAVSCIATTS

The Naval Small Craft Instruction and Technical Training School (NAVSCIATTS) is responsible for small craft maintenance, riverine and coastal training for foreign friendly and allied military students. Originally located in the Panama Canal Zone, NAVSCIATTS relocated to Stennis Space Center in

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1999 to take advantage of some of the finest riverine and coastal training areas in the world that are located at and around the space center.

1.4 References

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