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LAGNIAPPE

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NASA begins engine test project for SLS rocket

RS-25 rocket engine No. 0525 sits on the deck of the A-1 Test Stand at NASA's Stennis Space Center in preparation for a series of developmental tests. NASA spent almost a year preparing the A-1 stand for the test series, which represents a major milestone in the agency's return to deep-space missions. Once installed, a series of tests on the engine will provide data on engine modifications and the performance of a new controller. RS-25 engines will power the core stage of NASA's new Space Launch System.

"A leader (is) someone who knows the way, goes the way and shows the way. Leadership happens at all levels, so we all can be one of 'them.'"

From the desk of
Pamela Covington
Manager, Office of Communications, Stennis Space Center

I had an awakening moment over the July 4th weekend during a roundtable session with some elders at my family reunion. The eldest, at 91 years young, enabled my "aha" moment. She looked directly at me, called me by name and said it was in my hands. The torch she and other family elders were passing on to the next generation – to carry on the family values, customs and lineage – was in my hands.

"You are the leaders," she charged. "You will do the great things we dream of and so much more."

Wow, that's really deep I thought. Could it be I am becoming one of "them?" I did not notice that my transition to the "them" club had slipped up on me. It is a wonderful association with members having the distinction of being seasoned and of a certain age and of possessing a varied portfolio of knowledge, experiences and accomplishments.

They are better known as leaders.

As we celebrate the 50th anniversary of the Civil Rights Act of 1964 during the month of July, I have reflected on the Stennis workforce composition when I started as a student intern in 1984. I admired many NASA "thems." I gravitated to NASA senior managers at that time – Ted Franklin in finance and John Gasery in safety, the few minorities in senior leadership at the time. Others included Pat Connor in science and Sharon Jeffers in the Human Resources Office. They all served as mentors and models of great leadership.

Dr. Harriet Jenkins mentioned Ms. Ocie Hall during the recent civil rights program at NASA Headquarters. Ms. Hall, a former associate administrator for equal opportunity and diversity, was an ultimate NASA "them." She was my mentor until her passing last year.

All these great individuals passed the leadership torch to so many of us to do the things they dreamed of and paved the way for.

This month marks the 45th anniversary of Apollo 11, so I would be remiss if I did not include Apollo legends among the great NASA "thems." The leadership torch they passed on continues to inspire us to explore deeper into space.

John Maxwell defines a leader as someone who knows the way, goes the way and shows the way. Leadership happens at all levels, so we all can be one of "them."

The torch is in your hands. You just may need an "aha" moment to realize you're in the club!

Pam

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FULFILLING NASA'S EXPLORATION MISSION

RS-25 engine installed on A-1 Test Stand

Engineers have taken a crucial step in preparing to test parts of NASA's Space Launch System (SLS) rocket that will send humans to new destinations in the solar system. They installed on July 17 an RS-25 engine on the A-1 Test Stand at the agency's Stennis Space Center near Bay St. Louis, Mississippi.

The Stennis team will perform developmental and flight certification testing of the RS-25 engine, a modified version of the space shuttle main engine that powered missions into space from 1981 to 2011. The SLS's core stage will be powered by a configuration of four RS-25 engines, like the one recently installed on the A-1 stand.

"This test series is a major milestone because it will be our first opportunity to operate the engine with a new controller and to test propellant inlet conditions for SLS that are different than the space shuttle," said Steve Wofford, SLS Liquid Engines Element manager. "This testing will confirm the RS-25 will be successful at powering SLS."

Early tests on the engine will collect data on the performance of its new advanced engine controller and other modifications. The controller regulates valves that direct the flow of propellant to the engine, which determines the amount of thrust generated during an engine test, known as a hotfire test. In flight, propellant flow and engine thrust determine the speed and trajectory of a spacecraft. The controller also regulates the engine startup sequence, which is especially important on an engine as sophisticated as the RS-25. Likewise, the controller determines the engine shutdown sequence, ensuring it will proceed properly under both normal and emergency conditions.

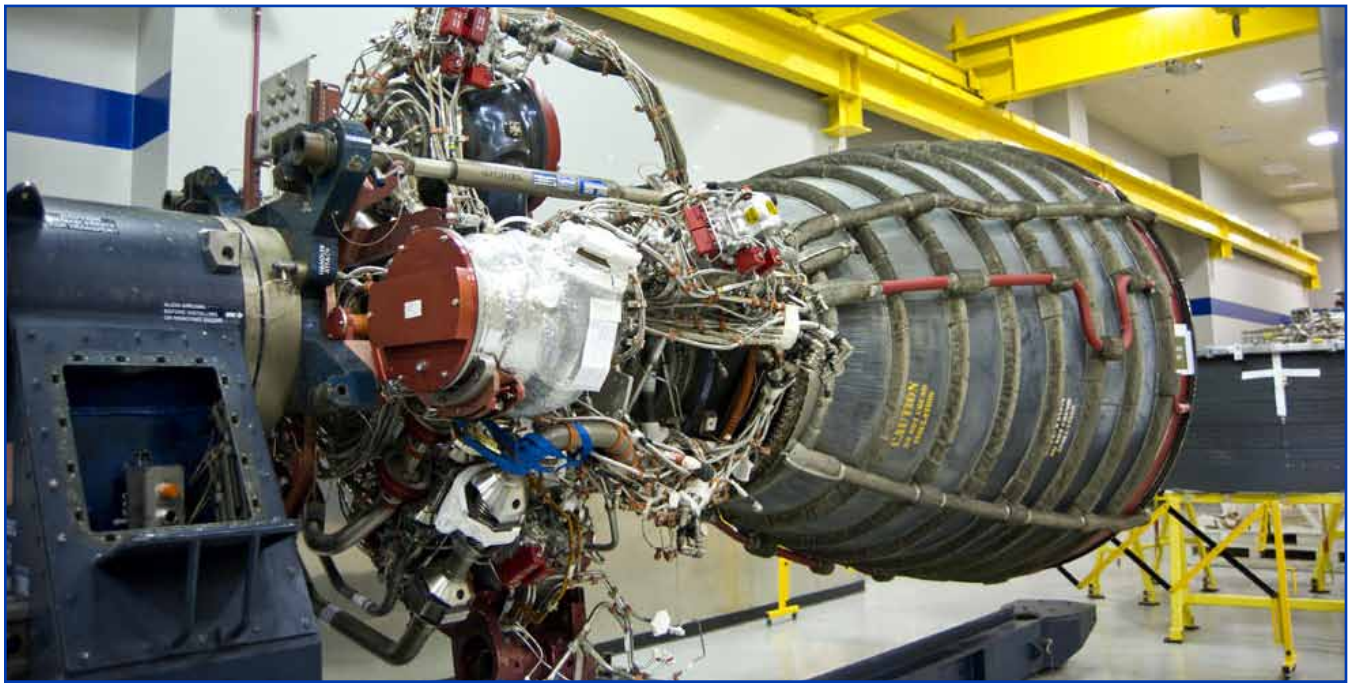
"Installation of RS-25 engine No. 0525 signals the launch of another major rocket engine test project for human space exploration on the A-1 Test Stand," said Gary Benton, RS-25 rocket engine test project manager at Stennis.

The SLS is designed to carry astronauts in NASA's Orion spacecraft deeper into space than ever before, to destinations including an asteroid and Mars. NASA is using existing and in-development hardware and infrastructure, including the RS-25 engine, to the maximum extent possible to enable NASA to begin deep space missions sooner.

Testing of engine No. 0525 begins in the coming weeks on a test stand originally built in the 1960s for Apollo-era engines that helped launch the lunar missions. The stand has since been used for several major testing projects, and NASA spent almost a year modifying the structure to accommodate the RS-25 engine.

The SLS Program is managed at NASA's Marshall Space Flight Center in Huntsville, Alabama. Aerojet Rocketdyne of Sacramento, California, is on contract with NASA to adapt the RS-25 engines for SLS missions.

For information about NASA's SLS Program, visit: http://www.nasa.gov/sls.

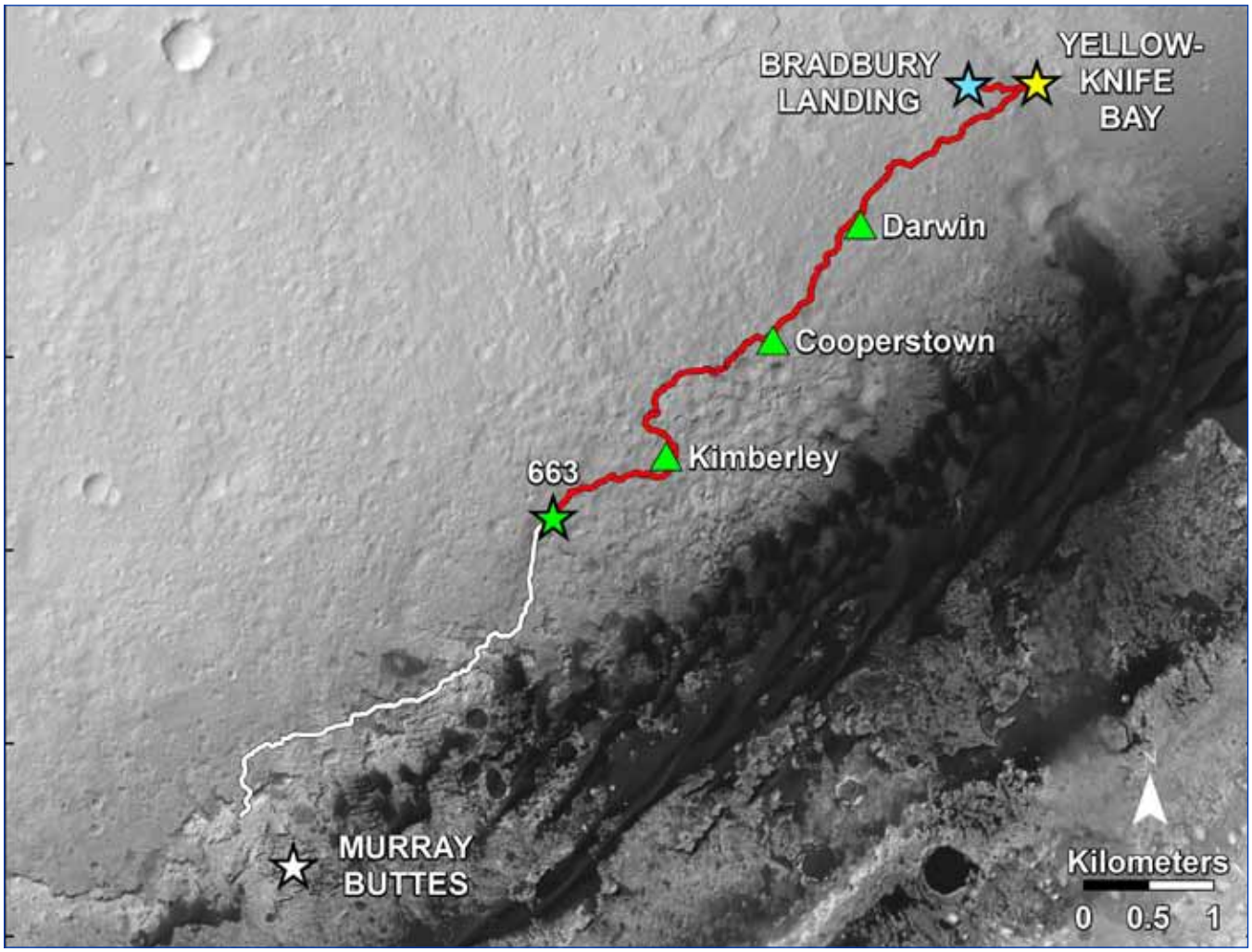


An RS-25 rocket engine is shown in the engine assembly facility at Stennis Space Center.

Orbital launch powered by Stennis-tested engines

The Orbital Sciences Corporation Antares rocket launches (top photo) from Pad-0A with the Cygnus spacecraft onboard July 13, 2014, at NASA's Wallops Flight Facility in Virginia. The Cygnus spacecraft is filled with more than 3,000 pounds of supplies for the International Space Station, including science experiments, experiment hardware, spare parts and crew provisions.

The Orbital-2 mission is Orbital Sciences' second contracted cargo delivery flight to the space station for NASA. Its launch was powered by a pair of AJ26 rocket engines tested at Stennis Space Center. Engine No. 13 (above left photo) was tested at Stennis on Aug. 8, 2013. Engine No. 14 (above right photo) was tested at the south Mississippi NASA center Nov. 19, 2013.



Curiosity completes Martian year of exploration

NASA's Mars Curiosity rover completed a Martian year – 687 Earth days – on June 24, having accomplished the mission's main goal of determining whether Mars once offered environmental conditions favorable for microbial life.

One of Curiosity's first major findings after landing on the Red Planet in August 2012 was an ancient riverbed at its landing site. Nearby, at an area known as Yellowknife Bay, the mission met its main goal of determining whether the Martian Gale Crater ever was habitable for simple life forms. The answer, a historic "yes," came from two mudstone slabs that the rover sampled with its drill. Analysis of these samples revealed the site was once a lakebed with mild water, the essential elemental ingredients for life, and a type of chemical energy source used by some microbes on Earth. If Mars had living organisms, this would have been a good home for them.

Other important findings include: assessing natural radiation levels both during the flight to Mars and on the Martian surface; measurements of heavy-versus-light variants of elements in the Martian atmosphere; and the first determinations of the age of a rock on Mars and how long a rock has been exposed to harmful radiation.

The map above shows in red the route driven by NASA's Curiosity Mars rover from the "Bradbury Landing" location where it landed in August 2012 (blue star at upper right) to nearly the completion of its first Martian year. The white line shows the planned route ahead.

Before Curiosity landed, scientists anticipated that the rover would need to reach Mount Sharp to meet the goal of determining whether the ancient environment was favorable for life. They found an answer much closer to the landing site. The findings so far have raised the bar for the work ahead. At Mount Sharp, the mission team will seek evidence not only of habitability, but also of how environments evolved and what conditions favored preservation of clues to whether life existed there.

For more on Curiosity, visit: http://www.nasa.gov/msl or http://mars.jpl.nasa.gov/msl/.

Individuals also can follow the mission on Facebook at: http://www.facebook.com/marscuriosity and on Twitter at: http://www.twitter.com/marscuriosity.

NASA names Stennis employee attorney of the year

NASA recognized Stennis Space Center employee Wendy L. Houser Bateman of Baton Rouge as its 2014 Attorney of the Year during a May 7 ceremony in San Jose, Calif.

Bateman currently serves as an attorney-advisor at Stennis, the nation's largest rocket engine test center, near Bay St. Louis, Mississippi. She was awarded annual Attorney of the Year honors for exhibiting performance at the highest levels of excellence and achievement. The annual award was presented by NASA General Counsel, Brig. Gen. Michael C. Wholley, USMC (Ret.). NASA Administrator Charles Bolden also attended the award ceremony.

The award citation noted Bateman "exemplified this standard (of excellence and achievement) in every one of the many tasks she took on for Stennis Space Center. Her dedication, energy and talent ensured the success of numerous high-profile and mission-critical tasks."

A native of Huntsville, Alabama, Bateman earned a bachelor's degree at Auburn University before graduating from the University of New Hampshire School of Law. She served as a summer intern in the Stennis Office of the Chief Counsel in 2003 and returned as a fulltime attorney the following year. Her interest in working for NASA was first inspired by her work as a Space Camp crew trainer at the U.S. Space & Rocket Center in Huntsville after completion of her undergraduate studies.

NASA in the News

Webb Space Telescope marks milestone

NASA's James Webb Space Telescope has reached another development milestone with completion of static load testing of its primary mirror backplane support structure (PMBSS), moving the telescope one step closer to its 2018 launch. The PMBSS is the stable platform that holds the telescope's science instruments and the 18 beryllium mirror-segments that form the 21-foot-diameter primary mirror nearly motionless while the telescope peers into deep space. The primary mirror is the largest mirror in the telescope – the one starlight will hit first. The PMBSS is one of the most lightweight precision-alignment truss structures ever designed and built. The James Webb Space Telescope is the world's next-generation space observatory and successor to NASA's Hubble Space Telescope. Designed to be the most powerful space telescope ever built, Webb will observe the most distant objects in the universe, provide images of the first galaxies formed and see unexplored planets around distant stars. For more information about NASA's James Webb Space Telescope, visit: http://www.nasa.gov/webb.

Saturn ocean could be as salty as Dead Sea

Scientists analyzing data from NASA's Cassini mission have firm evidence the ocean inside Saturn's largest moon, Titan, might be as salty as the Earth's Dead Sea. The new results come from a study of gravity and topography data collected during Cassini's repeated flybys of Titan during the past 10 years. Using the Cassini data, researchers presented a model structure for Titan, resulting in an improved understanding of the structure of the moon's outer ice shell. The findings are published in the journal Icarus. For more information about Cassini, visit online at: http://www.nasa.gov/cassini and http://saturn.jpl.nasa.gov.

NASA tests Orion's parachute system

NASA completed the most complex and flight-like test of the parachute system for the agency's Orion spacecraft on June 25. A test version of Orion touched down safely in the Arizona desert after being pulled out of a C-17 aircraft, 35,000 feet above the U.S. Army's Yuma Proving Ground. It was the first time some parachutes in the system had been tested at such a high altitude. The test marked the last time the entire parachute sequence will be tested before Orion launches in December on its first space flight test, EFT-1. An uncrewed Orion will travel 3,600 miles into space, farther than any spacecraft built to carry humans has been in more than 40 years. Orion will travel at the speed necessary to test many of the systems critical to NASA's ability to bring astronauts home safely from missions to deep space. During its return to Earth, Orion will reach a speed of up to 20,000 mph and experience temperatures near 4,000 degrees Fahrenheit. Once Orion has made it through the atmosphere, the parachute system, with two drogue parachutes and three massive main parachutes that together cover almost an entire football field will slow it down to just 20 mph for a safe splashdown in the Pacific Ocean. For more on Orion, visit: http://www.nasa.gov/orion.

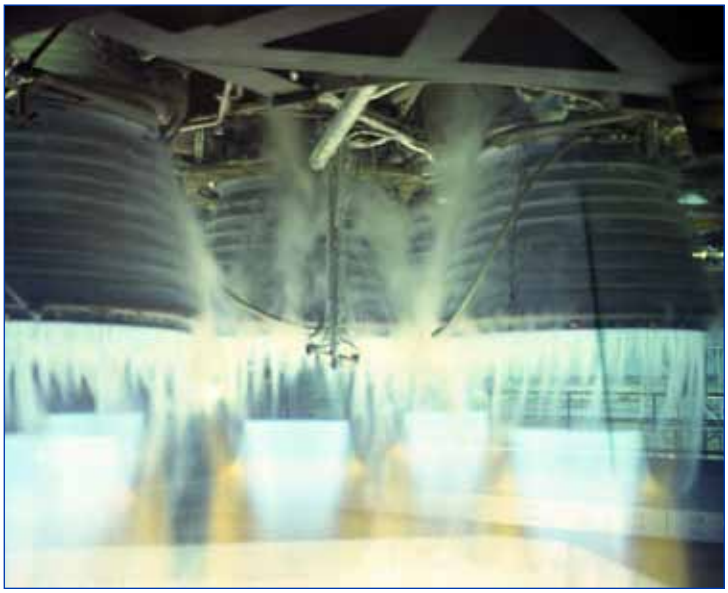
For NASA news releases, visit: www.nasa.gov/news/releases/latest/index.html.

NASA marks 45th anniversary of Apollo 11

Note: For more than 50 years, NASA's John C. Stennis Space Center has played a pivotal role in the success of the nation's space program. This month's Lagniappe provides a glimpse into the history of the south Mississippi rocket engine test center.

"I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."
President John F. Kennedy

It happened on July 20, 1969, when the "Eagle" landed on the moon. Apollo 11 astronauts Neil Armstrong and Edwin E. "Buzz" Aldrin Jr. became the first Americans to land on the moon. "That's one small step for man, one giant leap for mankind," Armstrong said as he stepped onto the lunar surface.



The Saturn engines that carried astronauts Armstrong, Aldrin and Collins on their historic Apollo 11 mission to the moon in 1969 were tested at the then-MTF, now Stennis Space Center.

The nation's historic mission was made possible with the help of rocket engines tested at the then-Mississippi Test Facility, now Stennis Space Center. "Nothing less than perfection could have launched Apollo 11 on its history-making voyage with such flawless precision," said Jackson Balch, who was appointed by Wernher von Braun as the second manager to lead the facility in 1965. "The dramatic flight is especially significant to all of us here because two of the major elements of the Saturn V vehicle – the S-IC and the S-II stages – were checked out and proven flightworthy here at MTF."

In 1969, there were 2,733 employees onsite that comprised not only NASA, but also General Electric, the Boeing Company, North American Rockwell, Rocketdyne and construction workers. At the time, few people outside of Mississippi realized that the small NASA facility located in Hancock County played such a vital role in getting Americans to the moon. The first and second stages of the Saturn V vehicle, which lifted the famed astronauts to the moon, were tested and proven flightworthy by engineers, scientists and professionals who worked at the site.

In observance of Apollo 11's 45th anniversary this month, events and celebrations through the years are recalled, beginning with Armstrong observing the lunar rock brought back from his mission on display at MTF in 1970. Other celebrations included the 15th anniversary appearance of Armstrong, Aldrin and fellow Apollo 11 crew member Michael Collins at Space Day at the World's Fair in New Orleans on July 20, 1984. A record crowd of 13,500 people turned out July 16, 1989, during an open house to help Stennis celebrate the historic voyage's 20th anniversary. For the 35th anniversary, a play titled, "The Eagle Has Landed," was performed at StenniSphere and An Oral History with Apollo 11 Anniversary Roundtable was recorded with interviewees Annette Moran, Prentice "Whitey" Carte, Gloria Jordan and Charlotte Holmes. Hundreds of employees and family members gathered for fun-filled activities July 28, 2009, in celebration of the 40th anniversary.

Now 45 years later, highlights of Apollo-era events leading up to Apollo 11's historic journey are remembered:

- On May 25, 1961, President John F. Kennedy sets a goal to send a man to the moon before the end of the decade.
- On Oct. 25, 1961, NASA announces the decision to build a national rocket test site in Hancock County, Miss.
- On May 17, 1963, workers cut the first tree to start clearing the test area for construction of the Mississippi test facility.
- Construction on the A-2 Test Stand at the then-Mississippi Test Operations site begins in 1964.
- On April 23, 1966, the first Saturn V rocket booster (S-II-T) is tested at the Mississippi Test Facility.
- In 1967, the first stage of the Saturn V rocket undergoes hot firing on the B-2 Test Stand at Stennis Space Center.
- July 16, 1969, Apollo 11 launches from Kennedy Space Center. Crew: Neil Armstrong, commander; Buzz Aldrin, lunar module pilot; and Michael Collins, command module pilot.
- July 20, 1969, Armstrong becomes the first person to walk on the surface of the moon.
- July 24, 1969, Apollo 11 crew returns safely to Earth, landing in the Pacific Ocean.

Office of Diversity and Equal Opportunity

1964 Civil Rights Act opens door to NASA diversity

The following article was submitted by NASA Office of Communications interns Courtney Cackowski and Joshua Finch.

This July marks the 50th anniversary of the signing of the Civil Rights Act of 1964 by President Lyndon B. Johnson. The landmark legislation initiated sweeping changes in areas such as education and employment by prohibiting discriminatory practices on the basis of race, color, religion, national origin and sex.

The Civil Rights Act was a massive victory and a significant step toward creating equal opportunities for all Americans. In the years following passage of the historic legislation, opportunities previously unavailable to women and minorities were filled by quality candidates for the betterment of the country.

NASA provides a great source of reflection to see how far the nation has come. In 1965, even after signing of the Civil Rights Act, four women applied to be selected for the astronaut corps, yet none were chosen. By 1978, the culture at NASA was changing with the selection of three African Americans, six women and one Asian American as members of that year's astronaut class. Today, women and minorities have served America's space program in every facet imaginable, as astronauts, lawyers, engineers, scientists, principal investigators and administrators.

NASA is a world-leading driver of innovation, and diversity is an essential element in allowing the agency to reach its mission. Much of the progress came as a result of the Civil Rights Act of 1964.

The Office of Diversity and Equal Opportunity is a great example of NASA's commitment to fostering a strong workforce through acknowledgement that "the best employees come from different backgrounds and hold divergent viewpoints and that workforce diversity, when fully utilized, leads to inclusion of more ideas and viewpoints, which in turn leads to more creativity and innovation. The bottom line is that NASA needs the best employees to design creative and innovative technical solutions. NASA must attract, fully utilize and retain the best talent."

The following list highlights achievements made possible as a result of the Civil Right Act of 1964:

• **Mae Jemison.** In 1978, Jemison was selected as a NASA astronaut candidate and became the first African American female to fly in space. Jemison flew on STS-47 as a mission specialist and logged over 190 hours in space.

• **Sally Ride.** Selected as a NASA astronaut candidate in 1978, Ride became the first American female in space in 1983. She served as a mission specialist on two space shuttle flights and went on to found her own company dedicated to encouraging young women to pursue science, technology, engineering and mathematics (STEM) careers.

• **Guion Bluford.** In 1979, Bluford was selected as a NASA astronaut and became the first African American to fly into space. He served as a mission specialist on four space shuttle flights, including STS-8, STS-31, STS-61A and STS-5, logging over 688 hours in space.

• **Eileen Collins.** Collins was the first female shuttle commander, leading the STS-93 mission in 1999. She also led the STS-114 Return to Flight mission in 2005.

• **Sunita Williams.** Selected for astronaut training in 1998, Williams holds the cumulative spacewalk record for a female astronaut and has logged over 322 days in space.

• **Maria Zuber.** Working on more than half a dozen NASA missions, Zuber is the first woman to lead a robotic planetary mission for NASA. Recently, she acted as the principal investigator for NASA's Gravity Recovery and Interior Laboratory (GRAIL) mission.

• **Charles Bolden.** In 2009, retired Marine Corps Major Gen. Bolden became the 12th NASA administrator. Bolden also spent 14 years in NASA's Astronaut Office and flew on four shuttle flights, including as pilot of the STS-31 mission to deploy the Hubble Space Telescope.

Pioneering men and women have helped shape NASA. They offer inspiration for future generations to pursue meaningful STEM careers. Through Women of STEM and educational initiatives like the Minority Research and Education Programs, NASA is committed to fostering the next generation of explorers. As a result, the nation can celebrate how far it has come since 1964, and dream of the bright future it has through embracing diversity.

Hail & Farewell

NASA bids farewell to the following:

Marina Benigno	Assistant to the Director	Office of the Director
Thomas Nicolaides	AST, Propulsion Systems & Tech	Engineering & Test Directorate

And welcomes the following:

Stephen Pokorski	Student Intern	Office of the Chief Counsel

Astronaut Epps visits INFINITY, New Orleans festival

Astronaut Jeanette Epps during a July 3 event speaks to visitors at INFINITY Science Center about the training astronauts undergo to serve as members of International Space Station expedition teams. Epps visited Stennis Space Center and the Gulf Coast area to participate in annual NASA outreach activities at the New Orleans Essence Festival. During the festival, Stennis representatives distributed materials about the rocket engine test center and NASA's plan to return humans to deep-space missions. Essence Festival visitors also had an opportunity to meet and talk with Epps. During her INFINITY visit, Epps also signed photos for visitors. Epps is a member of NASA's 2009 astronaut class and has completed training that included scientific and technical briefings, intensive instruction in ISS systems, extravehicular activity, robotics, physiological training, T-38 flight training and water and wilderness survival training.

Stennis directors host center interns

Stennis Space Center Cirector Rick Gilbrech speaks to center interns during an onsite lunch session July 9. Gilbrech and Stennis Deputy Director Jerry Cook and Associate Director Ken Human spoke to the interns from various NASA programs about their personal backgrounds and career paths and fielded questions. In addition to several NASA interns, the luncheon featured participants in the agency's DEVELOP Program, which provides students a chance to lead research projects using NASA Earth observations to address community concerns and public policy issues; and Pathways Programs, which provide opportunities for students and recent graduates to be considered for federal employment. Interns also included one participant in NASA's Harriett G. Jenkins Graduate Fellowship Program and one Space Technology Research Fellowship recipient.

Stennis hosts Take Our Children to Work Day

Some 200 children of employees at Stennis Space Center resident agencies and organizations visited the site July 10 to participate in annual Take Our Children to Work Day activities. Participants enjoyed various presentations, including sessions featuring astronaut Scott Altman (front row, center), a veteran of four space shuttle missions, and Alyssa Carson, a seventh-grade student from Baton Rouge who is pursuing her dream of becoming an astronaut. Participants also had an opportunity to visit site facilities and learn about various work performed at the NASA center.

Leadership Mississippi class visits Stennis

Members of the 2014 Leadership Mississippi class stand in front of the B-1/B-2 Test Stand at Stennis Space Center during a visit to the rocket engine test site July 11. In addition to touring the center, class members were briefed on Stennis by Deputy Director Ken Human and toured the INFINITY Science Center. Leadership Mississippi is sponsored by the Mississippi Economic Council. The program has graduated more than 1,000 alumni since 1974.