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LAGNIAPPE

John C. Stennis Space Center

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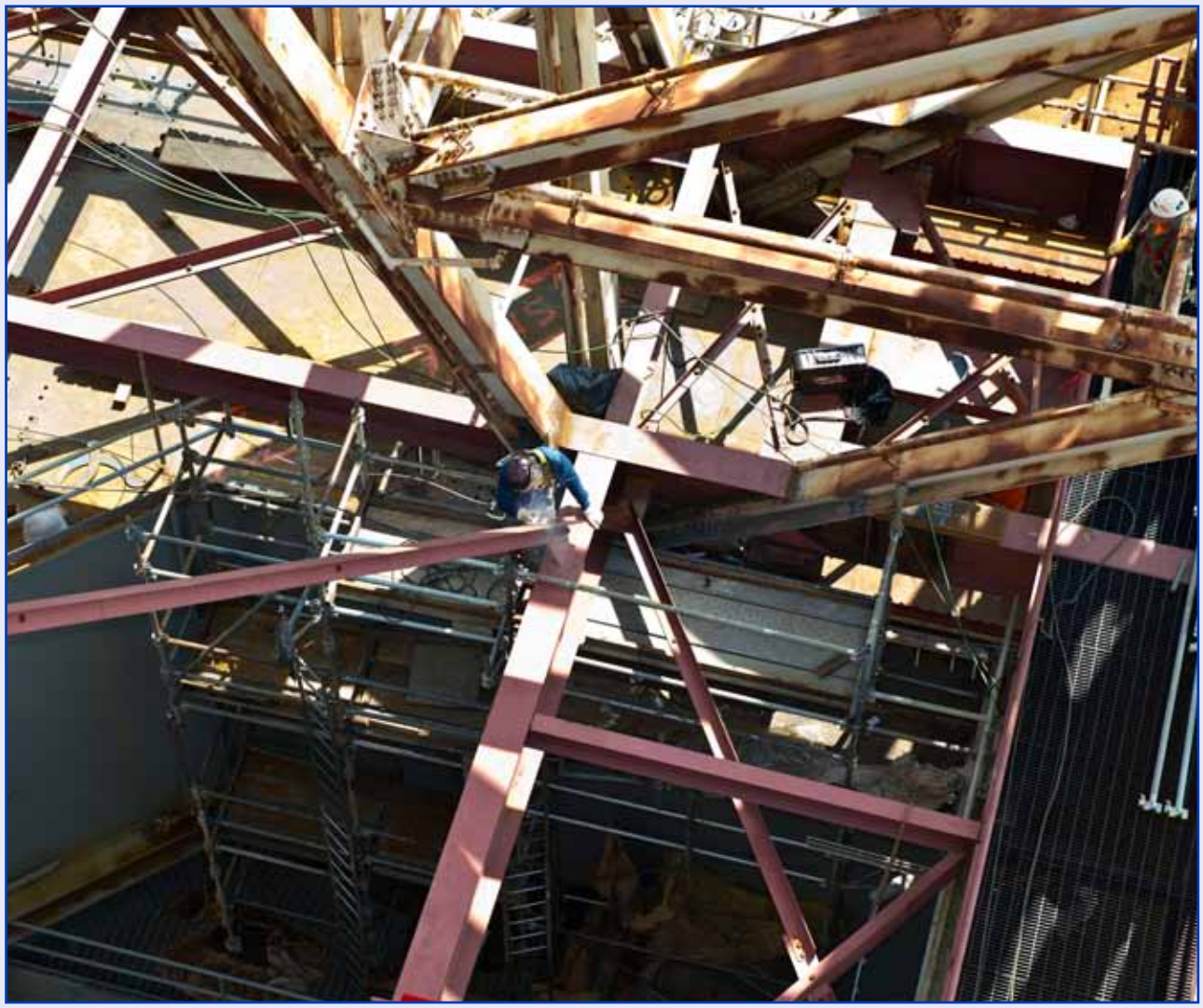

A Stennis Space Center employee helps prepare for moving the Main Propulsion Test Article structure on the B-2 Test Stand.

Setting the stage

NASA takes step forward in preparations for Space Launch System core stage testing

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"In the (rocket engine) test business, we know the consequences of failure, so we play to win on every test."

From the desk of
Randy Galloway
Director, Engineering & Test Directorate, Stennis Space Center

As the calendar rolls from July to August, the thoughts of many people in this part of the world turn toward that uniquely American game, FOOTBALL. Our favorite high school, junior college and college squads are sweating under the summer sun with visions of championships and future glory in their heads. Later this month, practice will give way to the real games, and some of those championship hopes will start to fade, while others will see their aspirations soar.

In football, the difference between success and failure often is measured in fractions of an inch. We will talk about the championship-defining plays or that "wait-til-next-year" moment for years to come. The lore and legends of the game tie generation to generation, connecting all those who played, cheered or coached for a team.

Testing rockets is a lot like football in many ways. The people who make the rockets work hard to get their creations ready to "play" on the test stand. Test teams prepare and practice to be ready to perform under the high-speed lights. When they have done well, we all get to celebrate and cheer a good test. When something goes wrong in the test, as it did on the E-1 Test Stand in May, we dig in to review the video and the data to find the secrets that are hidden in bits and bytes.

Just like a good football coach, we break everything down meticulously and question every aspect of the stand, our test team and the rocket itself. Our combined teams win more than they lose, but we have to be prepared for the worst and practice to execute the "Hail Mary" play to save the game. We pass the stories of our testing (good and bad) down across the generations so we do not repeat mistakes. That is why we have technical authority, lessons-learned programs, mishap investigations and procedures built on best practices. We have learned a lot from our previous 50-plus years of rocket design and testing, and that shows in our success rate.

The upcoming fall season of rockets and football will be a memorable one as we look toward the return of an old friend, the re-christened RS-25 engine (formerly the space shuttle main engine). It is installed on the A-1 Test Stand now, and we plan to test it starting in early October after a five-year hiatus here. We are continuing to test for SpaceX on the E-2 Test Stand, and we hope to return the E-1 Test Stand to mid-season form this fall with another AJ26 acceptance test.

Our test teams are sweating in the heat, practicing to be ready for the "game days" we will be facing. In the test business, we know the consequences of failure, so we play to win on every test, giving the customer good data and an intact test article at the end of the day. Our test teams always perform at a championship level!

I'm very proud to lead them!

Randy Galloway

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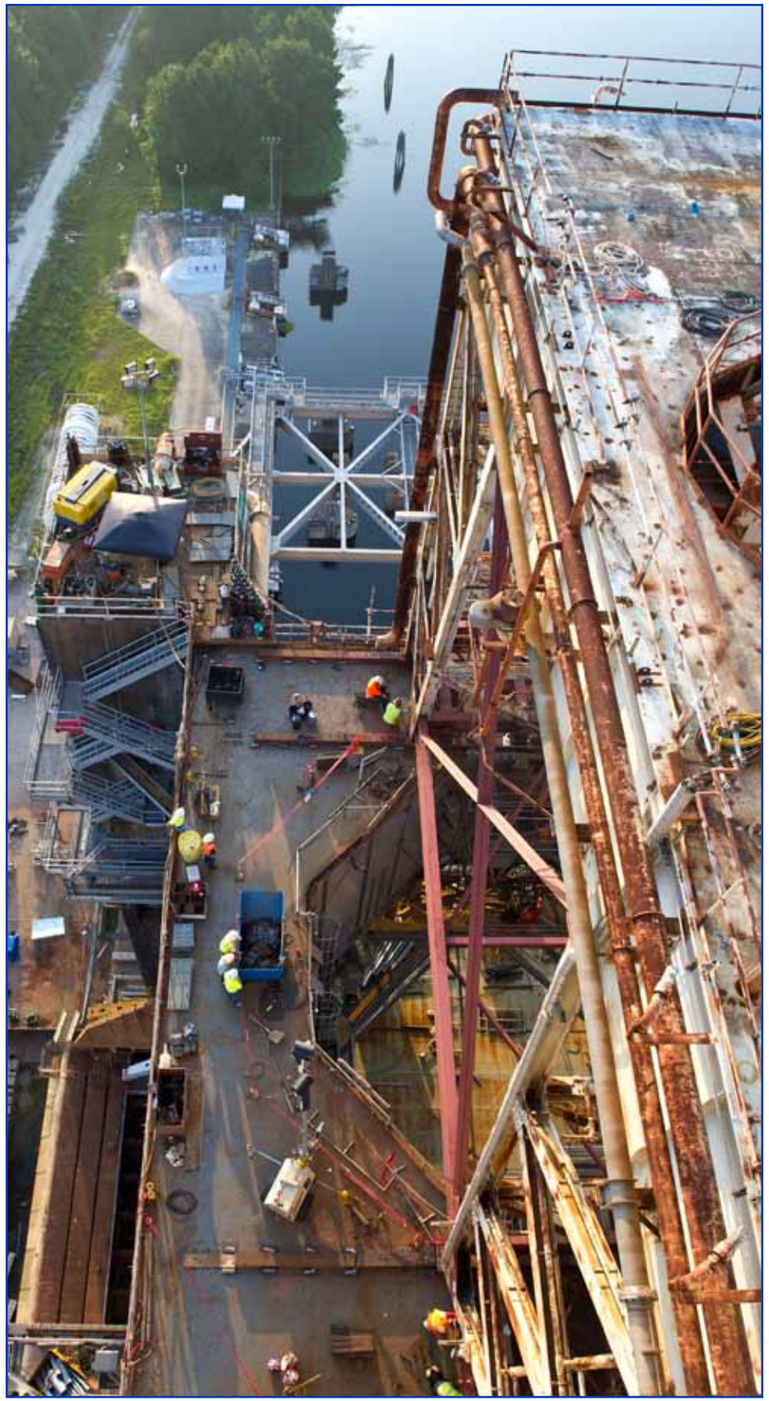
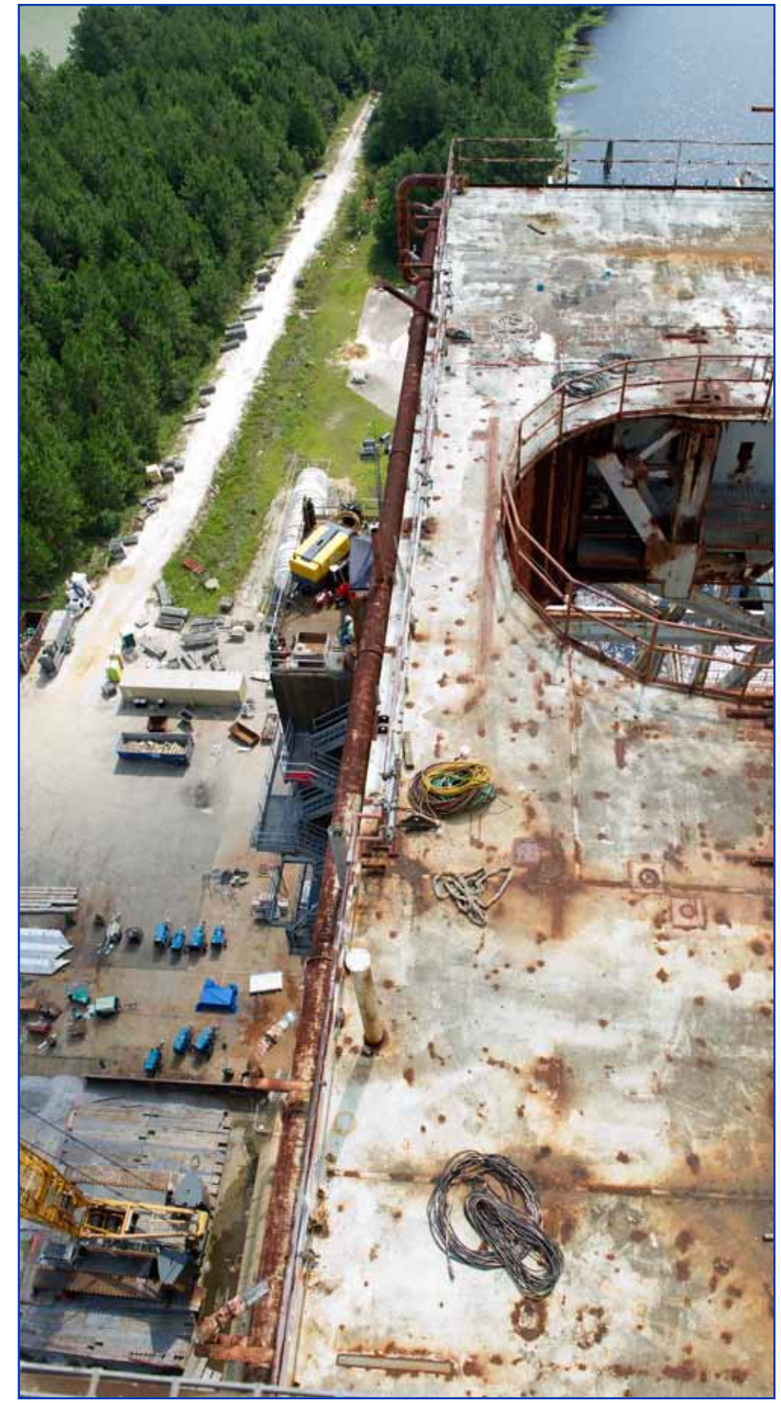
FULFILLING NASA'S EXPLORATION MISSION



A B-2 Test Stand "before " photo shows the tracks laid across the 20-foot area the MPTA structure must move.

NASA took a big step forward in preparations to test its Space Launch System core stage beginning on Aug. 7 with a 20-foot repositioning of the Main Propulsion Test Article (MPTA) structure on the B-2 Test Stand at Stennis Space Center. The existing MPTA framework structure, built in the late 1970s to support testing of the space shuttle MPTA, stands 61 feet high and contains about 1.2 million pounds of fabricated steel. It was shifted atop its test stand base platform (known as the "battleship") to accommodate the SLS core stage, which is taller than the Apollo/Saturn first stage and the space shuttle MPTA. After the move, another 1 million pounds of steel will be added to extend the structure 100 feet higher, a task targeted for completion by year's end. The repositioned MPTA structure and the added superstructure serve several purposes: to hold the core stage in place, absorb and direct the thrust generated by testing the stage and provide worker access to the core stage. Core-stage testing will involve the simultaneous firing of four RS-25 rocket engines, generating the same 2 million pounds of thrust that will help lift the SLS in actual flight. As designed, the SLS thrust will be directed through the new superstructure and the MPTA structure to the battleship base platform and down into the foundation of the test stand. Movement of the MPTA structure involved a number of steps. Crews worked to weld reinforcing steel plates and runners onto the structure to ensure it maintained structural integrity during the move. The structure then was unbolted from the battleship base platform and jacked up to facilitate movement. By "re-purposing" the MPTA structure, considerable cost-savings were achieved. The B-2 stand actually is one-half of a dual-position engine test structure. The B-1 test position is used by Aerojet Rocketdyne to test RS-68 rocket engines. Work on both stands can be coordinated; in fact, an RS-68 engine test was conducted on Aug. 5, just two days before MPTA repositioning began. To view a YouTube clip on the MPTA move, visit: http://youtu.be/J2Lzftbep6k.

B-2 Test Stand photos show the track (top photo) and jacks (bottom photo) used to move the MPTA structure.



A B-2 Test Stand "after" photo shows the MPTA structure moved 20 feet to the edge of the stand.

Curiosity reaches two-year anniversary on Mars

This image from the Navigation Camera on NASA's Curiosity Mars rover shows wheel tracks printed by the rover as it drove on the sandy floor of a lowland called "Hidden Valley" on the route toward Mount Sharp. The image was taken during the 709th Martian day of the rover's work on Mars (Aug. 4, 2014). That was one day before the second anniversary, in Earth years, of Curiosity's landing on Mars. During its first year of operations, the Curiosity rover fulfilled its major science goal of determining whether Mars ever offered environmental conditions favorable for microbial life. Clay-bearing sedimentary rocks on the crater floor in an area called Yellowknife Bay yielded evidence of a lakebed environment billions of years ago that offered fresh water, all of the key elemental ingredients for life, and a chemical source of energy for microbes, if any existed there. During its second year, Curiosity has been driving toward long-term science destinations on lower slopes of Mount Sharp. NASA's Jet Propulsion Laboratory manages the Mars Science Laboratory Project. Follow NASA's Journey to Mars at: www.nasa.gov/exploration and www.nasa.gov/mars. For more information about Curiosity, visit online: www.nasa.gov/msl and http://mars.jpl.nasa.gov/msl.

NASA in the News

NASA to send rover to Mars in 2020

The next rover NASA will send to Mars in 2020 will carry seven carefully-selected instruments to conduct unprecedented science and exploration technology investigations on the Red Planet. NASA announced the selected Mars 2020 rover instruments July 31. Managers made the selections out of 58 proposals received in January from researchers and engineers worldwide. Proposals received were twice the usual number submitted for instrument competitions in the recent past. This is an indicator of the extraordinary interest by the science community in the exploration of Mars. Planning for NASA's 2020 Mars rover envisions a basic structure that capitalizes on the design and engineering work done for the NASA rover Curiosity, which landed on Mars in 2012, but with new science instruments for accomplishing different science objectives. For more about NASA's Mars programs, visit: www.nasa.gov/mars.

New instruments to track climate impact

NASA has selected proposals for two new instruments that will observe changes in global vegetation from the International Space Station. The sensors will give scientists new ways to see how forests and ecosystems are affected by changes in climate or land use. A laser-based system from the University of Maryland will observe the structure of forest canopy. This instrument will be completed in 2019. A high-resolution multiple wavelength imaging spectrometer from NASA's Jet Propulsion Laboratory will study the effectiveness of water use by vegetation. This instrument will be completed in 2018. The instruments were competitively selected from 20 proposals submitted to NASA's Earth Venture Instrument program, which supports small, targeted science investigations that complement NASA's larger research missions. For more, visit: http://go.nasa.gov/MKvgJO.

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

2014 Astronaut candidate class visits Stennis

Members of NASA's 2014 Astronaut Candidate Class stand in front of an RS-25 rocket engine on the A-1 Test Stand at Stennis Space Center during a visit to the site Aug. 12. Candidates visited the E Test Complex and the B-2 Test Stand, which is being prepared to test the core stage of NASA's new Space Launch System. They also toured the Aerojet Rocketdyne engine assembly facility and received briefings about engine testing and applied sciences work at the center. Class members are: (l to r) Victor Glover, Andrew Morgan, Jessica Meir, Christina Hammock, Nicole Aunapu Mann, Anne McClain, Josh Cassada and Tyler Hague.

Stennis observes Women's Equality Day

Stennis Space Center Director Rick Gilbrech presents a plaque of appreciation to Lori Mann Bruce following her presentation during the 2014 Women's Equality Day program onsite Aug. 8. Bruce is a Giles Distinguished Professor of electrical and computer engineering, associate vice president for academic affairs and dean of the graduate school at Mississippi State University. She is responsible for providing leadership and academic oversight for approximately 3,500 graduate students enrolled in more than 160 graduate programs. The Stennis program was sponsored by the Stennis Diversity Council and the NASA Engineering and Test Directorate at Stennis. Women's Equality Day commemorates the certification of the 19th Amendment to the Constitution granting American women the right to vote in 1920.

Stennis celebrates Apollo 11

Retired NASA engineer John Crouch speaks during a lunch-and-learn program at Stennis Space Center to mark the 45th anniversary of NASA's Apollo 11 mission, which landed humans on the moon for the first time. Crouch served as lead engineer for the mission. Crouch continues to be involved in space exploration as a volunteer at INFINITY Science Center.

2014 Stennis Space Center Safety & Health Day

(Top left photo) Astronaut Patrick Forrester signs autographs for NASA Safety and Health Day participants at Stennis Space Center on Aug. 14. Forrester flew on three space shuttle missions, logging more than 950 hours in space.

(Top center photo) Mercedes Ramirez Johnson speaks to Stennis employees about safety awareness, using her experience as a plane crash survivor as a background. Johnson was one of only four people to survive the crash of a commercial airline on a Colombian mountain that killed 159 passengers and crew members in 1995.

(Top right photo) Safety and Health Day participants listen to a presentation by a member of Gulf Coast Canine Search and Rescue, a volunteer organization that seeks to provide trained search-and-rescue personnel to aid area emergency officials.

(Bottom photos) Stennis Space Center employees visit some of the numerous exhibits highlighting various aspects of safety and health. Exhibits included information on topics ranging from ear protection to the dangers of electricity. They also included opportunities for employees to gather health-related information and even check their blood pressure.

Stennis hosts tech webinar

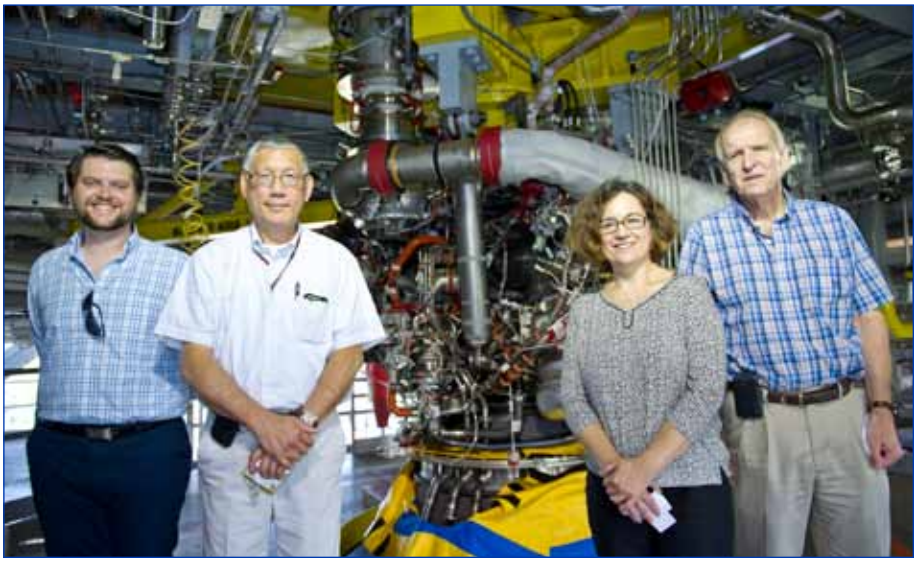
Stennis Chief Technologist Ramona Travis (right) and electronics engineer Scott Jensen (above) lead a NASA webinar Aug. 5 on "Utilizing NASA's Asynchronous Facility Health Monitoring System." The webinar focused on a novel Valve Health Monitoring System developed at Stennis that uses data-acquisition, wireless data-communication and data-processing subsystems to track both real-time and historical time-stamped data.

NASA safety and mission assurance staff visit Stennis

NASA safety and mission assurance officials stand in front of an RS-25 rocket engine during a tour of facilities at Stennis Space Center on Aug. 13. In addition to scheduled meetings, the officials enjoyed a firsthand look at the Aerojet Rocketdyne rocket engine assembly facility at Stennis. Pictured in front of the RS-25 engine are: (l to r) Grant Tregre, associate director of the Stennis Safety and Mission Assurance (SMA) Directorate; Maggie Jones, deputy director of the Stennis SMA Directorate; Sandra Hudson, range and explosive safety manager in the NASA Headquarters Office of SMA; John Lapointe, NASA Headquarters aeronautic research center oversight manager; and Arnold Baldwin, who is on detail from Johnson Space Center to the Stennis SMA Directorate.

Congressional staffers visit Stennis center

Staff members of the U.S. House Committee on Science, Space and Technology tour the A-1 Test Stand during their visit to Stennis Space Center on Aug. 7. During their stop at the rocket engine test center, staff members were briefed on the propulsion test work and applied science efforts at Stennis. In addition to visiting the A-1 stand, the staff members viewed the B-2 Test Stand and were briefed on efforts to restore and prepare the structure for testing the core stage of NASA's new Space Launch System. Visiting staff members were (l to r) Jarrett Stroud, Allen Li, Pamela Whitney and Richard Obermann.



Video footage documents Stennis early days

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.

The History Office has made strides in expanding its multimedia collection with video. Raw video footage of three decades of actual events at Stennis has been added to the history website.

The collection includes videos of both the Apollo and Space Shuttle programs with footage from when the site operated as the Mississippi Test Facility (MTF) and as National Space Technology Laboratories. Dating back to 1967, one video features the arrival of an S-IC, the first stage of a Saturn V rocket, aboard a barge powered by an Apollo Program tugboat on the Pearl River. Other scenes in the collection range from aerial views of the site to employees working in a test control center.

The shortest video in the collection is less than four minutes, with the longest more than 25 minutes in duration. All videos were reviewed and approved by team members of the scientific and technical information process at Stennis.

Stennis Space Center is known as America's largest rocket engine test complex. Since the site's inception in 1961, the center has accomplished many milestones in testing. It is home to NASA's Rocket Propulsion Test Program Office, the principal implementing authority for the agency's rocket propulsion testing.

Forty-two tests were conducted at Stennis for the Apollo Program, including ones on engines used on the program's unmanned missions. The Apollo Program launched three unmanned and 12 manned missions with six actual lunar landings.

With the Apollo Program ending in 1972, NASA announced on March 1, 1971, that the then-MTF would test main engines for NASA's new reusable spacecraft, the space shuttle. For 34 years, Stennis and major contractor Pratt & Whitney Rocketdyne (now Aerojet Rocketdyne) tested every main engine used to power the shuttle into orbit on 135 missions. Not a single space shuttle mission failed because of engine malfunction. The last space shuttle main engine was tested at Stennis on the A-2 Test Stand on July 29, 2009.

The 48 years of rocket engine testing in the history of NASA's Apollo and Space Shuttle programs and now the Space Launch System Program at Stennis feature many history-making events.

(Top photo) An Apollo tugboat delivers an S-IC via the Pearl River in 1967.

(Middle photo) The first stage of a Saturn V rocket undergoes a hotfire test on the B-2 stand in 1967 at the then-MTF.

(Bottom photo) During the1960s, employees in the Test Control Center monitor a test at Stennis.

Office of Diversity and Equal Opportunity

Women's equality in the U.S. – are we there yet?

"We have, by no means, done enough to strengthen family life and at the same time encourage women to make their full contribution as citizens. If our nation is to be successful in the critical period ahead, we must rely upon the skills and devotion of all our people... It is appropriate at this time ... to review recent accomplishments and to acknowledge frankly the further steps that must be taken. This is a task for the entire nation."

President John F. Kennedy, 1961

Our nation has had a colorful past as we have struggled and, at times, fought to hold on to our ideals. But change is inevitable, and with enough perseverance by those who see a better future, change comes. It has been no different for the women who saw a better future for themselves as they worked to change attitudes and prejudices about their place in society. What once was very rigid and set in stone is no longer. Because of the changes fostered by these early pioneers in the women's movement, we are a far greater nation today.

Office of Diversity & Equal Opportunity

Mission and Vision

Mission: *To make equal opportunity and the appreciation of diversity an integral part of all NASA SCC programs.*

Vision: *To set an example of diversity appreciation and teamwork for NASA SSC; To be an excellent resource for our customers, stakeholders, and partners; To have a sustained impact on NASA SSC and beyond.*

Fifty-one years ago, President John F. Kennedy signed the Equal Pay Act (EPA) into law to contest gender-based wage discrimination. At that time, the U.S. workforce included nearly 25 million women, a third of all U.S. workers. Yet, women earned an average of 59 cents on the dollar compared to their male colleagues. "Our economy today depends upon women in the labor force," Kennedy said when he signed the law in 1963.

By amending the Fair Labor Standards Act of 1938, Kennedy made it illegal to discriminate against women in the payment of wages. In the first two decades after the EPA's passage, the gender wage gap narrowed significantly, but progress has since languished. According to data from the U.S. Census Bureau, women in America today earn 77 cents for every dollar a man earns. Qualified women are often excluded from job opportunities in the trades and, instead, are more likely than men to work in part-time, low-wage jobs with no benefits. The 23-cent wage gap has remained intact over the years, a troubling fact for a modern economy in which more women are entering the workforce. According to the U.S. Department of Labor, women are projected to account for 51 percent of the increase in total labor force growth between 2008 and 2018.

Women make up 55 percent of workers in minimum-wage jobs; a full-time minimum wage job pays about $15,000 per year. The U.S. Department of Health and Human Services' 2014 guidelines reported that for a family of four, the poverty level is $23,850. The average woman has to work approximately 15 months, more than 90 additional days, to match what her male counterpart earns in 12 months.

According to a 2013 Pew Research Center analysis of census and polling, five in 10 American households with children under 18 include a mother who is either the sole or primary breadwinner for her family. Women make up approximately half of America's workforce, graduating at a higher rate than men from college and graduate schools.

The observance of Women's Equality Day is a day to reflect not only on the milestones and shattered ceilings of the past, but to raise the question of whether equality has been reached. As you can see, despite gradual progress toward gender equality in the 20th century, it is apparent that we still have a way to go to break down the barriers to economic equality.

Hail & Farewell

NASA bids farewell to the following:

Martin Aventon Jr.	Summer Intern	Engineering & Test Directorate
Peter Gruzinskas	Information Technology Specialist	Center Operations Directorate
Jasmine King	Summer Intern	Engineering & Test Directorate
Steven Pokorski	Summer Intern/Legal	Office of the Chief Counsel

And welcomes the following:

Brian Landry	Systems Accountant	Office of the Chief Financial Officer

Stennis hosts astronaut Mastracchio, back-to-school event

(Top photo) Astronaut Rick Mastracchio speaks to NASA employees and family members during a back-to-school event at Stennis Space Center on Aug. 5. Mastracchio flew on three space shuttle missions and returned earlier this year from a six-month stint as a member of the Expedition 39 crew on the International Space Station. Mastracchio shared highlights of the ISS mission during his presentation and later signed autographs for participants.

(Bottom left photo) In addition to other activites, participants in the Aug. 5 back-to-school event enjoyed a chance to view a test of an RS-68 rocket engine on the B-1 Test Stand.

(Bottom right photo) Astronaut Rick Mastracchio presents plaque of mission highlights to Stennis Deputy Director Jerry Cook following Mastracchio's presentation to NASA employees and family members at Stennis. Mastracchio has logged 228 days in space during four missions.

Students contribute to NASA mission at Stennis

On July 30, NASA Stennis Space Center hosted a poster session for students who participated in the Office of Education NASA Internship, Fellowship and Scholarship Program and the Office of Human Capital Pathways Program. Ten education and 12 Pathway Student interns showcased their work visually on poster boards while they actively engaged a variety of spectators. Katrina Emery, Office of Education director, opened the session with the recently produced Stennis Space Center Overview video, which provided a history of NASA Stennis Space Center and the backdrop of the mission at NASA Stennis, to which every student contributed over the course of the summer. NASA Acting Associate Administrator of Education Roosevelt Johnson encouraged students to be ambassadors and promote science, technology, engineering and mathematics (STEM) and STEM opportunities as they return to their communities. Stennis Director Rick Gilbrech presented Johnson with a signed copy of the book, "The Way Station to Space: A History of the John C. Stennis Space Center." As he officially opened the poster session, Gilbrech encouraged students to continue to work hard. For more information visit: https://intern.nasa.gov.