National Aeronautics and Space Administration

NASA's John C. Stennis Space Center

Mission Brochure 2014

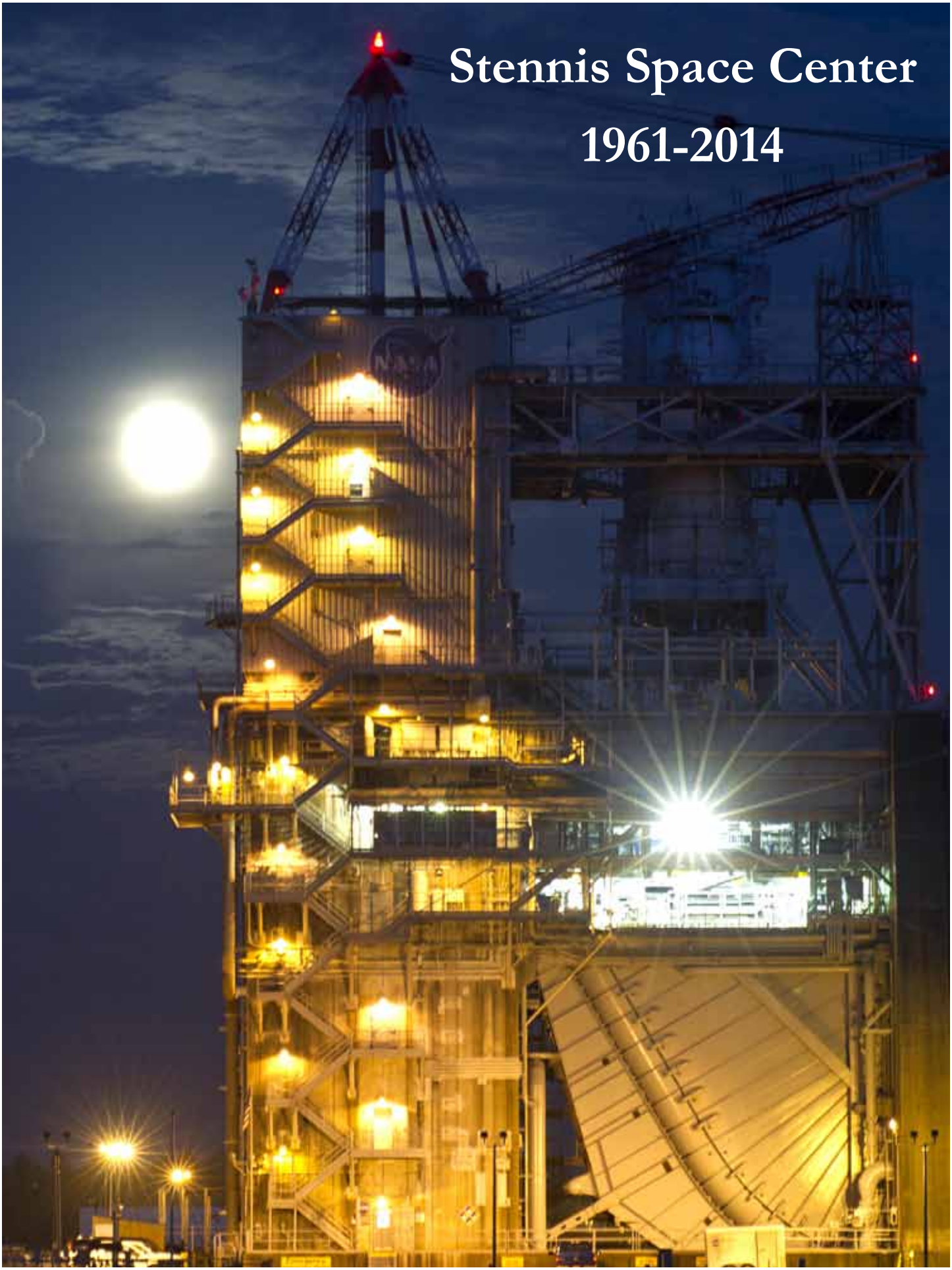
National Aeronautics and Space Administration

John C. Stennis Space Center
Office of Communications
Stennis Space Center, MS 39529-6000
800-237-1821 or 228-688-3333
www.nasa.gov/centers/stennis

www.nasa.gov

Stennis Space Center

1961-2014



contents

stennis space center

4 .... Overview

6 .... History

8 .... Propulsion Testing

10 ... Applied Science

12 ... Outreach

14 ... Education

16 ... Economic Impact

18 ... Test Complex Panorama

20 ... INFINITY Science Center

22 ... Stennis History

24 ... Stennis Facts

26 ... Timeline

31 ... Spinoffs

32 ... Helpful Websites

33 ... Resident Agencies

overview

stennis space center

For more than four decades, John C. Stennis Space Center in south Mississippi has served as NASA's primary rocket propulsion testing ground. Today, the center provides propulsion test services for NASA and the Department of Defense, as well as the private sector. It is home to NASA's Rocket Propulsion Test Program, which manages all of the agency's propulsion test facilities.

State-of-the-art facilities, a seven-and-one-half-mile canal waterway system and the 125,000-acre acoustical buffer zone that surrounds Stennis enable delivery and testing of large-scale rocket engines and components.

Stennis was established in the 1960s to flight-certify all first and second stages of the Saturn V rocket for the Apollo manned lunar landing program. From 1975 to 2009, the primary mission was to test the main engines that propelled space shuttle vehicles on their eight-and-one-half-minute ascent into orbit.

With NASA's Space Shuttle Program ended, Stennis now is preparing to test RS-25 engines (modified space shuttle main engines) that will be used on NASA's new Space Launch System. NASA also is partnering with commercial interests to provide space travel and transportation, and Stennis is working with commercial companies to supply their rocket propulsion testing needs. The center has partnered with Orbital Sciences Corporation to provide testing of the Aerojet Rocketdyne AJ26 engines that power the Antares rocket and Cygnus spacecraft on commercial cargo transport flights to the International Space Station. NASA also has teamed with Space Exploration Technologies Corporation (Space X) to test the company's Raptor methane rocket engine at Stennis.

Stennis' state-of-the-art test facilities include the A, B and E complexes, which enable testing of components, full-scale engines and rocket stages, as well as future-generation engines. The E Complex provides a particularly versatile option for testing a range of engines and components.

Stennis' Applied Science and Technology Project Office uses NASA-generated science research, remote sensing and other technical capabilities to help partner agencies, such as the Federal Emergency Management Agency and the U.S. Department of Agriculture, make more informed decisions. For instance, Stennis scientists use remote sensing technologies and their expertise in rapid prototyping to expand and improve hurricane prediction capabilities. They also focus on coastal management, an important consideration for the entire Gulf Coast region and one of NASA's national science priorities.

Through the Office of the Chief Technologist and NASA's Innovative Partnership Program, engineers and researchers at Stennis work to transfer NASA-developed technologies to the commercial sector to help improve the economic strength of the United States and the quality of life for its citizens. These efforts include research and development of new technologies, as well as the assessment, certification and acquisition of new and useful technologies from the commercial, academic and government sectors that improve the safety, efficiency and effectiveness of propulsion testing, Earth science applications and Stennis Space Center.

Since 2006, Stennis has been the home for the NASA Shared Services Center, which provides the national agency with centralized administrative processing services and customer contact center operations for support of human resources, procurement, financial management and information technology. The work performed by the center frees agency resources that can then be redirected to NASA's core mission.

Stennis Space Center also is home to a number of federal, state, academic and private organizations and several technology-based companies that share the cost of owning and operating the facility, making it more cost-effective for each agency to accomplish its independent mission.

The Naval Meteorology and Oceanography Command, the largest concentration of oceanographers in the world, is headquartered at Stennis, along with the Naval Research Laboratory, the Navy's corporate laboratory. Stennis also is the riverine warfare training ground for the Department of Defense's Special Boat Team TWENTY-TWO, the headquarters of the Naval Small Craft Instruction and Technical Training School and Naval Oceanography Mine Warfare Center. It also is home to the Lockheed Martin Mississippi Space and Technology Center, the Rolls-Royce North America Outdoor Jet Engine Testing Facility and the Aerojet Rocketdyne rocket engine assembly facility.

With its effective cost-sharing philosophy, state-of-the-art test facilities, highly-trained and professional workforce, and commitment to safety and customer satisfaction, Stennis is a model of government efficiency, providing American taxpayers positive returns on their investments.

NASA has a workforce of about 2,000 civil servants and contractors, part of the center's total workforce of 5,000-plus. The center has a strong influence on the economy of surrounding communities.

Its community involvement includes participation in the Combined Federal Campaign fundraising drive, hosting the area's annual Special Olympics, support of the annual Feds Feed Families food drive and conducting educator workshops.

Stennis offers bus tours of America's largest rocket engine test complex. Tours originate at the new INFINITY visitor center at I-10, Exit 2, which features a variety of Stennis-related displays, hands-on activities and space artifacts and memorabilia.

history

stennis space center

When President John F. Kennedy made his historic 1961 announcement that the United States would put humans on the moon by the end of that decade, a site was needed to test the powerful engines and rocket stages that would propel them on their journey.

For NASA officials, the rough terrain of Hancock County, Miss., provided the five things necessary to test the large Apollo engines and stages: a site isolated from large population centers, water and road access for transportation needs, available public utilities, nearby supporting communities and a climate conducive to year-round engine testing. In May 1963, workers felled the first tree in a daunting construction project. The effort marked the largest construction project in the state of Mississippi and the second largest in the United States at that time.

Despite a pressing schedule, occasional setbacks and even the disruption of Hurricane Betsy in 1965, construction workers toiled day and night to prevail in their tasks. On April 23, 1966, just three years after the first tree was felled and construction began, a Saturn V second stage prototype was test-fired on the A-2 Test Stand. With the shake, rattle and roar of the test, south Mississippi was blasted into the space age.

From 1967 until 1972, Stennis test-fired first and second stages of the Saturn V rocket for the Apollo Program. After the Apollo Program ended, Stennis Space Center was called on to test main engines for NASA's new reusable spacecraft, the space shuttle. After necessary modifications to the test structures, Stennis tested the first space shuttle main engine on the A-1 Test Stand on May 19, 1975.

For the next 34 years, until a final test firing on July 29. 2011, NASA and contractor engineers at Stennis Space Center would continue to test every main engine used to power the shuttle spacecrafts into orbit. In that time, not a single mission failed because of engine malfunction.

In 2013, Stennis began preparation for testing RS-25 rocket engines for use on NASA's new Space Launch System, being developed to carry humans deeper into space than ever, to such destinations as asteroids and eventually Mars. Four RS-25 engines will power the SLS core stage. Testing of those engines will begin in 2014 on the A-1 Test Stand at Stennis. In addition, the B-2 Test Stand is being modified to test the SLS core stage in 2016. Core-stage testing will involve firing a configuration of four RS-25 engines simultaneously.

Into its sixth decade of NASA support, Stennis remains focused on building on its rich history as the nation's largest rocket engine test facility and the place where space dreams really do find the power to fly.

Photos: (Page 6) A 1965 photograph shows the B-1/B-2 Test Stand (foreground) and the A-2 Test Stand under construction at Stennis Space Center. (Page 7) A 2009 aerial photograph shows the B-1/B-2 Test Stand (foreground) at Stennis Space Center, with the facility's A Test Complex and its A-1, A-2 and A-3 test stands all visible.

propulsion testing

stennis space center

Established in the early 1960s, Stennis Space Center has grown into the nation's largest rocket engine test facility. The center is home to NASA's Rocket Propulsion Test Program Office, the principal implementing authority for the agency's rocket propulsion testing. The agency office manages NASA rocket propulsion test facilities located at Stennis; Marshall Space Flight Center in Huntsville, Ala.; Johnson Space Flight Center/White Sands Test Facility in Las Cruces, N.M.; and Glenn Research Center/Plum Brook Station in Sandusky, Ohio.

At Stennis, the Engineering and Test Directorate conducts propulsion test activities on one-of-a-kind facilities collectively valued at more than $2 billion and dubbed national assets. State-of-the-art facilities include the A, B and E complexes, where rocket propulsion tests can be conducted on engine components, full-scale engines and even rocket stages.

The A Test Complex at Stennis Space Center consists of two single-position, vertical-firing test stands designated A-1 and A-2, both built in the 1960s. The stands have been used to conduct full flight-stage and engine component tests, as well as single-engine tests at sea level and simulated altitudes. In 2014, the A-1 stand will begin testing RS-25 rocket engines, which will power the core stage of NASA's new Space Launch System, being developed to carry humans deeper into space than ever.

NASA also is heavily involved in testing rockets for the nation's commercial launch sector at Stennis. RS-68 engine testing continues in support of the United Launch Alliance Delta IV expendable launch vehicle. Testing of Aerojet Rocketdyne AJ26 engines for Orbital Science Corporation's Antares space vehicle began in 2010. The engines power commercial cargo flights to the International Space Station. Space Exploration Technologies Corporation (SpaceX) also has partnered with NASA to test components of its Raptor methane rocket engine at Stennis.

An Aerojet Rocketdyne AJ26 rocket engine is tested on the E-1 Test Stand at Stennis on Nov. 19, 2013. AJ26 engines power commercial cargo missions to the International Space Station.

The B Test Complex at Stennis consists of a dual-position, vertical, static-firing test stand designated B-1/B-2, also built in the 1960s. First stages of the Apollo Saturn V rocket were static fired at the test stand from 1967 to 1970. Stennis now leases the B-1 test position to Aerojet Rocketdyne for testing of the RS-68 engine. Meanwhile, the B-2 position is being modified to test the SLS core stage, which will involve mounting the stage on the stand and firing four RS-25 rocket engines simultaneously.

The E Test Complex at Stennis was constructed in the late 1980s and early 1990s. This three-stand complex includes seven separate test cells capable of supplying ultra high-pressure gases and cryogenic fluids, using a variety of rocket propellants. The complex offers particularly versatile options for testing engines and components, including Aerojet Rocketdyne AJ26 engines and SpaceX Raptor engine components.

Various infrastructures support the Stennis test complexes. Test stands are linked by a seven-and-one-half-mile canal system used primarily for transporting liquid propellants. Additional features of the test complex include test control centers, data acquisition facilities, a large high-pressure gas facility, an electrical generation plant, and a high-pressure industrial water facility served by a 66-million gallon reservoir.

applied science

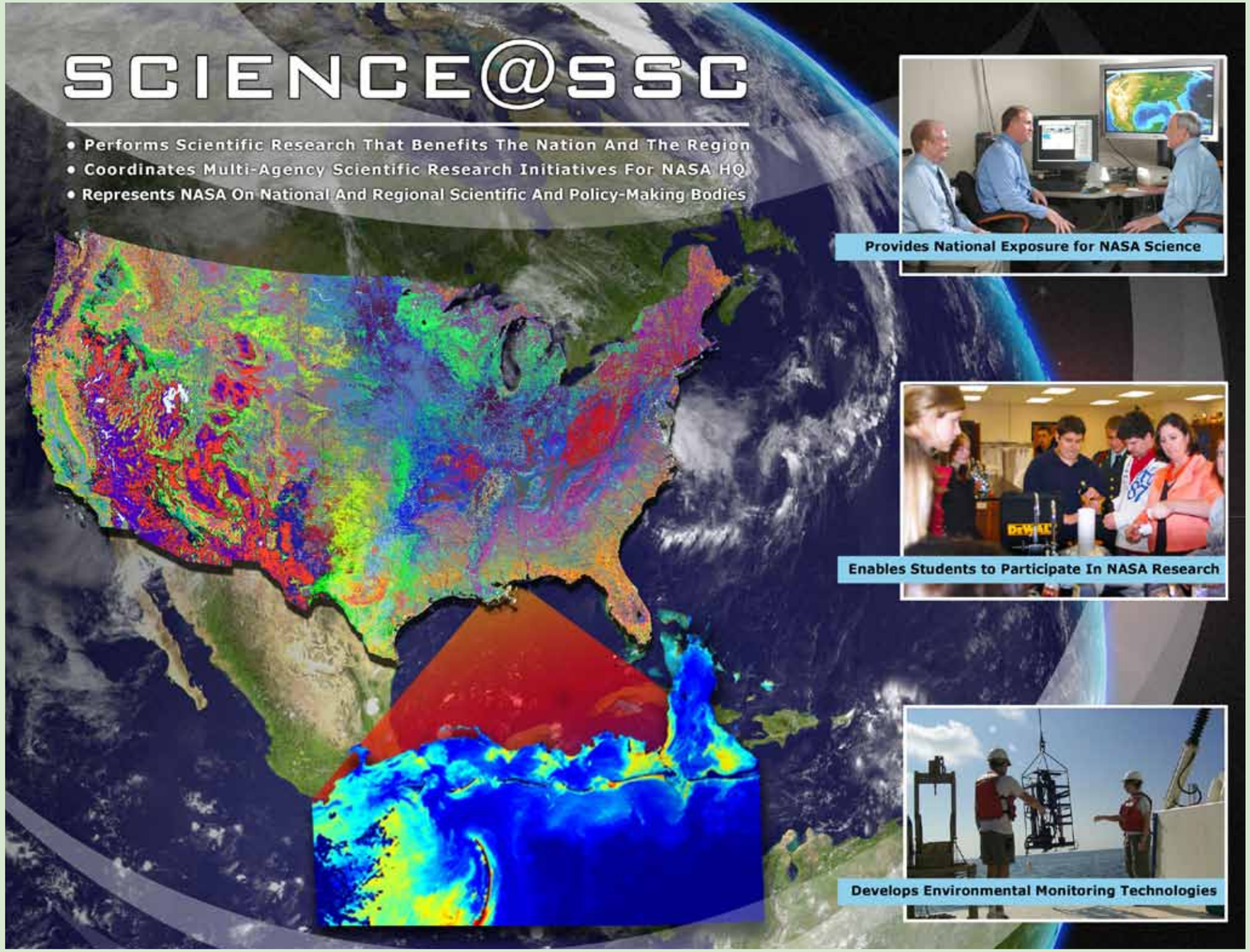
stennis space center

The Applied Science & Technology Project Office (ASTPO) at Stennis Space Center works on the front lines of science and engineering to make a meaningful, beneficial impact on the world.

ASTPO works with community partners to demonstrate how Earth science research can help respond to crises, establish sustainable policies and address societal issues. Using expertise in remote sensing, oceanography, land use/land cover analysis, signal processing, electronics, and mathematical modeling, ASTPO conducts scientific research, creates new tools and techniques to monitor the environment, and generates information to help leaders make informed decisions.

In 2007, NASA formed the Gulf of Mexico Initiative to help the Gulf region recover from the devastating hurricanes of 2005 and to address coastal management issues of the future. ASTPO oversees this initiative, which employs hundreds of scientists and engineers across the country to address high priority issues defined by the Gulf of Mexico Alliance, a regional collaboration of 13 federal agencies and the five states bordering the Gulf of Mexico. Priority topics include water quality, wetland and coastal conservation and restoration, sediment management, coastal ecosystems and environmental education.

ASTPO helps the Gulf region respond to disasters such as the Deepwater Horizon oil spill, tornadoes and flooding. When the Morganza and Bonnet Carré spillways were opened in 2011 to prevent Mississippi River flooding in Baton Rouge and New Orleans, ASTPO mapped the flooding in the Atchafalaya River basin and the nutrient-rich sediment plumes flowing into the Gulf. When a super cell spawned dozens of tornadoes across the southeastern United States in April 2011, ASTPO used satellite data to identify tornado tracks and areas heavily damaged by the storms.



During the Deepwater Horizon oil spill, ASTPO acquired data to understand the impact of the spill on the barrier islands, collected various samples to evaluate oil spill mitigation and remediation technologies, and helped coordinate NASA and state operations to detect the oil slick and understand its impact on critical habitats.

ASTPO researchers use data from multiple satellites, aircraft, buoys, monitoring stations and computer models to observe coastal marshes, barrier islands, estuaries, fields and forests; to detect threats to critical habitats; and to evaluate conservation, restoration and management strategies. Working with local, state and federal partners, ASTPO scientists address problems across the Gulf and apply the lessons learned to issues throughout the nation and around the world.

In all ASTPO efforts, the goal is clear: use NASA expertise to solve real-world problems.

outreach

stennis space center

Stennis Space Center conducts a variety of outreach activities aimed at informing and educating the public about the nation's space program and the range of work performed at the facility to support that mission.

Stennis offers bus tours of America's largest rocket engine test complex. Tours originate at the new INFINITY visitor center at I-10, Exit 2. Vistor center staff members also support special events throughout the region to provide information and hands-on activities for adults and children alike.

NASA's Speakers Bureau Program at Stennis regularly provides scientists, engineers and other employees for lectures and presentations to civic groups and schools along the Mississippi Gulf Coast and throughout southeast Louisiana. Topics of interest include space shuttle main engine testing work, aerospace engineering, propulsion systems technology, remote sensing applications, technology transfer, the benefits of the space program spinoffs in society, NASA education programs and the economic impact of Stennis Space Center.

Members of the media are frequent visitors to Stennis Space Center, and the facility periodically hosts an open house for the general public. The 72,000-square-foot INFINITY facility provides an interactive, informative look at the work under way at Stennis, rated as the best place to work in NASA, one of the best among all federal agencies and undeniably one of the most interesting and exciting sites in all of the world.

education

stennis space center

There is no mistaking the goal of the Stennis Education Office – to inspire and enable a new generation of science, engineering and space leaders. To that end, the Stennis education team focuses squarely on promoting science, technology, engineering and mathematics (STEM) training, learning and careers. The aim is emphasized and advanced through a variety of efforts and initiatives.

Each year, the Stennis Education Office sponsors weeks and weekends of space-related camps for children and young people through its Astro Camp and Astro STARS programs. All of the sessions use hands-on activities to teach math and science principles and explore science and space-related career possibilities. The goal of the camps is to spark children's imaginations about space exploration in the hope that they choose to take part in America's vision to explore worlds beyond this one.

In addition, the Stennis office provides annual support to *FIRST*® LEGO® and *FIRST*® Robotics activities, which have proven an invaluable training ground for students. The education team provides funding, judges, mentors and volunteers for the annual student competitions.

The Stennis office also sponsors a variety of teacher workshops throughout the years, all geared toward introducing educators to available NASA resources and equipping them to use the teaching tools in their classrooms. The workshops are held both on-site and at off-site locations throughout the Louisiana-Mississippi region.

For higher education students and teachers, the Stennis Education Office offers a wide range of fellowship, internship and study programs. All involve STEM activities and place a heavy emphasis on introducing participants to real-life research and work environments.

In recent years, the Stennis education team has widened its focus by producing a trio of curricula that are available electronically for use in classrooms around the world. The curricula focus on such topics as explaining mass and weight to students, using sports to explain Newton's Laws of Motion and exploring nutrition-related issues by examining food in space. The curricula have been widely acknowledged, with the Mass vs. Weight materials even supported by a live video feed that gave local students a chance to talk to astronauts aboard the orbiting International Space Station and ask them questions about living in space.

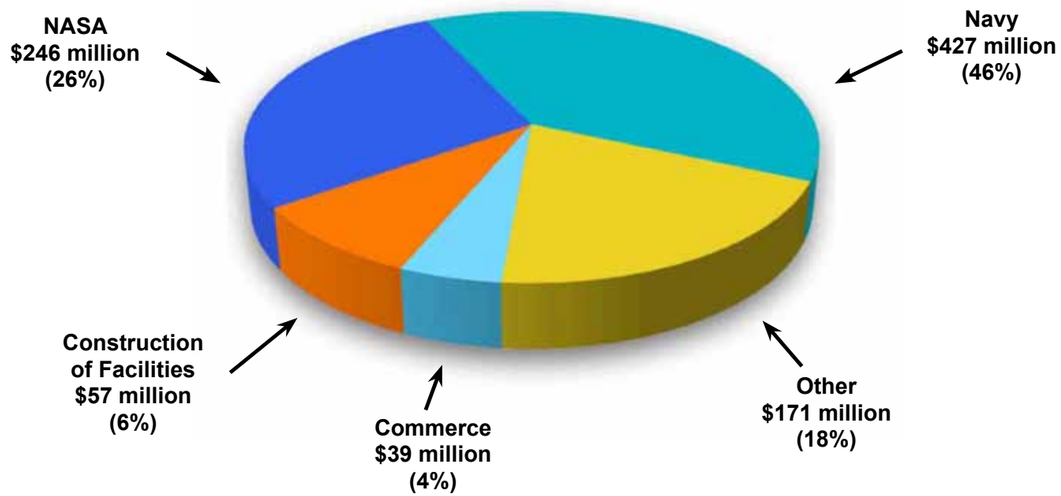
In addition to annual scheduled events, the Stennis education team supports a wide variety of special events each year, providing hands-on demonstrations and presentations. Team members also partner regularly with local schools on special projects, all intent on inspiring students to pursue studies and careers that will make them supporters and leaders of the American space program of tomorrow.

Photos: (Page 14) Louisiana and Mississippi science teachers participate in a hands-on exercise during an educator workshop co-sponsored by the Stennis Education Office. (Page 15) An area student prepares to ask a question of International Space Station astronauts during a Stennis Space Center live video link from space.

2013 economic impact

stennis space center

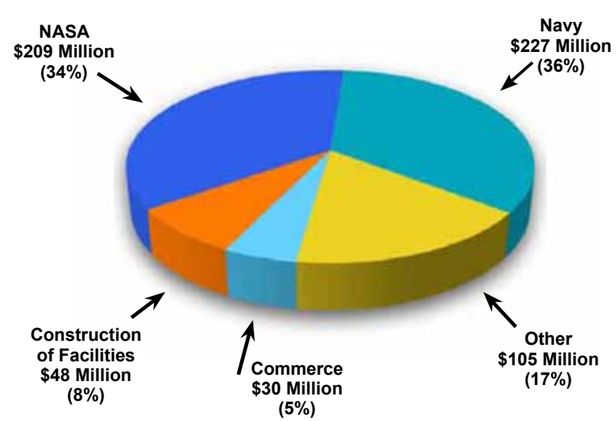
Direct Global Economic Impact – $940 Million



Direct Economic Impact 50-mile Radius – $619 Million

Stennis Space Center is a significant source of employment and income in its local area. If Stennis had not been in operation in 2013, considering direct and indirect effects, a very conservative estimate of reduction in employment for the local area would be more than 19,000 jobs; personal income would have been reduced by about $999.2 million; and retail sales would have been reduced by almost $460 million. It is estimated Stennis had an impact of almost $70 million on state and local government tax revenue.

**Study by Dr. Charles A. Campbell, professor emeritus of economics, Mississippi State University, January 2014.*

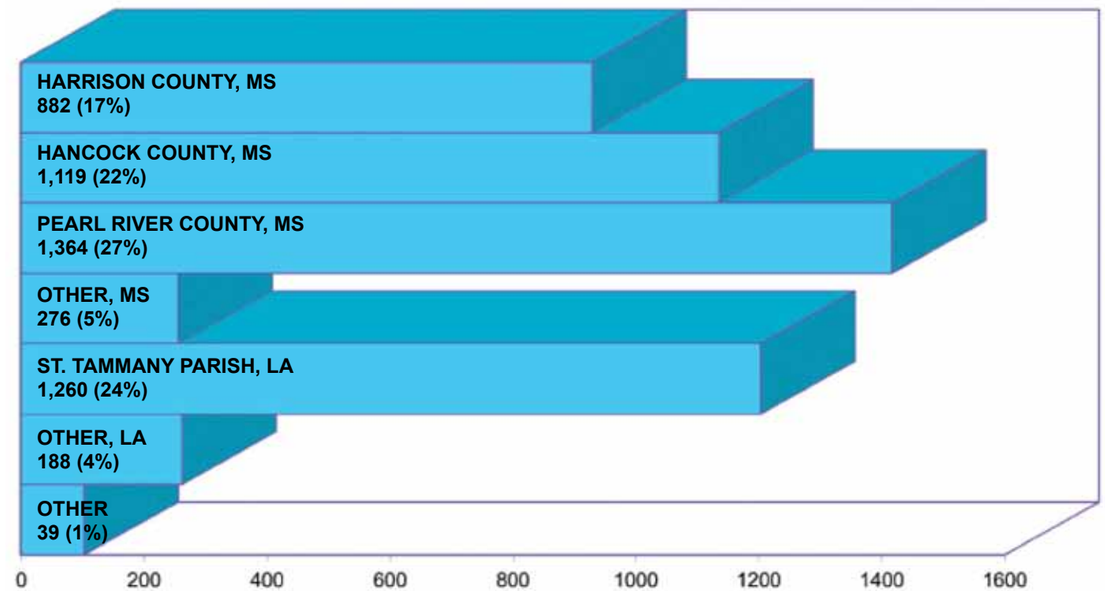


Workforce*

- NASA and contractors – 2,008
  (Stennis federal civil servants, 453; contractors and other, 1,555)
- Department of Navy and contractors – 1,948
- Department of Commerce and contractors – 172
- Other Resident Agencies – 1,000

*Totals as of Sept. 30, 2013

Residential Distribution of Stennis Personnel



Employee Skills

- Scientific/Engineering – 30%
- Business/Professional – 21%
- Technical/Crafts/Production – 21%
- Clerical – 11%
- Other – 17%

Education Levels (All Employees)

- Doctorate – 4%
- Masters – 14%
- Bachelors – 29%
- Associates – 13%
- Some College – 18%
- High School Diploma – 21%
- Other – 1%

NASA conducts a test of the next-generation J-2X rocket engine on the A-2 Test Stand at Stennis Space Center on Dec. 6, 2013.

INFINITY
SCIENCE CENTER
A NASA Visitors Center

Visitors to the 72,000-square-foot INFINITY Science Center enter a world where discovery truly is endless. View up-close the work conducted at Stennis Space Center, the nation's largest rocket engine test facility and a unique federal city of more than 30 agencies and organizations.

See how many of the agencies touch everyday life through exhibits such as coastal research in the Gulf of Mexico, a tsunami buoy, submarines, a U.S. Navy riverine training boat and an interactive view of ocean life.

Learn about exploration from the early days of seafaring nations to modern-day space travel in the Great Nations Dare to Explore exhibit. Take a mesmerizing journey at Science on a Sphere and explore the tracks of hurricanes, the surface of the sun or Mars and much more.

Look to the stars in the Space Gallery, and discover how space travel has evolved over the past 50 years. See the space suit Biloxi, Miss., native Fred Haise wore during the historic Apollo 13 mission. Explore life aboard the International Space Station in a full-scale ISS module. Discover NASA's plans for astronauts to travel deeper in space than ever before using its new launch vehicle currently in development, the Space Launch System, which will carry the Orion spacecraft.

Experience the shake, rattle and roar of a real rocket engine test or take a journey on the motion simulator ride. Take your photo in a space suit on the surface of Mars or view real 3-D images of the Red Planet.

Join a bus tour of Stennis Space Center and see the massive test stands used to test the engines that propelled humans to the moon and powered each of the space shuttle missions. Today, the stands are testing the engines for the Space Launch System, as well as commercial companies.

Experience all this and more when visiting INFINITY at NASA Stennis Space Center!

(Top left photo)
Eden Landis looks skyward while "wearing" a NASA space suit like those worn by contemporary astronauts.

(Top right photo)
Mississippi First Lady Deborah Bryant views an encased moon rock on display at INFINITY Science Center

(Left photo)
Students from Benjamin E. Mays Preparatory School in New Orleans help harvest lettuce grown in the Controlled Environment Agriculture unit at INFINITY.

stennis history

stennis space center

May 25, 1961 President John F. Kennedy sets a goal of sending humans to the moon by the end of the decade.

Oct, 25, 1961 NASA announces its decision to establish a national rocket test site in Hancock County, Mississippi.

May 17, 1963 Workmen cut first tree to start construction of Stennis.

April 23, 1966 First Saturn V rocket booster (S-II-T) is tested at Stennis.

Sept. 9, 1970 NASA announces Earth Resources Laboratory will locate at Stennis.

March 1, 1971 NASA announces Stennis will test space shuttle main engines.

May 19, 1975 Stennis conducts first space shuttle main engine test, beginning a series that will last 34 years and involve all of the major test stands at times.

May 28, 1976 Flag-raising ceremony marks move of the Naval Oceanographic Program to Stennis.

April 21, 1978 Stennis conducts first test of the Space Shuttle Main Propulsion Test Article, firing three shuttle main engines simultaneously.

Jan. 18, 1989 Construction begins on the Component Test Facility, now the versatile E Test Complex.

Aug. 20, 1990 For the first time, space shuttle main engine tests are conducted on all three test stands in one day.

Dec. 30, 1991 NASA designates Stennis Space Center as the Center of Excellence for large propulsion system testing.

July 24, 1992 Stennis conducts its 2,000th space shuttle main engine test.

May 30, 1996 NASA designates Stennis Space Center as the lead center to manage agency capabilities and assets for rocket propulsion testing.

Feb. 21, 1997 Stennis is designated NASA's lead center for implementing commercial remote sensing activities.

Aug. 5, 2002 Three new facilities open at Stennis, collectively valued at more than $60 million – the Lockheed Martin Mississippi Space and Technology Center, the Naval Small Craft Instructional and Technical Training School and Special Boat Unit TWENTY-TWO, and the Naval Oceanographic Office Warfighting Support and Survey Operations Center.

Jan. 21, 2004 The space shuttle main engine achieves a significant milestone during a Stennis test – 1 million seconds of test and flight operations.

Aug. 29, 2005 Hurricane Katrina makes landfall, its eye passing directly over Stennis.

April 21, 2006 Stennis marks the 40th anniversary of the facility's first engine test.

Dec. 18, 2007 Stennis conducts "chill test" on the A-1 Test Stand to begin an initial series of tests on Powerpack 1A, to be used on the next-generation J-2X rocket engine being developed to carry humans into deep space.

Oct. 22, 2008 Stennis conducts a flight certification test on space shuttle main engine No. 2061, installed on the A-2 Test Stand. It is the last space shuttle main flight engine to be built for the Space Shuttle Program.

July 29, 2009 The last test of a space shuttle main engine is conducted at the A-2 stand.

Nov. 10, 2010 Stennis conducts the first successful test firing of the Aerojet AJ26 engine for Orbital Sciences Corporation, which has partnered with NASA to provide cargo space flights.

July 14, 2011 Stennis conducts an ignition test on new J-2X rocket engine, marking the third major testing series for the historic A-2 Test Stand.

Oct. 25, 2011 Stennis culminates a yearlong celebration of its 50th anniversary on the day NASA announced plans in 1961 to build the rocket engine test facility in south Mississippi.

Nov. 9, 2011 NASA conducts a milestone 500-second test of the J-2X rocket engine at Stennis. The eighth test in the series, it marks the fastest a U.S. engine program has achieved flight-duration firing.

Nov. 16, 2011 The 2011 U.S. Office of Personnel Management's Employee Viewpoint Survey ranks Stennis as the best place to work in NASA and second out of all federal agency subcomponents. Stennis will earn the same standing in 2012 and 2013 as well.

April 13, 2012 The ribbon is cut to open the INFINITY Science Center, a 72,000-square-foot facility featuing space and Earth science artifacts and activities.

July 24, 2012 NASA engineers conduct a 1,350-second test of the J-2X power pack at Stennis, marking the longest-duration test firing in the facility's A Test Complex. The test breaks a record of 1,150 seconds set on June 8.

Nov. 5-9, 2012 NASA records an historic week in the E Test Complex at Stennis, conducting tests on three different rocket engines/components on three E Complex test stands. The 27 total tests include firings on all three stands during a 24-hour period Nov. 6-7 and a nine-hour-plus period on Nov. 8.

Aug. 16, 2012 Stennis marks a historic moment with the first instance of two female engineers conducting rocket engine tests on the same day at the facility.

May 13, 2013 NASA installs J-2X engine No. 10002 on the A-1 Test Stand at Stennis for a series of gimbal, or pivot, tests. It marks the first full engine to be installed on the test stand in almost a decade.

Jan. 9, 2014 Orbital Sciences Corporation launches an Antares rocket and Cygnus spacecraft on the first of eight planned cargo missions to the International Space Station under NASA's Commercial Resupply Services contract. The core stage of the vehicle is powered by two Aerojet Rocketdyne AJ26 engines tested at Stennis.

stennis facts

stennis space center

Historical facts

- NASA announced plans to open a rocket engine test facility in Hancock County on Oct. 25, 1961.
- Construction of Stennis facilities necessitated relocation of 660 families to other areas.
- Tree-cutting for construction of rocket engine test facilities at Stennis began May 17, 1963.
- At the height of construction of Stennis facilities in the 1960s, some 6,100 employees were on-site with 30 prime and 250 subcontractor companies.
- Rocket scientist Dr. Wernher von Braun affirmed the importance of Stennis by stating, "I don't know yet what method we will use to get to the moon, but I do know that we have to go through Mississippi to get there!"
- NASA first called its test facility Mississippi Test Operations, then Mississippi Test Facility and National Space Technology Laboratories. On May 20, 1988, President Ronald Reagan named the site in honor of U.S. Sen. John C. Stennis of Mississippi.

Stennis Space Center

- Stennis features seven-and-a-half miles of canal waterways, which include a lock-and-dam system needed to transport large rocket stages and cryogenic barges to and from the Gulf of Mexico via the Pearl River.
- All Stennis facilities are located within a 13,800-acre "fee" area owned by the federal government. The Stennis fee area is surrounded by a 125,000-acre noise buffer zone, which has been designated as a national asset.
- In April 2008, the American Institute of Aeronautics and Astronautics named Stennis a historic aerospace site.
- Stennis facilities have been affected by numerous tropical storms, including three major hurricanes – Hurricane Betsy in 1965, Hurricane Camille in 1969 and Hurricane Katrina in 2005.
- The INFINITY at NASA Stennis Space Center facility features informative and interactive exhibits, including a moon rock and space program artifacts.
- In 2009, Stennis unveiled an "all hazards network" system (HazNet) that provides comprehensive information in emergency situations. Developed through NASA's Innovative Partnerships Program, the system has been adopted at all NASA centers, as well as by several area communities.

Propulsion testing

- Stennis is America's largest rocket engine test facility, with test structures valued at more than $2 billion.
- NASA's Rocket Propulsion Test Program Office at Stennis manages test facilities across the agency.
- The three major test stands at Stennis are the single-position, vertical-firing A-1 and A-2 tests stands, and the dual-position, vertical-firing B-1/B-2 Test Stand. The versatile three-stand E Test Complex includes seven separate cells capable of various test activities.
- Stennis is among the world's largest consumers of liquid hydrogen – a primary fuel in rocket propulsion testing.
- On Aug. 8, 1998, all four test positions at Stennis were occupied for the first time in the center's history.

Apollo Program

- First- and second-stage Saturn V rocket boosters for NASA's Apollo Program were tested at Stennis, including those that propelled humans to the moon on seven lunar missions from 1969 to 1972.
- Stennis engineers conducted the first rocket engine test at the facility on April 23, 1966, a 15-second firing of a Saturn V second stage prototype (S-II-C).
- During the Apollo Program years, Stennis engineers conducted 45 test firings. The accumulated experience of the test team members amounted to 2,475 years of rocket engine test expertise.
- The Stennis team tested 27 Saturn V rocket stages in the Apollo years. All that were launched performed their missions without failure.

Space Shuttle Program

- Stennis engineers conducted the first full-duration test of a space shuttle main engine June 24, 1975.
- All of the main engines used on 135 space shuttle flights were tested at Stennis. Every modification and configuration of space shuttle main engines also was tested and proven flight-worthy at Stennis before being used on a mission.
- In April 1978, Stennis conducted the first test of the Space Shuttle Main Propulsion Test Article with three main engines configured as they are on a space shuttle orbiter during flight. All three main engines were fired simultaneously on the B-2 Test Stand to prove the space shuttle propulsion system flight-worthy. Many consider the propulsion system testing as one of Stennis' finest hour.
- Space shuttle main engines at Stennis were test fired for about eight-and-one-half minutes (520 seconds), the amount of time the engines must fire during an actual flight.
- On Aug. 20, 1990, for the first time ever, space shuttle main engines were tested on all three large test stands in a single day.
- The 1 millionth second of space shuttle main engine firing was recorded at Stennis on Jan. 24, 2004, during a test conducted on the A-2 Test Stand.
- Stennis conducted the last test of a space shuttle main engine on July 29, 2009.

Current and future testing

- In 1998, Stennis partnered with Pratt & Whitney Rocketdyne (now Aerojet Rocketdyne) to test RS-68 engines used for Delta IV rocket launches. It marked the first longterm commitment to allow Stennis engine test facilities to be used for commercial purposes. Testing of RS-68 engines continue on the site's B-1 Test Stand.
- Two test stands are currently involved in testing for NASA's new Space Launch System (SLS). RS-25 engines to power the SLS core stage will be tested on the A-1 Test Stand. The core stage itself will be tested on the B-2 Test Stand with the simultaneous firing of four RS-25 engines.
- In 2010, NASA partnered with Orbital Sciences Corporation to test Aerojet Rocketdyne AJ26 rocket engines to power commercial cargo flights to the International Space Station at Stennis. In 2013, Space Exploration Technologies Corporation (SpaceX) announced it will test its Raptor methane rocket engines at Stennis as well.

Federal city

- Stennis is a federal city, home to more than 40 federal, state, academic and private organizations and several technology-based companies. The entities share the cost of owning and operating the Mississippi facility, making it more cost-effective for each one to accomplish its independent mission.
- Since 1998, the U.S. Navy has conducted training for the Special Boat Team TWENTY-TWO special ops riverine force on Stennis waterways.
- Stennis is home to the largest concentration of oceanographers in the world.

timeline

stennis space center

May 25, 1961 ... President John F. Kennedy challenges the United States to send humans to the moon and return them safely by the end of the decade.

Oct. 25, 1961 ... NASA publicly announces plans to build a rocket engine test facility in Hancock County. On Dec. 18, the facility is officially named Mississippi Test Operations.

July 1, 1965 ... NASA renames its Mississippi Test Operations site the Mississippi Test Facility.

May 17, 1963 ... Construction workers cut the first tree to start clearing an area for NASA's new rocket engine test facility.

April 23, 1966 ... The space age arrives in Hancock County as operators at NASA's Mississippi Test Facility conduct the first-ever Saturn V rocket booster (S-II-T) test on the A-2 Test Stand.

July 29, 1969 ... Astronaut Neil Armstrong becomes the first human to set foot on the moon. His Apollo 11 mission is powered by first- and second-stage Saturn V rocket boosters tested at the Mississippi Test Facility.

Sept. 9, 1970 ... NASA announces its Earth Resources Laboratory will be located at the Mississippi Test Facility.

March 1, 1971 ... As the Apollo Program ends, NASA assigns responsibility for testing space shuttle main engines to the Mississippi Test Facility.

June 14, 1974 ... The Mississippi Test Facility is renamed National Space Technology Laboratories.

May 28, 1976 ... A flag-raising ceremony marks official move of the Naval Oceanographic Program to National Space Technology Laboratories.

March 1978 ... Earth Resources Laboratory Applications Software is developed at National Space Technology Laboratories and implemented worldwide.

May 19, 1975 ... The first-ever space shuttle main engine is test-fired at National Space Technology Laboratories.

April 21, 1978 ... The first test of the Space Shuttle Main Propulsion Test Article is conducted, which involves simultaneously firing three space shuttle main engines arranged in flight configuration.

April 12, 1981 ... Columbia launches from Kennedy Space Center on the first flight of NASA's Space Shuttle Program. It is powered by three main engines tested at Stennis.

Feb. 25, 1988 ... Operators at National Space Technology Laboratories conduct the 1,000th test firing of a space shuttle main engine.

May 20, 1988 ... National Space Technology Laboratories is renamed the John C. Center Space Center to honor the longtime U.S. senator from Mississippi who was instrumental in establishment and growth of the rocket engine test facility.

Aug. 20, 1990 ... Space shuttle main engine tests are conducted for the first time on all three Stennis test stands on the same day.

Dec. 30, 1991 ... NASA designates Stennis as the Center of Excellence for large propulsion system testing.

July 24, 1992 ... Stennis conducts its 2,000th test firing of a space shuttle main engine.

May 1, 1994 ... Management of the space shuttle main engine test operations program is transferred from NASA's Marshall Space Flight Center in Huntsville, Ala., to Stennis Space Center.

May 30, 1996 ... NASA designates Stennis as its lead center to manage capabilities and assets for rocket propulsion testing.

Feb. 21, 1997 ... Stennis is designated as NASA's lead center for implementing commercial remote sensing activities.

Aug. 8, 1998 ... All four test stands – A-1, A-2 and B-1/B-2 – are occupied for the first time.

July 27, 1998 ... Activation is initiated on the E-1 Component Test Facility, a world-class, high-pressure cryogenic test structure at Stennis Space Center.

Jan. 21, 2004 ... A test firing at Stennis marks 1 million seconds of space shuttle main engine test and flight operations.

Aug. 5, 2002 ... Ribbons are cut on three new Stennis facilities, valued at more than $60 million – for Lockheed Martin, the U.S. Navy and the Naval Oceanographic Office.

Aug. 29, 2005 ... Hurricane Katrina makes landfall, battering southeast Louisiana and the Mississippi Gulf Coast. Tracking maps show the storm's eye passing directly over Stennis Space Center, inflicting damage to several facilities. After the storm, Stennis serves as key relief/recovery location for area residents.

Aug. 11, 2005 ... Stennis marks 30 years of space shuttle main engine testing with an afternoon firing on the A-2 Test Stand.

April 21, 2006 ... A space shuttle main engine test marks the 40th anniversary of rocket engine testing at Stennis Space Center.

timeline

stennis space center

Sept. 29, 2006 ... The final space shuttle main engine test on the A-1 Test Stand is conducted. In early November, the stand is officially handed over to begin testing the next-generation J-2X engine.

June 2, 2009 ... NASA officials and visiting dignitaries open the new Emergency Operations Center at Stennis Space Center to house the facility's medical clinic, fire department, security services, energy management control system and incident command post.

Aug. 2010 ... The Stennis Education Office develops Mass vs. Weight, its first-ever teaching curriculum. It offers a series of hands-on activities for grades 5-8 to help educate students about mass and weight concepts. A year later, in support of the new curriculum, Stennis hosts area students to dialogue with International Space Station astronauts during the facility's first-ever live video feed from the orbiting ISS.

July 26, 2011 ... Stennis operators conduct a successful ignition test of the next-generation J-2X rocket engine. The test signals launch of the third major test series on the historic A-2 Test Stand.

May 2, 2011 ... The main administration building at Stennis Space Center is named in memory of late site Director Roy S. Estess.

Oct. 25, 2011... Stennis culminates a yearlong celebration of its 50th anniversary on the day in 1961 that NASA publicly announced plans to build the rocket engine test facility in south Mississippi. The day's activities included burial of a time capsule to be opened on the center's 100th anniversary in 2061.

April 11, 2012 ... The ribbon is cut to open the INFINITY Science Center facility. The 72,000-square-foot NASA visitor center features space and Earth science artifacts and activities.

Oct. 22, 2008 ... Stennis' A-2 Test Stand team conducts a final certification test on engine No. 2061, the last space shuttle main flight engine scheduled to be built.

Nov. 10, 2010 ... Stennis conducts first successful test of the Aerojet AJ26 engine for Orbital Sciences Corporation. The engines will power commercial cargo transport flights to the International Space Station.

July 29, 2009 ... The final space shuttle main engine is tested at Stennis Space Center, ending 34 years of testing flight engines for 135 shuttle missions.

May 2011 ... The Stennis Applied Science and Technology Project Office provides invaluable satellite data on water and sediment flow after Louisiana officials open the Morganza and Bonnet Carre spillways to control Mississippi River flooding.

Aug. 11, 2011 ... The visit of the STS-135 space shuttle Atlantis crew marks the close of NASA's Space Shuttle Program for Stennis Space Center. The crew returned to Earth on July 21, completing the final flight in the 30-year shuttle program.

Aug. 18, 2011 ... Stennis hosts its first live video link from space. Students from four Louisiana and Mississippi schools gather at the center to talk with astronauts aboard the International Space Station.

Nov. 16, 2011 ... The 2011 U.S. Office of Personnel Management's Employee Viewpoint Survey ranks Stennis as the best place to work in NASA and second out of 240 federal agency subcomponents.

Nov. 9, 2011 ... NASA conducts a milestone 500-second test on the J-2X rocket engine at Stennis. The engine was tested at 100 percent power in just four tests and achieved the full flight-duration test of 500 seconds in its eighth test, faster than any other U.S. engine program in history.

April 11, 2012 ... Mississippi Gov. Phil Bryant announces the National Oceans and Applications Research Center will locate at Stennis Space Center. The world-class facility will harness the resources of NASA, the National Oceanic and Atmospheric Administration and U.S. Navy teams to give scientists a "space-to-sea floor" understanding of the Gulf of Mexico and other oceans.

timeline

stennis space center

Aug. 20, 2012 ... Stennis marks a historic moment with the first instance of two female engineers conducting rocket engine tests on the same day at the facility.

Nov. 5-9, 2012 ... NASA records a historic week in the E Test Complex at Stennis Space Center, conducting tests on three different rocket engines/components on three E Complex test stands. The 27 total tests included firings on all three stands during a 24-hour period Nov. 6-7 and a nine-hour-plus period on Nov. 8.

Dec. 18, 2013 ... For the third year in a row, Stennis ranks at the top of NASA centers and second out of 300 federal agency subcomponents as the best place to work in the federal government, according to a Partnership for Public Service survey.

July 24, 2012 ... NASA engineers conduct a 1,350-second test of the J-2X powerpack at Stennis Space Center, marking the longest-duration test firing in the facility's A Test Complex. The test broke a record of 1,150 seconds, which engineers had set just weeks earlier during a June 8 powerpack firing.

April 20, 2012 ... NASA Administrator Charles Bolden presents the space agency's Small Business Administrator's Cup Award to Stennis Space Center in recognition of its stellar small business program for fiscal year 2011. It marked the first time the center has received the NASA award.

Sept. 9-13, 2013 ... NASA engineers conduct three days of tests on a fourth-generation HD4B engine for the Morpheus lander on the E-3 Test Stand, including several tests using a 3-D-printed nozzle. The engine is designed to power a prototype planetary lander that could evolve to carry cargo and technologies safely to space destinations such as asteroids and Mars.

Jan. 9, 2014 ... Orbital Sciences Corporation launches an Antares rocket and Cygnus spacecraft on its first of eight planned cargo missions to the International Space Station under NASA's Commercial Resupply Services contract. The core stage of the vehicle is powered by two Aerojet Rocketdyne AJ26 engines tested at Stennis.

and the journey continues ...

spinoffs

stennis space center

Most people do not think of NASA as they watch a major golf tournament or load computer software or select baby food flavors or listen to a news update about land mine removal in a distant country.

They should. Through a variety of spinoff technologies, the 56-year-old American space agency has contributed to all of those areas of everyday life – as well as many, many more.

A NASA "spinoff" refers to space-related technology that has been commercialized with NASA funding, research and/or assistance. NASA spinoffs can be traced to matters as diverse as artificial limbs, heart pumps, anti-icing systems for airplanes, food safety, golf club design, firefighting gear, enriched baby, food safe land mine removal and water purification.

Many of the spinoffs are developed through NASA's Innovative Partnerships Office, which is part of the agency's Office of the Chief Technologist. The Mississippi Enterprise for Technology and the Louisiana Business & Technology Council at Stennis also help companies work with NASA on spinoff possibilities.

Find NASA in your home and everyday world by visiting: www.nasa.gov/city/

Stennis and Stennis-related companies already have partnered to produce valuable spinoffs. When NASA celebrated its 50th anniversary by naming its top 50 spinoffs technologies, Stennis posted two on the list – development of a one-of-its-kind arbitrary shape deformation (ASD) software capability to aid designers and development of the Earth Resources Laboratory Applications Software (ELAS) used worldwide for processing satellite and airborne imagery data into readable and usable information.

In recent years Stennis teamed with a local company to develop a state-of-the-art Real-time Emergency Action Coordination Tool (REACT). The system incorporates maps, reports, Internet-driven data and real-time sensor input into a geographical information system (GIS)-based display to provide comprehensive information during emergency and disaster situations. This allows organizations and officials to collaborate on a coordinated response during events. The REACT system has proven so effective that it has been adopted in all NASA centers and by various area communities.

All in all, NASA spinoffs have contributed – and continue to contribute greatly – to everyday life in ways that few realize.

helpful websites

stennis space center

National Aeronautics and Space Administration

www.nasa.gov
Gain access to the NASA Image of the Day, mission information, video feeds, NASA blogs and much more regarding the American space program.

www.nasa.gov/exploration/systems/sls/
Read the latest about development of NASA's new Space Launch System, being developed to carry humans deeper into space than ever, to such destinations as asteroids and Mars.

John C. Stennis Space Center

www.nasa.gov/centers/stennis/home/index.html
Gain access to the latest news and information about work at Stennis Space Center.

www.ssc.nasa.gov/sirs/scripts/xmlWelcome.pl
Browse the Stennis Image Retrieval System for photographs related to Stennis Space Center work, events and history.

Education Office

www.nasa.gov/centers/stennis/education/index.html
Access the gateway to information about various NASA education programs and opportunities.

http://education.ssc.nasa.gov/astrocamp.asp
Obtain information about Astro Camp activities, including schedule and registration policy.

NASA jobs

http://usajobs.gov
Use keywords and locations to search a database of job vacancies at all or selected federal agencies.

http://intern.nasa.gov
Learn about NASA student research opportunities, internships, fellowships and scholarships.

http://nasajobs.nasa.gov
Learn about NASA job vacancies and career development opportunities and how to apply.

http://nasajobs.nasa.gov/studentopps/default.htm
Gather information on NASA student programs and opportunities, including how to apply for available positions.

http://www.nasa.gov/centers/stennis/about/jobs/index.html
Access information about job vacancies at all major resident agencies located at Stennis Space Center

resident agencies

stennis space center

Government Agencies

NASA

In addition to administrative and Rocket Propulsion Test Program offices, Stennis is home to the NASA Shared Services Center, which provides agencywide, state-of-the-art administrative processing services and customer contact center operations.

Department of Defense

Stennis is home to the U.S. Navy's Meteorology and Oceanography Command, Naval Oceanographic Office, Research Laboratory Detachment, Small Craft Instruction and Technical Training School and Special Boat Team TWENTY-TWO unit.

Department of Commerce

The U.S. Department of Commerce maintains the National Data Buoy Center National Weather Services office at Stennis, as well as the National Coastal Data Development Center and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service office.

Department of the Interior

The U.S. Geological Survey Hydrologic Instrumentation Facility supports hydrologic data collection activities of USGS scientists in all 50 states, Puerto Rico and other U.S. territories. The support includes evaluation and testing of hydrologic instruments and equipment, technical support, training, and instrument acquisition, rental and repair services. The facility's Hydraulic Laboratory, environmental testing chambers, water quality lab, training room, repair shop, warehouse and testing pier on the Pearl River.

Environmental Protection Agency

The U. S. EPA, Office of Pesticide Programs, Biological and Economic Analysis Division's Environmental Chemistry Laboratory provides analytical support for the analyses of foods, as well as environmental and various other samples.

State of Mississippi

The Mississippi Enterprise for Technology Inc. is a private non-profit corporation to facilitate regional economic development by leveraging the resources of Stennis Space Center, the state, and the region to foster business opportunities among public and private entities. MSET operations at Stennis include a small business incubator for young technology businesses and the Mississippi Technology Transfer Office.

State of Louisiana

The Louisiana Business & Technology Center at LSU maintains a Technology Transfer Office at Stennis whose primary mission is to link small businesses and universities with the resources of federal labs, such as NASA at Stennis Space Center.

Education

Center of Higher Learning

Five institutions operate the Center of Higher Learning at Stennis Space Center – Mississippi State University, Pearl River Community College, the University of New Orleans, the University of Southern Mississippi and the University of Mississippi.

Mississippi State University

The Mississippi State University Science and Technology Center houses the Northern Gulf Institute Program Office, MSU faculty and staff, and the National Oceanic and Atmospheric Administration's National Coastal Data Development Center. The MSU personnel focus on atmospheric and ocean science, food safety, and critical ecosystem, watershed, and coastal management issues.

University of Southern Mississippi

A USM facility at Stennis supports the school's Department of Marine Science in the College of Science & Technology. The USM Department of Marine Science provides graduate and undergraduate education as well as basic and applied research in the fields of physical oceanography, geological oceanography, biological oceanography, marine chemistry and hydrographic science.

Major Contractors / Commercial Companies

A^2Research

A^2Research provides laboratory services for NASA and other resident agencies at Stennis through its Measurement Standards and Calibration Laboratory and Science Laboratory. Its work encompasses such areas as calibration, repair, metrology engineering, scientific and environmental services.

ASRC Research and Technology Solutions

ARTS is an engineering, research and technology services company, which partners with Stennis and other facilities to support a range of missions, including aeronautics, aviation, information technology management, and Earth and space sciences.

Jacobs Technology Inc.

Jacobs is responsible for the Facility Operating Services Contract at Stennis, which provides administrative, facility engineering, construction management, food, mail, fire protection, custodial, multimedia, public affairs, education, facility maintenance and operations, safety, quality and environmental, medical and occupational health, procurement, and logistics and transportation services.

Lockheed Martin

Lockheed Martin is a global security company principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The company provides test operations support at Stennis Space Center.

ISS Action

ISS Action is a federally certified 8A woman-owned business based in Jamaica, N.Y. It provides security services at Stennis, including physical security operations, personnel security, access control, badging, 911 dispatch center, access monitoring, traffic control and locksmith services.

Aerojet Rocketdyne

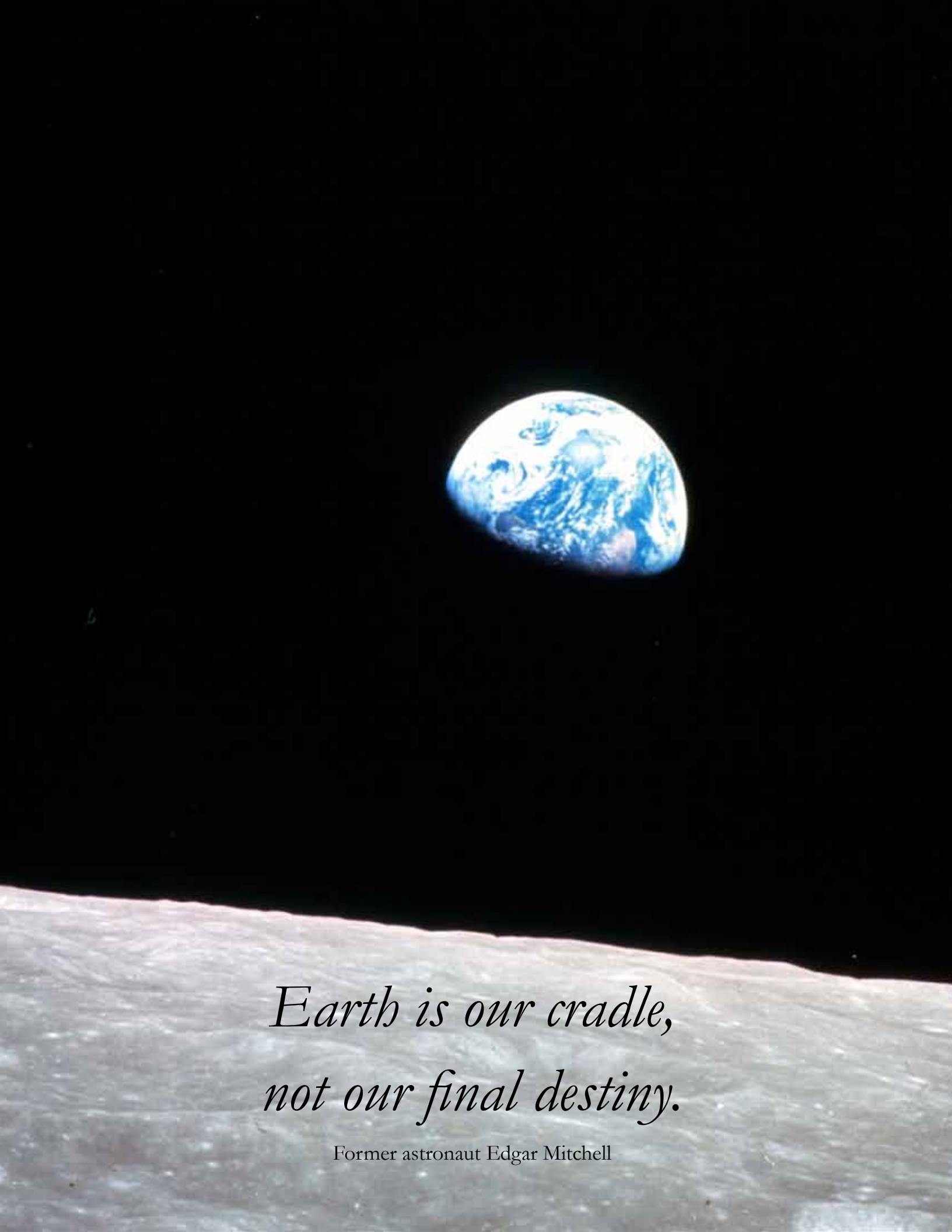
Aerojet Rocketdyne maintains an engine assembly facility at Stennis, which will be used to prepare RS-25 engines for testing and eventual use on NASA's new Space Launch System vehicle. Aerojet Rocketdyne also assembles the RS-68 rocket engines at the engine assembly facility and leases the B-1 Test Stand at Stennis to test these engines, which are used on Delta IV launches for the U.S. Department of Defense.

Science Applications International Corp.

SAIC is a scientific, engineering and technology applications company focused on issues related to national security, energy and the environment, critical infrastructure and health.

Rolls-Royce North America

Rolls-Royce opened its jet engine test facility at Stennis in 2007. The facility is used to test development and prototype jet engines for performance, noise, validation of safety systems and other factors. It is the first Rolls-Royce test facility of its kind outside the United Kingdom and the first built from the ground up in the United States.


Earth is our cradle,
not our final destiny.
Former astronaut Edgar Mitchell