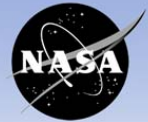




National Aeronautics and Space Administration



LAGNIAPPE

John C. Stennis Space Center

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February 2018

NASA conducts 2nd RS-25 test of 2018



NASA followed up the first RS-25 test of 2018 with a second hot fire of the Space Launch System (SLS) engine on Feb. 1 at Stennis Space Center. The full-duration, 365-second certification test of another RS-25 engine flight controller on the A-1 Test Stand comes about two weeks after a Jan. 16 hot fire. The test marks completion of green run testing for all four of the new RS-25 engine flight controllers needed for the second flight of NASA's SLS rocket. NASA is building SLS to send humans to such deep-space destinations as the moon and Mars. The Exploration Mission-1 (EM-1) flight will test the new rocket and carry an uncrewed Orion spacecraft into space beyond the moon. Exploration Mission-2 (EM-2) will be the first flight to carry humans aboard the Orion spacecraft, returning astronauts to deep space for the first time in more than 40 years. RS-25 controllers for the EM-1 flight already are installed on the engines that will be part of the SLS core stage. In addition to the flight controller, the Feb. 1 hot fire at Stennis also marked the third test of a 3D-printed pogo accumulator assembly for the RS-25 engine. Testing of the 3D-printed component is part of an ongoing effort to use advanced manufacturing techniques and processes as a means of reducing engine construction costs. NASA plans to test a number of 3D-printed components for the RS-25 engine. For the recent test, flight controller ECU 11 was installed on RS-25 developmental engine E0528 and fired under conditions akin to an actual launch. Each RS-25 hot fire is designed to test and evaluate the performance of the engine and its components in specific scenarios. Typically, an engine is cycled through various thrust levels that may be needed during flights to help engineers gather as much performance data as possible. Once certified, tested flight controllers are removed for installation on flight engines for the SLS rocket. All RS-25 engines and flight controllers for SLS missions are being tested at Stennis, as is the flight core stage for the first SLS mission. SLS core stage testing will involve installing the stage on the B-2 stand at Stennis and firing all four of the RS-25 engines simultaneously. At launch, the four RS-25 engines will fire simultaneously to generate 2 million pounds of thrust and working in conjunction with a pair of solid rocket boosters to produce more than 8 million pounds of thrust. RS-25 engines for initial SLS flights are former space shuttle main engines, modified to provide additional power to launch the larger SLS rocket. The new flight controller is a key component of that modification, serving as the RS-25 "brain" to help the engine communicate with the SLS rocket and to help control engine operation and internal health diagnostics.

When a poet called February a “month of despair,” it must have been right after all of the holiday bills finally had been received. Ark! I spend the first few months of every year eating noodles and crackers while paying off the excesses of holiday spending.

It seems I would learn my lesson, working with NASA. One can hardly find a better example of stretching dollars than the space agency. It has been exploring deeper and deeper into the universe with less and less funding for decades now.

Every February, as NASA rolls out its annual budget request (page 6), we are reminded again of the bang the agency gets for its bucks. In the Apollo Program days, NASA received up to 4.4 percent of the federal budget. It now receives under 0.5 percent, which rounds out to a bit less than \$20 billion a year.

That sounds like a lot of money – and in some ways it is. However, consider also, Americans spend more than \$30 billion a year buying pizzas. They spend about \$40 billion on coffee each year. And this month, folks in this country will spend as much as \$19 billion

for Valentine’s Day alone, which adds up to a whole lot of roses and chocolate. Ark!

Meanwhile, NASA manages its small slice of federal funding to send probes to other planets, to engage in groundbreaking research, to support the International Space Station and, soon, to send humans deeper into space than ever. Think of that the next time you look at one of those fantastic Hubble Space Telescope photos or the latest Mars image from the Curiosity rover.

Inevitably, someone will say NASA’s money could be better spent solving problems here on Earth. Never mind that NASA’s annual funding would pay less than 10 percent of the yearly interest on the national debt or that NASA conducts extensive Earth science studies and research to understand and address such problems.

Indeed, through its spinoff technologies and developments, NASA is helping to solve problems here on Earth – day in and day out. All in all, it is almost impossible to calculate the great return-on-investment for NASA funding. Now, if I could just get them to manage my Christmas budget this year!



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FULFILLING NASA'S EXPLORATION MISSION

Stennis continues preparations for testing Space Launch System core stage on B-2 Test Stand



A work crew completes installation of an 18-inch-diameter hydrogen vent line at the B-2 Test Stand at Stennis Space Center early in February. Installation of the vent line, fabricated on site and installed by Syncom Space Services personnel, is part of preparations for testing the flight core stage of NASA's new Space Launch System rocket on the Stennis stand. Testing will involve installing the actual flight stage on the stand and firing all four of its RS-25 engines simultaneously, as during a launch. RS-25 engines burn a mixture of liquid hydrogen and liquid oxygen. During testing, the vent line and attached flare stack are used to bleed and burn off excess liquid hydrogen from vehicle vent and engine bleed lines so it can be released safely into the atmosphere. Work crews earlier moved the hydrogen flare stack from the A-1 Test Stand back to its original B-2 location.

'Look down, fair moon, and bathe this scene'

A partially eclipsed moon is seen beside the A-1 Test Stand at Stennis Space Center early on the morning of Jan. 31. The early morning hours offered a rare celestial sight visible across the country – a total lunar eclipse, the second full moon of the month and the second so-called “supermoon” of 2018. A lunar eclipse occurs when the moon, Earth and the sun are aligned so that the moon passes behind the Earth and into its shadow. There are three types of lunar eclipses: penumbral, when the moon is somewhat dimmed as it passes through Earth’s outer shadow; partial, when a portion of the moon passes through Earth’s inner – or umbra – shadow; and full, when the entire moon passes through the Earth’s umbra shadow. A second total lunar eclipse will occur this year on July 27 but will be visible only in the southern portion of the country. Two full moons in one month is a rare occurrence, happening about every two-and-one-half years or so. Jan. 31 marked the first time in more than 150 years that a lunar eclipse and blue moon coincided and could be seen in North America. In a “supermoon” phenomenon, a full moon appears larger than usual as a result of its closer approach to Earth in its orbit. The Jan. 31 “supermoon” marked the third in the last two months. Previous “supermoons” were seen Dec. 4, 2017 and Jan. 1, 2018.



Mount Sharp ‘photobombs’ Mars Curiosity rover



A new self-portrait of NASA's Curiosity Mars rover shows the vehicle on Vera Rubin Ridge, which it has been investigating for the past several months. Directly behind the rover is the start of a clay-rich slope scientists are eager to begin exploring. In coming weeks, Curiosity will begin to climb this slope. Poking up just behind Curiosity's mast is Mount Sharp, photobombing the robot's selfie. When Curiosity landed on Mars five years ago, the team's intention was to study lower Mount Sharp, where the rover will remain for all of its time on Mars. The mountain's base provides access

to layers formed over millions of years. These layers formed in the presence of water – likely due to a lake or lakes where sediments accumulated, which formed these layers inside Gale Crater. The mosaic was assembled from dozens of images taken by Curiosity's Mars Hand Lens Imager on Jan. 23, 2018. For news about other Mars missions this month, view the first episode of a new video series, "The Mars Report" at: <https://www.nasa.gov/feature/jpl/mount-sharp-photobombs-mars-curiosity-rover>. Additional information about NASA's exploration of Mars is at: <https://mars.nasa.gov/>.

NASA in the News

NASA developing lunar orbit opportunities

As NASA sets its sights on returning to the moon, and preparing for Mars, the agency is developing new opportunities in lunar orbit to provide the foundation for human exploration deeper into the solar system. For months, the agency has been studying an orbital outpost concept in the vicinity of the moon with U.S. industry and the International Space Station partners. As part of the fiscal year 2019 budget proposal, NASA is planning to build the Lunar Orbital Platform-Gateway in the 2020s. The platform will consist of at least a power and propulsion element and habitation, logistics and airlock capabilities. While specific technical and mission capabilities as well as partnership opportunities are under consideration, NASA plans to launch elements of the gateway on the agency's Space Launch System or commercial rockets for assembly in space. NASA's Space Launch System rocket and Orion spacecraft are the backbone of the agency's future in deep space. For more on NASA's deep-space plans, visit: <https://www.nasa.gov/journeytomars>.

Study finds sea level rise accelerating

Global sea level rise has been accelerating in recent decades, rather than increasing steadily, according to a new study based on 25 years of NASA and European satellite data. This acceleration, driven mainly by increased melting in Greenland and Antarctica, has the potential to double the total sea level rise projected by 2100 when compared to projections that assume a constant rate of sea level rise. If the rate of ocean rise continues to change at this pace, sea level will rise 26 inches by 2100 – enough to cause significant problems for coastal cities, according to the new assessment by NASA's Sea Level Change team. The team published their work Feb. 12 in the journal *Proceedings of the National Academy of Sciences*. "This is almost certainly a conservative estimate," team member and lead author Steve Nerem said. "Our extrapolation assumes that sea level continues to change in the future as it has over the last 25 years. Given the large changes we are seeing in the ice sheets today, that's not likely."



'The state of NASA is strong'

(Top photo) Acting NASA Administrator Robert Lightfoot delivers a "State of NASA" report from Marshall Space flight Center in Huntsville, Ala., on Feb. 12, in front of an RS-25 engine like those being tested at Stennis for use on the agency's new Space Launch System rocket. Traditional and social media members visited Stennis Space Center – and other NASA centers across the country – to view the broadcast report, which presented the president's annual budget request for NASA. The fiscal year 2019 budget request for the agency totals \$19.9 million, an increase of \$400 million from the current year. The request "reflects the administration's confidence that America will lead the way back to the moon and take the next giant leap from where we made that first small step for humanity nearly 50 years ago," Lightfoot said. Lightfoot reviewed ongoing work at the agency and outlined future plans and goals, declaring the state of NASA is strong. For more, visit: <https://www.nasa.gov/budget>.

(Right photo) Stennis Space Center Director Rick Gilbrech updates employees on ongoing work at the site following the "State of NASA" report by Robert Lightfoot on Feb. 12.

(Left photo) Stennis Space Center Deputy Director Randy Galloway briefs visiting media members on ongoing work at the site following the "State of NASA" report Feb. 12.



NASA's *Spinoff 2018* features Stennis technologies

NASA has released its *Spinoff 2018* publication, featuring 49 technologies the agency helped create that are used in almost every facet of modern life. These include innovations that help find disaster survivors trapped under rubble, purify air and surfaces to stop the spread of germs, and test new materials for everything from airplanes to athletic shoes.

“NASA’s work represents an investment in the future, not just for air and space travel, but for the nation, ...” said Stephen Jurczyk, associate administrator of the Space Technology Mission Directorate in Washington. “Commercial technology spun off from NASA research and technology programs, and missions creates new companies, grows the economy, saves money, keeps us safer and even saves lives.”

In *Spinoff 2018*, one will learn how:

- Ultra-sensitive radar technology used to detect gravity fluctuations was repurposed to identify the vital signs of disaster survivors trapped under rubble.
- A technique developed to preserve plants in a spacecraft led to devices that eliminate bacteria, viruses, molds and volatile organic compounds from air, surfaces and even laundry.
- One company’s work on high-speed stereo photogrammetry for space shuttle analysis enables low-cost, highly-accurate materials testing to improve designs for everything from running shoes to jetliners.

Other highlights include: artificial intelligence that helps drones avoid collisions and could one day enable self-driving cars; a business jet that is both the fastest and the most efficient in its class; and a computer program that, 50 years after its creation, is still used to design cars, buildings and much more.

The 2018 publication also highlights one Stennis Space Center-related technology – the development of new LED lights for use on the site’s rocket engine test stands. Seeking to improve energy efficiency, Stennis issued a pair of Small Business Technology Transfer contracts to LED lighting company Energy Focus of Solon, Ohio.

Energy Focus used the research funding to develop floodlights able to withstand the hazardous test stand conditions while providing the illumination needed for high-speed filming of rocket engine tests. The company has since used the heat-management and beam-focusing techniques needed to develop those lights to improve the efficiency and lifespan of their other LED products.

The book also features a Spinoffs of Tomorrow section that highlights 20 NASA technologies ripe for commercial application and available for licensing. Two Stennis-related technologies are included in this section:



- A cryogenic butterfly cam valve with a simple no-leak design that can be used over a wide range of temperatures. The technology can be used in such industries as aerospace, natural gas, air-gas separation, cryogenic plants and food hydrogenation.

- A suite of software tools that have a proven record in processing and analyzing satellite data to create maps detailing risks and damage to forests, agricultural crops and grazing land. The software can detect, identify and track various disturbances, such

as damage from river flooding, hurricanes, drought, wildfires, wind, ice, hail and frost. The software is particularly adaptable for forest monitoring and management, agricultural management, grazing rangeland management and academic/scientific research.

Spinoff is a part of NASA’s Technology Transfer Program, which is charged with finding the widest possible applications for NASA technology through partnerships and licensing agreements with industry.

Print and digital versions of *Spinoff 2018* are available online at: <https://spinoff.nasa.gov>. An iPad version is available for download in the Apple iTunes store.

For more information about NASA’s Technology Transfer Program, visit: <https://technology.nasa.gov>. For information about the Stennis Advanced Technology and Technology Transfer Branch and its activities, visit: <https://technology.ssc.nasa.gov>.

Stennis convenes Enterprise Park Industry Day



(Above photo) Stennis Director Rick Gilbrech welcomes company representatives to an onsite Industry Day on Feb. 7. Stennis hosted the event to present information about Enterprise Park, an onsite 1,100-acre area designated for development as a technology corridor. Stennis is seeking a non-federal partner to lead in developing and operating the park to enable private sector participation in space exploration, support commercial space transportation activities, promote commercial development of technologies for use in space and on Earth, and provide opportunities for companies and other organizations to co-locate at Stennis to support the missions of existing federal city tenants at Stennis.

(Right photo) Tim Pierce, a planning and development specialist at Stennis, presents Enterprise Park information to Industry Day participants Feb. 7. Event attendees represented companies and entities interested in partnering with NASA and Stennis Space Center to develop the park as a technology corridor.

Enterprise Park

STENNIS SPACE CENTER



Stennis hosts consul generals, collegians



Consul generals and honorary consuls representing six nations (above), joined by a Mississippi Development Authority official and Mississippi Enterprise for Technology official, pose in front of the A-2 Test Stand during a visit to Stennis Space Center on Feb. 1. Representatives of Britain, France, Germany, Belgium, Wales and Ireland toured Stennis facilities during their afternoon visit and learned about ongoing propulsion test work at the NASA site. The visiting representatives and officials also had an opportunity to view an Aerojet Rocketdyne RS-68 rocket engine test on the B-1 Test Stand.



Louisiana Space Consortium (LaSPACE) students from Xavier University in New Orleans (above) gather at the B-1/B-2 Test Stand during a visit to Stennis Space Center on Feb. 7. The students were hosted by the Stennis Office of Communications and Office of Education. They spent the day learning about Stennis as part of the LaSPACE Historically Black Colleges and Universities Institutional Scholars Program, which seeks to mentor groups traditionally underrepresented in science and engineering professions and engage them in aerospace science and technology research or experiences.

Stennis observes annual NASA Day of Remembrance

Stennis Space Center Director Rick Gilbrech speaks to site employees during the annual Day of Remembrance ceremony Jan. 25. Following his comments, Gilbrech and NASA Shared Services Center Acting Executive Director Anita Harrell placed a memorial wreath in memory of NASA family members who lost their lives while furthering the cause of exploration and discovery, including the crews of Apollo 1 and shuttles Challenger and Columbia. The NASA Day of Remembrance is observed each year in January.



Stennis contractor emphasizes safety performance

Note: The following is part of a regular focus on safety and health at Stennis Space Center. It was written by Kevin Gallagher with Syncom Space Services.

Our objective in working together safely at Syncom Space Services (S3) is to eliminate injuries and illness from the workplace through positive and collective behavioral change.

At the outset of the Synergy-Achieving Consolidated Operations and Maintenance (SACOM) contract, S3 implemented Human Performance Training (HUP) as a vehicle for continuous improvement of its safety culture.

The training seeks to develop strategic avenues for achieving excellence in safety and health through collaboration, by reducing the frequency and severity of events, by continually improving the safety culture and by minimizing risks and raising awareness among the workforce and customers.

S3 HUP teams were drafted afterwards and are organized by work areas. The memberships are a cross section of workers, supervisors, managers and technical support personnel. The targets of the teams is to achieve the site and customer goals, assist in recognizing error-likely situations, eliminate organizational weaknesses, strengthen defenses, model safe behavior and reinforce safe practices.

Why have teams? An added value is the ownership, diversity and creativity provided by team members; they know their job better than anyone else. Teams typically meet

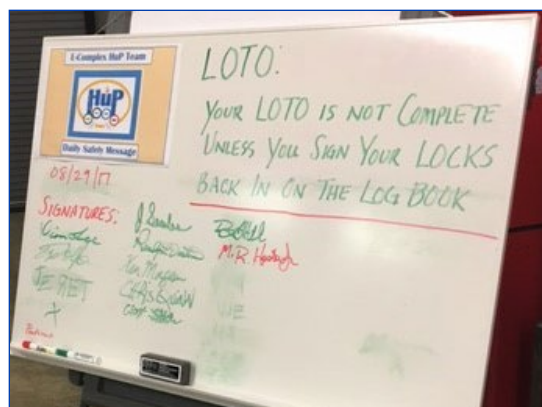
biweekly, and each team has a senior champion and an elected employee team chair. The team objectives are:

1. Promote event prevention through human performance improvement.
2. Identify area/department emerging issues and human performance gaps and implement improvement initiatives.
3. Evaluate event clock reset data. (The event clock is used to measure event rate, average days between events and success rate).
4. Support initiatives that comprise our excellence philosophy.

Communication to the Stennis and Michoud Assembly Facility teams is a key element of human performance. A monthly newsletter headlines specific safety topics, accomplishments and concerns and provides other helpful articles. Weekly highlights and lowlights are authored by the safety staff in each area and sent to management for review.

Morning safety meetings are held with employees daily. A safety billboard displays the same message shared in the meetings for those that could not attend, and they sign it for verification they have reviewed the information.

Areas also have a safety and quality wall for displaying weekly HUP team updates, safety topics, awareness messages and area news. At S3, we are one team, and zero incidents, zero harm and zero compromise underpins everything we do.



Area bulletins boards help spread S3 safety message.



An engaged safety culture keeps Stennis Space Center rocketing forward!

To contribute to this page, contact:

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1988 – 1,000th space shuttle main engine test

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.

1988 was a big year for NASA and for the then-National Space Technology Laboratories (NSTL). It started off with an important test firing of a space shuttle main engine in February.

On Feb. 25, for the 1,000th time, NASA conducted a space shuttle main engine test fire. NASA was reeling from the space shuttle Challenger disaster in 1986, and the report of the presidential commission charged with investigating the disaster, submitted to President Ronald Reagan in June 1986.

The modifications and overhaul of the civil space program began in the ensuing months, as did a new era of recordbreaking space shuttle main engine testing at NSTL. (The commission report cleared space shuttle main engines of contributing to the Challenger disaster but did recommend modifications to the engine and thorough testing before the next shuttle flight.)

The milestone 1,000th test fire occurred on the evening of Feb. 25, on the A-1 Test Stand for a duration of 573 seconds. It marked continuation of a very busy year for NSTL, which already had conducted 10 space shuttle main engine hot fires in 1988 as NASA worked to return the shuttle fleet to flight.

In 1987, leading up to the 1,000th test firing, a record-breaking 33,738 seconds of space shuttle main engine tests had rumbled across the Gulf Coast as well. As then-NSTL Director Jerry Hlass noted, the 1987 total was equivalent to the time the engines would be required to perform for 22 shuttle launches.

“Our team is working very diligently to do its part in returning the shuttle to flight,” Hlass said.

NASA's anticipated return to flight came later in the year as space shuttle Discovery was launched Sept. 29, 1988, on the STS-26 mission. On Oct. 3, Discovery and its five-person crew landed at Andrews Air Force Base in California after a four-day mission, and the “Return to Flight” after the Challenger disaster was a success, powered by engines tested at Stennis Space Center.



NASA conducts an evening hotfire test of a space shuttle main engine on the A-1 Test Stand at Stennis Space Center on Nov. 26, 2002. Fourteen years earlier, on Feb. 25, 1988, NASA conducted a similar evening test on

the same stand that marked a milestone – the 1000th hot fire of a space shuttle main engine. The milestone test also was part of NASA's Return to Flight preparation following the loss of shuttle Challenger in 1986.

Office of Diversity and Equal Opportunity

Black History Month focuses on African Americans in war

Black History Month, also known as National African American History Month, is observed every February to celebrate achievements by African Americans. It is also a time for recognizing their contributions to American history, society and culture.

The Black History Month theme for 2018 is “African Americans in Times of War.” The theme commemorates the centennial of the end of World War I in 1918, and highlights the service and sacrifice of African Americans during wartime, from the Revolutionary War to present.

Since the time of the American Revolution, African Americans have volunteered to serve their country in times of war. One such American is Henry Johnson, a World War I soldier who singlehandedly beat back a German assault while critically wounded. He was a great American hero and received the highest military honor of two different countries. One of those countries, however, his very own, did not bestow that medal until nearly 100 years after his service in World War I.

In 1917, the year the United States entered World War I, Johnson joined the military. He volunteered in the 369th Infantry regiment, an all-black unit of the New York National Guard. In 1918, the 369th was transferred from the command of the segregated U.S. Army to the French Army. Shortly after, Johnson and his fellow soldiers were given French rifles and helmets and stationed at Outpost 20 in the Argonne Forest, in France’s Champagne region, just west of the infamous battlefields of Verdun.

In the early hours of May 14, 1918, Johnson and another soldier, Needham Roberts, were on guard duty when German snipers began firing on their outpost. Johnson recounted that day: “I began to get ready. They’d a box of hand grenades there, and I took them out of the box and laid them all in a row where they would be handy; ... the snippin’ and clippin’ of the wires sounded near. So I let go with a hand grenade. There was a yell from a lot of surprised Dutchmen and, then, they started firing.”

A German grenade hit Needham in the arm and hip, and he was too badly wounded to fight, so he laid in the trench and handed Johnson grenades. Some of the shots hit Johnson, clipping his head, lip, hand and side, as well as shattering his left foot. With Germans coming from all sides, Johnson threw grenades until they were all gone; then, he grabbed his rifle.

Johnson was using his French rifle when he tried to load an American magazine, causing the rifle to jam. He then used his rifle like a club, swinging in every direction at the

enemy soldiers, until his rifle stock was shattered. Johnson then grabbed his French bolo knife and slashed in every direction. “They knocked me around considerable and whanged me on the head, but I always managed to get back on my feet,” Johnson said.

Until the past few decades, there was nothing in government or military record books to preserve the legacy of a man Teddy Roosevelt had called one of the “five bravest Americans” to serve in World War I. He was, however, the first American to receive the Croix de Guerre, France’s highest military honor.

Yet, for his valor, Johnson had nothing to show from his own government, not even a Purple Heart for the serious wounds he sustained that kept him hospitalized for months. Because the Army kept no record of Johnson’s injuries, he also was ineligible for disability benefits after his discharge.

Joined by senators and military veterans, Johnson’s son, Herman, fought for the military commendations his father had been denied during his short life. “Fighting for your country is an honor, but they would not give black people any honors,” Herman Johnson said.

The first recognition for Johnson came in 1996 when then-President Bill Clinton awarded Johnson the Purple Heart for the injuries he suffered in combat. He had gone to the grave with his wounds, but the paperwork documenting his injuries took another 80 years.

Shortly before Herman Johnson’s death, his father also received the second-highest military award, the Distinguished Service Cross. The Medal of Honor submission had been denied, citing insufficient evidence. However, Sen. Chuck Schumer’s office discovered a letter written by Gen. John J. Pershing, issued shortly after Johnson’s battle in the Argonne, commending his bravery, and additional citations from Johnson’s peers.

On June 2, 2015, then, nearly a century after Johnson made his legend fighting in Europe, then-President Barack Obama posthumously awarded him the Medal of Honor.

As Stennis Space Center celebrates black history this month, take a moment to remember the brave African American soldiers like Henry Johnson who fought for this country and its freedom.

(Information in this article came from an online posting at The Daily Beast.)



Faces of Stennis

Each month, Lagniappe will feature employees at Stennis Space Center whose work enables the center to fulfill its mission as the nation's largest rocket engine test center. This month's employee is highlighted on the following page.



B.T. Wigley



B.T. Wigley has a simple answer for how he ended up at Stennis Space Center – fate. Wigley grew up in Gainesville, Florida, but later found work on the Mississippi Gulf Coast in Bay St. Louis. There, he learned enough about Stennis to apply for an open position. Wigley worked as an instrumentation engineer for three years with Lockheed Martin and Rocketdyne at Stennis, then joined the NASA team in 1999. He now serves as B-2 Test Stand Space Launch System (SLS) operations electrical lead and instrumentation and data acquisition engineer. The role includes helping to prepare new data acquisition systems for upcoming SLS flight core stage testing on the stand. Wigley considers the hands-on work, propulsion testing experience and team of peer professionals the best part of being at Stennis. He recalls meeting people who had been involved in Apollo Program testing.

“I have a huge amount of respect and admiration for that generation and what they accomplished,” he says. He also reflects with pride on his team work supporting NASA Fastrac 60K engine testing in the 1990s, as well as work on later projects that earned him a NASA Silver Snoopy Award. He is excited about upcoming SLS core stage testing and about “ultimately witnessing something I was involved with as a test team member actually launch into the final frontier.” It will mark realization of an early dream as he watched video of Apollo 11 astronauts on the moon and the elation of the mission control team members. “I thought it would be cool to be one of those team members, minus the slide rule and pocket protector,” he says. Away from work, Wigley, now a Long Beach resident, enjoys time with his wife, daughters and grandchildren, as well as gardening and traveling.