



National Aeronautics and Space Administration



LAGNIAPPE

John C. Stennis Space Center

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New year – continuing mission



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Every January, as I launch another round of well-intentioned resolutions, a few lines from an old novel come to mind – “All beginnings are hard. ... Especially a beginning that you make by yourself. That’s the hardest beginning of all.” I think it just helps justify the fact that most of my resolutions are in tatters by mid-month. Ark!

Still, beginnings are a fitting thought for any new year, including this new 2018 year, as NASA prepares to celebrate its 60th anniversary and Stennis Space Center enters into its 52nd year of rocket engine and stage testing. Likely no one who remembers those early days would have predicted the successes NASA and Stennis have recorded in their five-plus decades. They shot for the moon and reached it – literally!

It is an amazing story, not only that they reached so high but stayed there. Since the early days of success, NASA and Stennis together have continued to build on their space expertise to fly farther and reach higher. This year continues the story as NASA moves toward launch of the new Space Launch System (SLS), the most powerful rocket ever built. Stennis is testing both

the engines that will power SLS flights and the rocket’s core stage. In 2018, we will not only see RS-25 engine tests on site but the arrival of the pathfinder core stage simulator. A replica of the core stage, it will be installed on the B-2 Test Stand to make sure everything is set for the test project.

By year’s end, arrival of the flight core stage will be just around the corner. Once it is installed on the B-2 stand, NASA will fire all four of its RS-25 engines simultaneously, just as during an actual launch.

I cannot wait to feel the shake, rattle and roar of that test! It will be the biggest, loudest test ever conducted at Stennis and the culmination of efforts by a lot of hard-working people, as well as a testament to their combined space expertise and know-how.

If that is not enough, it also will mark an important milestone – the official beginning of the grandest human space exploration era in history, including an eventual trip to Mars. I, for one, am determined to stick around for the show. Now, that may be a New Year’s resolution I finally can keep. Ark!



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FULFILLING NASA'S EXPLORATION MISSION

NASA engineers picked up this year where they left off in 2017, conducting a certification test of another RS-25 engine flight controller on Jan. 16 on the A-1 Test Stand at Stennis Space Center near Bay St. Louis, Mississippi. The 365-second, full-duration test came a month after the space agency capped a year of RS-25 testing with a flight controller test in mid-December. A 3D printed part tested in December was tested again. This rocket engine component, a pogo accumulator assembly, is part of an ongoing series of tests with parts made using advanced manufacturing techniques that will make building future engines more affordable. For this "green run" test, the flight controller was installed on RS-25 developmental engine E0528 and fired just as during an actual launch. Once certified, the flight controller will be removed and installed on a flight engine for use by NASA's new deep-space rocket, the Space Launch System (SLS). NASA is building SLS as the most powerful rocket in the world, designed to carry humans on the Orion spacecraft and enable missions to the moon and Mars. Launch of the SLS rocket will be fueled by four RS-25 engines firing 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 the initial SLS flights are former space shuttle main engines, modified to provide the additional power needed by the larger SLS rocket. A key part of that modification is the new flight controller, which works as the RS-25 "brain," helping the engine communicate with the SLS rocket and providing precision control of engine operation and internal health diagnostics. NASA is testing all RS-25 engines and flight controllers for SLS missions at Stennis. The initial SLS Exploration Mission-1 (EM-1) will serve as the first test flight for the new rocket and will carry an uncrewed Orion spacecraft. All the engines for this flight have been tested at Stennis and are ready to be attached to the rocket's core stage being built at NASA's Michoud Assembly Center in New Orleans. Current engine tests are for controllers for Exploration Mission-2, the first flight that will transport astronauts aboard Orion. In addition to testing the engines for those flights at Stennis, NASA is preparing the B-2 Test Stand at the center to test the entire SLS core stage with its four engines for EM-1. This "green run" testing will involve installing the flight core stage on the B-2 stand and firing all four RS-25 engines simultaneously, just as during an actual launch. RS-25 tests at Stennis are conducted by a team of NASA, Aerojet Rocketdyne and Syncom Space Services engineers and operators. Aerojet Rocketdyne is the RS-25 prime contractor. Syncom Space Services is the prime contractor for Stennis facilities and operations.

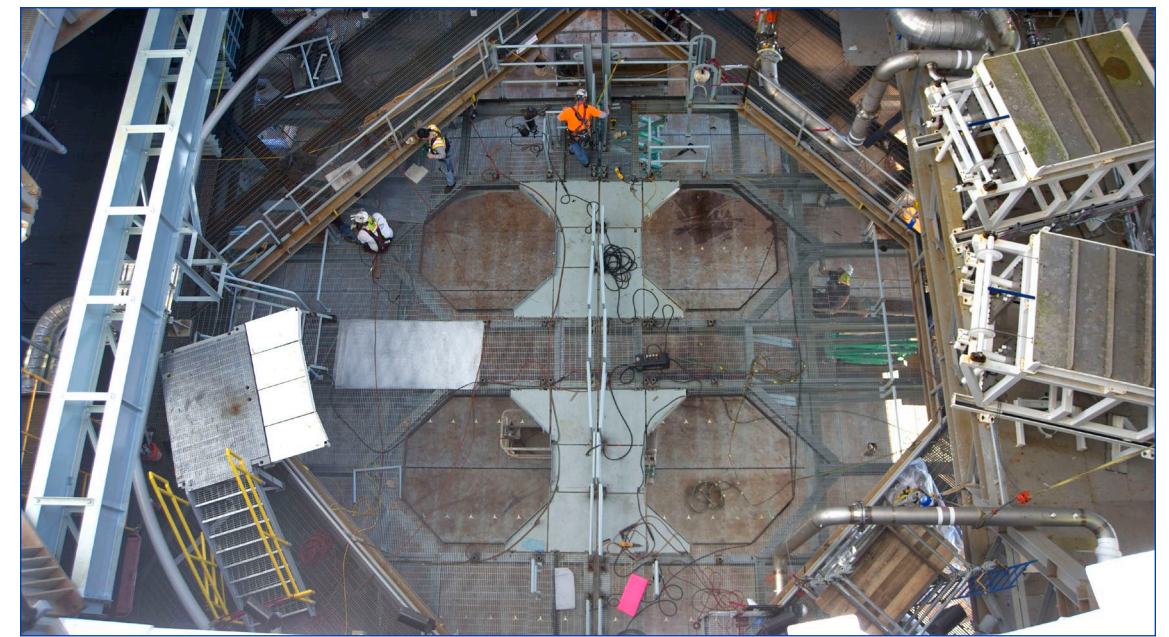
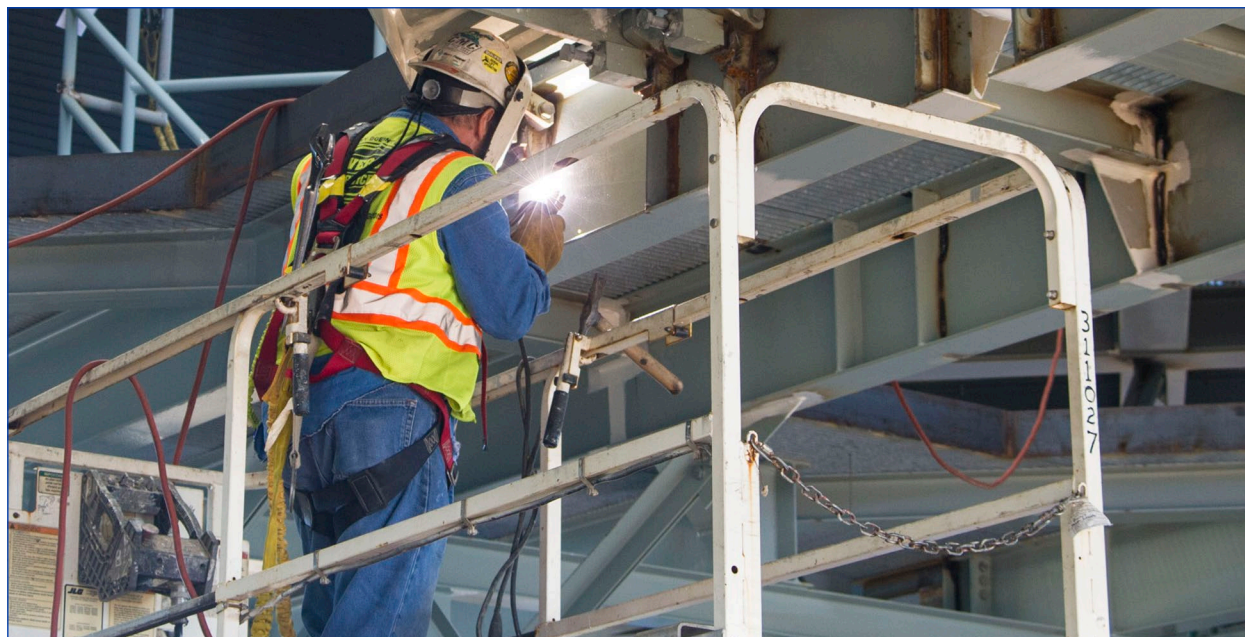


FULFILLING NASA'S EXPLORATION MISSION



Stennis prepares for SLS pathfinder arrival

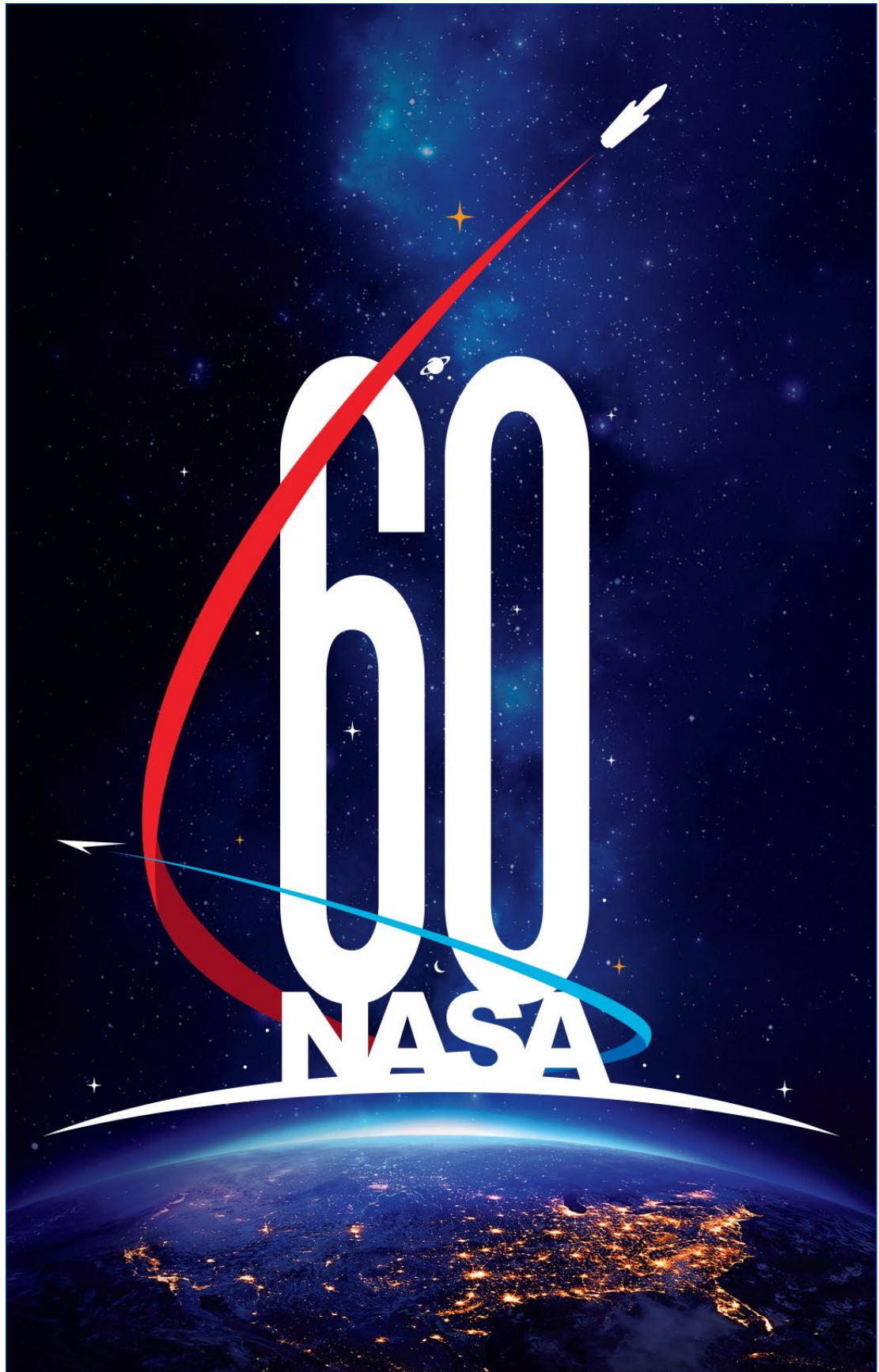
The Space Launch System (SLS) core stage pathfinder (above) is shown at Michoud Assembly Facility in New Orleans, prior to its transport of Stennis Space Center later this year. The pathfinder is a full-scale size and weight replica of the SLS core stage. Once it arrives at Stennis, it will be installed on the B-2 Test Stand to make sure all preparations are complete for testing the actual SLS core stage that will be used on the rocket's initial Exploration Mission-1 (EM-1) flight. NASA has completed major renovation work on the B-2 stand for SLS flight stage testing, but final preparations continue (right and left). NASA is building SLS as the most powerful rocket in the world to carry astronauts deeper into space than ever before. At launch, the rocket will be powered by four RS-25 engines, firing simultaneously and in conjunction with a pair of solid rocket boosters. For EM-1 flight testing, the core stage will be installed on the B-2 stand and all four RS-25 engines fired simultaneously, just as during an actual launch.



NASA in the News

NASA releases 60th logo

In 2018, NASA will mark the 60th anniversary of its establishment as a U.S. government agency. President Dwight D. Eisenhower signed NASA's founding legislation, the 1958 National Aeronautics and Space Act, on July 29, 1958. NASA considers its birthday to be Oct. 1, the day the agency opened for business. NASA has released an official logo for use in observing this milestone anniversary. Created by NASA graphic artist Matthew Skeins, the logo depicts how NASA is building on its historic past to soar toward a challenging and inspiring future. "NASA" and "60" are stacked, bold and tall, atop the continental United States, the curvature of Earth, and the light of an approaching dawn. This placement captures the spirit of a metaphor about knowledge and discovery, often attributed to 17th century physicist Isaac Newton: "If I have seen further than others, it is by standing on the shoulders of giants." Similarly, NASA was built from the legacy and expertise of giants in government-sponsored research and development, including the National Advisory Committee for Aeronautics, the Naval Research Laboratory, the Army Ballistic Missile Agency and the Jet Propulsion Laboratory. For more about NASA's 60th anniversary, visit: <http://www.nasa.gov/60>.



Stennis hosts young engineers for first-of-its-kind design challenge

In his memoir, U.S. Gen. George S. Patton Jr. famously said, “Never tell people how to do things. Tell them what to do, and they will surprise you with their ingenuity.” For NASA and Stennis Space Center, that concept served as the foundation for a first-of-its-kind collaborative challenge.

Sixteen NASA employees from five centers visited Stennis for two weeks last October to participate in a Young Engineers Design Challenge hosted by the NASA Rocket Propulsion Test (RPT) Program, which manages all of the agency’s propulsion test facilities. Divided into two teams, the engineers competed to design a portable, efficient, cost-effective platform for testing small rocket thrusters, generating up to 10-15k pounds of thrust.

The challenge was no mere exercise – NASA plans to actually produce the small platform for use in agency and commercial test projects. “We surpassed all the goals we set for this challenge,” RPT Program Deputy Director Steve Taylor said. “Now, we will work on choosing a final design and building it.”

The test platform itself represents only one of three goals Taylor and others had going into the challenge.

The first – and primary – goal was to foster an environment of collaboration among NASA engineers and centers. “Years ago, it was all about competition,” Taylor said. “Now, the focus is on collaboration among engineers and centers. We wanted to instill that idea in young engineers and help them begin building relationships they can carry through their careers.”

The second goal was to design the test platform, not as an intellectual exercise but to fill an identified need. In 2016, an RPT analysis identified several areas of future need for NASA and commercial rocket engine testing. One focused on developing test capabilities for small rocket thrusters.

Taylor and others thought that need would set the perfect stage for a collaborative challenge. The idea traveled all the way to NASA Headquarters, which approved the plan.

A call for participants went out – and engineers from Stennis, Marshall Space Flight Center in Huntsville, Alabama; Glenn Research Center’s Lewis Field in Cleveland, Ohio, and Plumbrook Station in Sandusky, Ohio; Kennedy Space Center in Titusville, Florida; and White Sands Test Facility in Las Cruces, New Mexico, were selected. Stennis participants included engineers Jasper Cook, Tiffany Hawkins, Justin Lucas, Robbie Randall, Jason Richard and Janice Tasin.

Participating engineers were divided into two competing teams. Challenge leaders gave the teams very broad design parameters. “We wanted to foster thinking,” Taylor said. “We wanted to give them room to be innovative.”

In an opening video gathering, NASA Acting Administrator

Robert Lightfoot told the participating engineers, “The thing I like about this (is that) we actually need this capability. ... This isn’t just a job to keep you busy. It’s a job to actually see what innovative ideas you come up with as you put this together. ... Don’t be constrained.”

NASA Associate Administrator for Human Exploration and Operations Bill Gerstenmaier echoed the idea. “Be open to a variety of ideas.” He said. “Surprise us with what you can do and what innovation you can bring us.”

By Taylor’s account, the teams did just that. “The teams got a lot farther along with their designs than expected,” he said. “They did a lot of modeling, accomplished a lot of work in putting their ideas together.”

The teams worked with experienced NASA engineers as mentors – Tom Meredith and Maury Vander from Stennis and James Buzzell from Marshall. They also worked in a cutting-edge environment set up especially for the challenge, which leads to the third goal of the effort.

In addition to the two primary aspects of the challenge, the RPT team also wanted to gather feedback on the collaborative work environment and tools used by the teams. That effort was led by Chris Carmichael, chief technology officer for information technology in NASA Office of the Chief Information Officer.

The goal was to design and equip a workspace that fostered creativity and teamwork. The layout used such things as active seating options and workspaces, 3D printing, virtual reality capabilities and interactive whiteboards. “We wanted to make a space that did not look like any other,” Carmichael said.

Initial feedback was good, and a more detailed survey has been forwarded to participating engineers to gather additional input. Eventually, Carmichael hopes to open an onsite lab to test new workplace technologies and a collaboration space that Stennis teams can use for project work. “There are a lot of technologies out there,” Carmichael said. “We want to identify what works well here and make it available.”

After two weeks of work in their innovative settings, the competing teams presented their designs. Taylor and others now are working to choose a final design, either one of those presented or a hybrid of ideas within them.

They plan to keep the teams involved with the project as long as possible, perhaps even bringing them together again at some point. They also can foresee future collaborative efforts along the same lines – at Stennis and elsewhere in the agency.

“Everyone was excited about the outcome (of the challenge),” Taylor said. “We definitely want to continue with this collaborative concept.”

Sixteen young engineers from five NASA centers (right) convened at Stennis Space Center in October 2017 to participate in a first-of-its-kind collaborative design challenge hosted by the NASA Rocket Propulsion Test Program. Split into two teams, the engineers developed and presented (below) designs for a portable platform to test small rocket engine thrusters. Organizers now are working to decide on a final design to build the test platform for use by the agency.



Stennis hosts FIRST® Robotics kickoff

Twenty-one teams from Louisiana and Mississippi high schools traveled to the 2018 FIRST® (For Inspiration and Recognition of Science and Technology) Robotics kickoff hosted by Stennis Space Center on Jan. 6.

The teams viewed a live broadcast from FIRST® headquarters to learn details of their 2018 competition challenge. Teams also received parts kits they will use to build robots for the challenge. Teams nationwide are given identical parts kits and six weeks to build robots to compete in scheduled tournaments.

This year's "Power Up" game will be played by two alliances of video game characters and their human operators who are trapped in an arcade game. Both alliances must work to complete tasks in order to defeat the boss and escape. A description and video simulation of the "Power Up" game can be found online at: goo.gl/vnarQL.

After completing robots, teams from across the country will compete for awards, scholarships and other

prizes at regional competitions. These include the annual Bayou Regional Competition, scheduled for March 21-24 at the Ponchartrain Center in Kenner, Louisiana. Regional winners are eligible to advance to national championship events.

The regional event is supported by FIRST® Louisiana-Mississippi, a nonprofit group that seeks to grow

FIRST® teams across the two-state region. NASA and Stennis Space Center also support the FIRST® Robotics Competition with mentors, volunteers and contributions.

For information about FIRST® Robotics, visit: www.usfirst.org/. For more about the Bayou Regional FIRST® Robotics Competition, visit: www.frcbayouregional.com/



(Above photo) Stennis Education Director Kelly Martin-Rivers welcomes participants to the kickoff of the 2018 FIRST® Robotics season Jan. 6. Twenty-one teams from across Louisiana and Mississippi attended the kickoff event to learn details of this year's robotic challenge.

(Left photo) Stennis Space Center mascot Orbie the Astronaut welcomes participants to the 2018 FIRST® Robotics season kickoff event in the StennisSphere auditorium Jan. 6.

Stennis resident agency focuses on workplace safety

Note: The following is part of a regular focus on safety and health at Stennis Space Center. It was written by Donna Pullman with Aerojet Rocketdyne.

Aerojet Rocketdyne believes in providing a safe work environment for its employees. The company is diligent about continually improving both safety and quality processes to prevent injuries in the workplace.

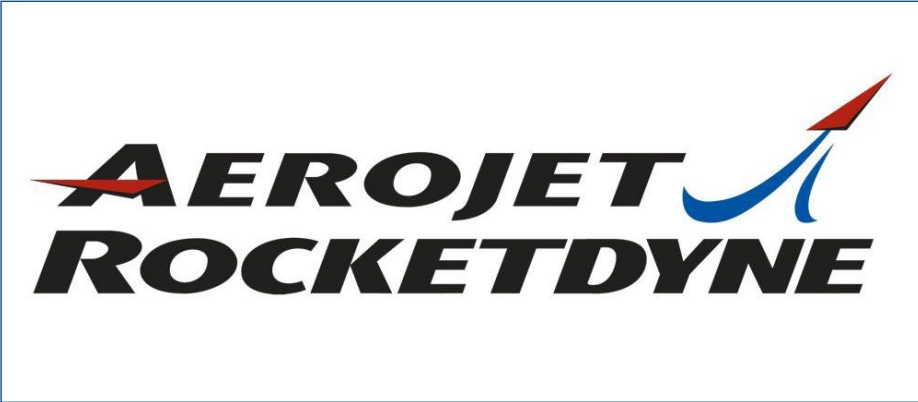
When employees are injured, thorough investigations are conducted to determine the root cause of the incident and develop and implement corrective actions to prevent similar incidents from happening in the future. When more than one similar event happens, consideration is given to how those incidents are related and whether there are similar corrective actions that can help prevent injuries during other operations.

Two Aerojet Rocketdyne employees each recently pinched their hand while conducting different torqueing operations. The company took the initiative to make sure the lessons learned during both investigations were applied broadly. In both cases, the torqueing operation failed in an unexpected way: a hex bit broke during one operation, while a wrench vibrated off the handle of a pneumatic ratchet during the other.

Risk analyses, industrial ergonomic assessments and job safety analyses were reviewed. Investigations showed that

in both cases an approved risk assessment was in place, and both employees were experienced in these types of operations.


There is, however, always room for improvement in our practices and assessments. Additional consideration can be given to improve tools used in the operations; eliminate options for use of less effective tools; identify any anomalies even if they do not result in injuries; update risk assessments; and thoroughly question and, if possible, eliminate deviations from expected operations.



Following these incidents, employees were retrained with emphasis placed on tool usage and the importance of removing damaged tools from service. A full sweep of all tool kits

was performed to verify proper safety practices were being maintained. Updated requirements for using the improved tools were implemented. A site assessment for alternate tooling configurations was performed. Work instructions were updated to include new tooling information, and equipment was modified to make sure the new requirements could be met.

At Aerojet Rocketdyne, there is an emphasis placed on safety and quality as an expectation to achieve mission success. These examples show that even companies that routinely perform risk assessments and have experienced personnel can still experience injuries. However, the subsequent investigations and resulting comprehensive corrective actions show the commitment Aerojet Rocketdyne has for the safety of its employees.



An engaged safety culture keeps Stennis Space Center rocketing forward!
To contribute to this page, contact:
Kamili Shaw at kamili.j.shaw@nasa.gov or Karen Patton at karen.patton@

Hail & Farewell

NASA bids farewell to the following:

- | | | |
|-------------------------------|----------------------------------|----------------------------------|
| Mark Hughes | AST, Engineer Project Management | Engineering and Test Directorate |
| Kathy Lambert | Management Support Assistant | Center Operations Directorate |

1978 – ‘Steel City’ comes to Stennis Space Center

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.

One thing Jackson Balch tried to do as director of the Mississippi Test Facility (MTF) from 1965 to 1975 was bring agencies and organizations together so their work and research would benefit each other.

In 1971, the U.S. Army was searching for a place to build a plant for their ammunition modernization program. This was a classified program named “Steel City.” At first, it was suggested that the Army look at Camp Shelby, just south of Hattiesburg, for their ammunition plant. However, the Army had its sights set on the Mississippi Test Facility to the south.

The Army estimated that the plant was going to cost \$500 million and employ around 1,200 people, quite overwhelming numbers compared to the smaller installations on site at MTF. Balch worried that the ammunition plant would overshadow the space and environmental work that was being done at MTF.

However, Mr. Balch needed not worry. The Army did suggest some changes at MTF, including that engine testing could possibly move to another site in Florida. However, NASA and U.S. Sen. John C. Stennis of Mississippi kept to their word and said the decision had already been made that engine testing would stay at MTF.

A 2015 aerial photo shows some of the former Mississippi Army Ammunition Plant facilities at Stennis Space Center. Constructed by the U.S. Army on acreage in the northern portion of Stennis, the plant opened in 1983 as the most sophisticated munitions-manufacturing facility in the nation. Plant production of 155mm howitzer projectiles and grenade bodies ended in 1990. In 1992, the U.S. Army began leasing space to tenants. The facility was designated for closure in 2005 and officially closed in 2009. It was transferred to NASA ownership in 2011, with a dozen tenants already occupying former plant facilities.

The Army, MTF and Stennis all wanted to make Steel City work. The Senate Armed Services Committee, which Stennis chaired, gave the Army funding to begin construction of the Mississippi Army Ammunition Plant (MSAAP) at MTF.

A lot was happening at MTF at that time as Balch focused on building up the agencies that would call MTF home. He convinced Dr. George Constan, a former manager of NASA’s Michoud Assembly Facility in nearby New Orleans, to serve as the liaison between NASA and the Army for the Steel City project.

The building of Steel City began with groundbreaking ceremonies 40 years ago on Jan. 10, 1978. Stennis joined Jerry Hlass, who succeeded Balch as MTF director, for the ceremony, along with U.S. Reps. Trent Lott and Sonny Montgomery; Deputy Secretary of Defense Charles Duncan Jr.; Secretary of the Navy W. Graham Clator Jr.; Rear Admiral J. Edward Snyder Jr.; and NASA Deputy Administrator Alan Lovelace.

In his address at the groundbreaking, Stennis congratulated the arrangement of agencies at the site. “Today, this facility exists as a national model of federal agency coordination and cooperation,” he said. Some 1,500 people from the surrounding area joined in the celebration of this monumental facility.

The history between MSAAP and MTF is a long and interesting one. If you want to know more, check it out at the Stennis History Office in Bldg. 3204 or call 688-2643.



Office of Diversity and Equal Opportunity

Martin Luther King Jr. holiday – ‘A Day On ... Not a Day Off’

Everybody can be great ... because anybody can serve. – Dr. Martin Luther King Jr.

Dr. Martin Luther King, Jr. once said, “Life’s most persistent and urgent question is: ‘What are you doing for others?’” Each year, Americans across the country answer that question by coming together on the Martin Luther King (MLK) Jr. holiday to serve their neighbors and communities. The day represents the opportunity to start the year off right by making a positive impact in the community.

It took 15 years to create the federal holiday. Congressman John Conyers introduced legislation for a commemorative holiday four days after King was assassinated in 1968. After the bill stalled, petitions endorsing the holiday and containing six million names were submitted to Congress.

Public pressure for the holiday mounted during the 1982 and 1983 civil rights marches in Washington. Congress passed the holiday legislation in 1983, and it was signed into law by President Ronald Reagan. In January 1986, Coretta Scott King oversaw the first legal holiday in honor of her late husband. The King holiday now is celebrated each year by millions of people in over 100 countries.

The national recurring theme of the holiday is “Remember! Celebrate! Act! A Day On ... Not A Day Off.” It calls on the American people to engage in public service and promote peaceful social change.

King’s holiday is a perfect opportunity for Americans to honor his legacy through service. The MLK Day of Service empowers individuals, strengthens communities,

bridges barriers, creates solutions to social problems and moves persons closer to King’s vision of a beloved community. On this day, Americans of every age and background celebrate King through service projects.

In 1994, Congress designated the King federal holiday as a national day of service and charged the Corporation for National and Community Service with leading the effort. Taking place each year on the third Monday in January, the MLK Day of Service is the only federal holiday observed as a national day of service – a “day on ... not a day off.” Each year, the MLK Day of Service calls for Americans to work together to provide solutions to our most pressing national problems.

More than 40 years after his death, King’s example can continue to guide in addressing the most critical issues. Everyone can contribute to strengthening their own communities by serving in King’s honor not only on the holiday but throughout the year.

By making service part of daily lives, individuals can create and sustain opportunities for Americans to strengthen their own and others’ economic opportunity, ensure that more young people graduate from high school, support military families and veterans and help communities prepare for and recover from disaster.

Join the hundreds of thousands of people who serve on MLK Day and throughout the year. America’s new foundation will be built one community at a time – and it starts with you.



Stennis observes 2018 MLK Jr. Day

Donald Burris speaks to Stennis Space Center employees during the site’s 2018 Martin Luther King Jr. Day program on Jan. 11. A St. Tammany Parish business owner, Burris also serves as pastor of Goodwill Missionary Baptist Church in Mandeville, La., and as a chaplain with the St. Tammany Parish Coroner’s Office. He spoke of his involvement in various charity efforts, reflecting King’s emphasis on community service and highlighting the theme of the annual emphasis – Remember! Celebrate! Act! A Day On, Not a Day Off!

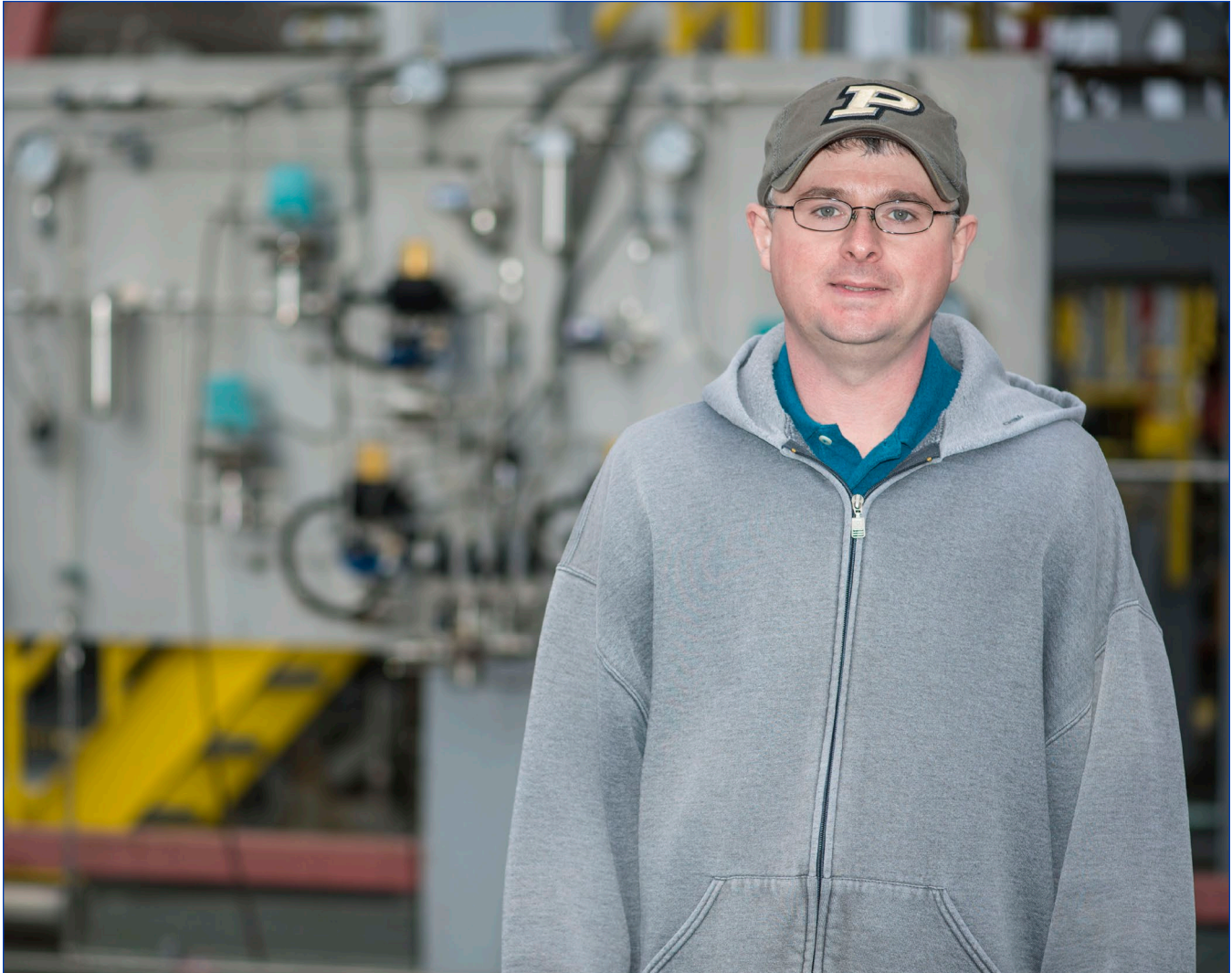


Faces of Stennis

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.



Nick Nugent



Nick Nugent's earliest space-related memory is not a good one. As a six-year-old suffering with pneumonia, he viewed the Challenger tragedy on television. Years later, though Nugent is replacing that memory with exciting new ones related to his work as a design engineer in the mechanical and design branch of the Engineering and Test Directorate at Stennis Space Center. His duties relate directly to NASA's plans to enter a new era of human space exploration aboard the Space Launch System (SLS) rocket and Orion spacecraft. Stennis is testing engines for the SLS and preparing to test its rocket stages on the B-2 Test Stand. Nugent serves as mechanical design lead for SLS core stage testing on the stand, as well as for the subsequent SLS exploration upper stage testing project. It is unlikely the native of Shepherdsville, Kentucky, who grew up in Evansville,

Indiana, ever imagined living in Carriere, Mississippi, and working on site. However, as a doctoral student at Purdue University, Nugent earned a fellowship through NASA's Graduate Student Researcher's Project. "This allowed me to visit and work with Stennis," he said. "I enjoyed the work environment and people." Nugent continues to enjoy working with talented Stennis colleagues on challenging projects. He is proud of his contributions to beneficial advancements and technologies and looks forward to the SLS "green run" test projects that will support NASA's return to the moon and missions to deeper space destinations. He also is excited about Stennis' growing partnerships with commercial space companies. Away from Stennis, Nugent enjoys model railroading and joining his wife, Sarah, in working on their Carriere acreage, hiking, visiting parks and traveling.