National Aeronautics and Space Administration

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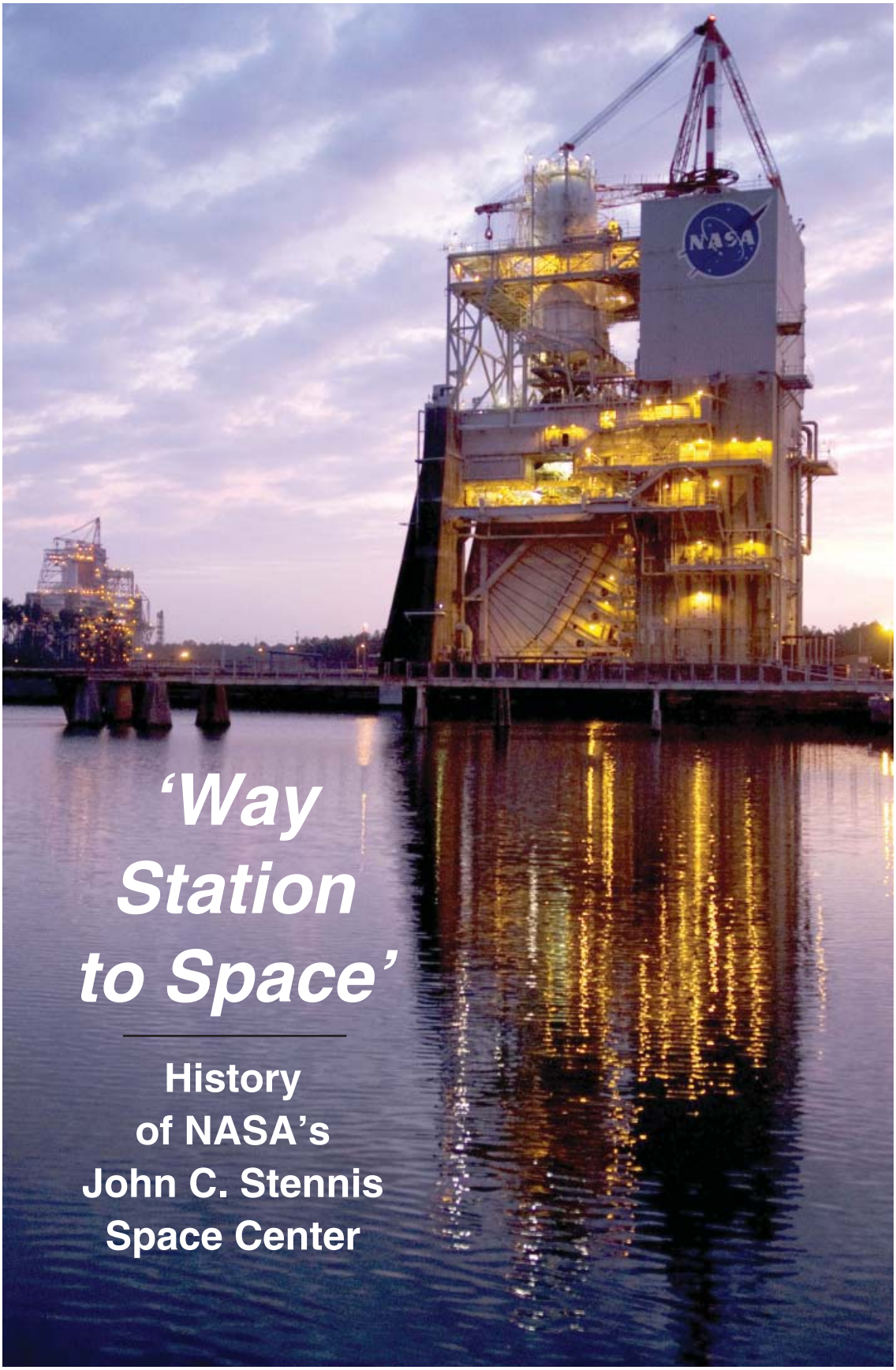


'Way Station to Space'

History of NASA's John C. Stennis Space Center

The beginning

NASA's John C. Stennis Space Center has a rich history in space exploration. Established as Mississippi Test Operations in the early 1960s, the site was designed to test the engines for America's first journeys to the moon aboard the Apollo Program spacecraft. The facility was renamed in 1988 for Mississippi Sen. John C. Stennis, who championed its construction in his home state.

Now the nation's largest rocket engine testing facility, Stennis Space Center has tested all of the main engines for the space shuttle missions and is preparing to test the next generation of rocket engines that will carry astronauts beyond low-Earth orbit again.

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 place was needed to test the powerful engines 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: a site isolated from large population centers, water and road access for transportation needs, public utilities availability, nearby supporting communities and a climate conducive for 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.

At its peak during the summer of 1965, there were 6,100 workers on site, employed by 30 prime and 250 subprime contractors, all involved in construction of facilities and the trio of test stands for the Apollo Program's Saturn V rocket engines. The massive, 200-foot-tall, steel-and-concrete test structures were built to last. Able to withstand thrust loads of more than 1 million pounds and temperatures up to 6,000 degrees Fahrenheit, all three of the original test stands are still in use today.

During those hectic early days of construction, workers also built a seven-and-one-half-mile canal system to connect the test stands to the Pearl River. The canal system was needed for transporting the large Apollo stages from the nearby Michoud Assembly Facility in New Orleans and on to Kennedy Space Center in Florida. It still is used to deliver liquid propellants by barge to the test facility.

Stennis operators conduct the first test-firing of a Saturn V booster stage – a cluster of five F-1 rocket engines – on Aug. 25, 1967.

Despite a pressing schedule, occasional setbacks and even the disruption of Hurricane Betsy in 1965, workers toiled day and night to prevail in their construction 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.

Apollo years

From 1967 until 1972, Stennis test-fired all first and second stages of the Saturn V rocket for the Apollo Program. Michoud Assembly Facility manufactured the large rocket stages. From that nearby New Orleans facility, the stages were barged to Stennis. After testing, the stages were transported by barge once more, this time across the Gulf of Mexico to Kennedy Space Center, Fla., where they were prepared for launch on Apollo missions.

1964: A-2 Test Stand under way

1965: A-2 Test Stand takes shape

1966: Saturn booster stages arrive

1969: S-II booster stage is test-fired

The first test firing on April 23,1966, represented a "vital" milestone for the Apollo Program. Altogether, Stennis conducted 42 tests for the Apollo Program, including ones on all of the engines used on the program's manned missions. The Apollo Program launched three unmanned and 12 manned missions with six actual lunar landings. A dozen astronauts walked on the moon. The first lunar footprints were those of Apollo 11 astronauts Neil Armstrong and Buzz Aldrin on July 20, 1969. The final steps on the moon were taken by Apollo 17 crewmembers Harrison Schmitt and Eugene Cernan on Dec. 14, 1972. They – and their astronaut colleagues who joined the exclusive lunar club on other missions – all were safely transported 240,250 miles to the moon by engines proven flightworthy at Stennis.

Apollo Milestones

- Oct. 11-12, 1968: Apollo 7, first manned mission
- Dec. 21, 1968: Apollo 8, first mission to orbit the moon
- July 16-24, 1969: Apollo 11, first humans walk on moon
- April 11-17, 1970: Apollo 13, mission aborted after oxygen tank rupture. Crew returns safely, including astronaut Fred Haise of Biloxi, Miss.
- Dec. 7-19, 1972: Apollo 17, last lunar landing

Stennis operators conduct the final planned space shuttle main engine test on the A-2 Test Stand on July 29, 2009.

For the next 34 years, Stennis and major contractor Pratt & Whitney Rocketdyne would continue to test every engine used to power the shuttle into orbit. In that time, not a single mission failed because of engine malfunction.

The space shuttle was the first spacecraft able to carry large satellites into orbit and retrieve them. It can orbit Earth at altitudes as high as 330 miles on missions of seven to 16 days, carrying a crew of up to seven. Scientific experiments are conducted in the gravity-free environment. Studies conducted in the shuttle's weightless environment enable research not possible on Earth.

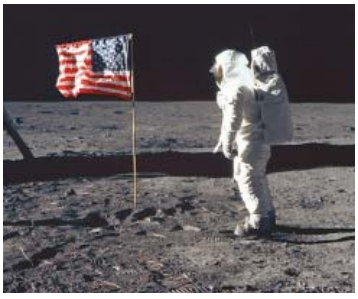
The shuttle has been part of exciting space projects. On April 24, 1990, the space shuttle transported and launched the Hubble Telescope into space, expanding human understanding of the universe. Beginning in 1998, the shuttle began transporting the components to build the International Space Station, an inhabited, scientific laboratory orbiting 250 miles above Earth. Stennis also conducted extensive testing to return the space shuttle to safe flight after the losses of space shuttles Challenger in 1986 and Columbia in 2003.

Space shuttle

After Apollo, NASA announced it would create the world's first reusable spacecraft, the space shuttle. Stennis Space Center was called on to test the new vehicle's main engines. After converting the Apollo test structures, Stennis and contractor General Electric tested the first space shuttle main engine on the A-1 Test Stand on May 19, 1975.

Space Shuttle Milestones

- May 19, 1975: First space shuttle main engine test at Stennis
- April 12-14, 1981: First space shuttle mission; astronauts John Young and Robert Crippen visit Stennis to thank workers for providing a remarkable ride
- Jan. 21, 2004: Stennis marks 1 million seconds of space shuttle main engine testing and launch firings
- July 29, 2009: Last scheduled space shuttle main engine test at Stennis



1969: First astronauts walk on the moon

1995: Test engine rotated

2004: Return to Flight shuttle engine ships out

2006: 40th anniversary of engine testing

The future

In May 2007, NASA announced construction of a new test stand at Stennis Space Center to test the next-generation rocket engines that can return human beyond low-Earth orbit once more. Ground was broken on the project later that year, and work began on the A-3 Test Stand, the first large test-firing structure to be built on site since the 1960s. In April 2009, workers marked a major milestone with final assembly of 4 million pounds and 16 stages of fabricated structural steel on the test stand foundation.

Since next-generation rockets are planned to travel beyond low-Earth orbit, they must be built to start in space. To test that capability, the new 300-foot-tall, open-steel-structure A-3 Test Stand will use a series of chemical steam generators to create simulated altitudes of up to 100,000 feet for testing engines. The stand is scheduled to be completed in 2012.

Completion of the A-3 Test Stand will give Stennis Space Center unique rocket engine testing capabilities. Operators will be able to conduct full-duration tests (the amount of time engines will have to fire during actual flights) on full-scale engines and to gimbal the engines (rotate them in the same way they must move during flight to ensure proper trajectory), all at simulated altitudes of up to 100,000 feet. No other stand in the country allows all three of those aspects at the same time.

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