

Stennis Day at the Capitol



Astronaut Stephanie Wilson speaks to Mississippi senators during Stennis Day at the Capitol activities March 21 in Jackson, Mississippi. She is joined (l to r) by state Sens. Angela Burks Hill of Picayune, Jennifer Branning of Philadelphia, Philip Moran of Kiln and state Rep. Timmy Ladner of Poplarville.



'It was a good year'

Stennis director hosts annual community briefing

See page 5

FORE!!! Sorry – I did not mean to yell so loudly in your ear, but it is that time of year to get back into good golfing form. Most golfers head to the driving range to sharpen up their swings after a winter hiatus from the links. However, when you have a golf swing like mine, it is better to work on getting the vocal chords into good shouting shape for warning fellow duffers of inevitably errant shots. Ark!

You may think golf is a funny topic for a NASA publication, but it turns out the two have quite a partnership. NASA development and use of technology has impacted the world of golf for a number of years and in a number of ways. NASA high-speed video technology helped companies study balls in flight to determine the best design. Metal mixtures from space shuttle research helped develop a new line of golf clubs. A fabric developed for spacewalking astronauts even has been used to reduce sweating in socks, which might just make your golf shoes smell better!

Of course, golf is not the only area of life in which NASA had an impact. You almost cannot name an area where NASA technology or knowledge has not proven

of good use. Whenever you use the camera on your smartphone, turn to GPS to get yourself “un-lost” or rest on that memory foam mattress or pillow you love, you are benefiting from NASA technology.

NASA technology has contributed to products and processes in such areas as airlines, baby formula, search-and-rescue efforts, transportation, construction, water filtration, orthodontics, heart surgery, packaged foods, physical rehabilitation, even amusement parks.

A number of the spinoff technologies have been developed by and through Stennis, such as the imager that firefighters around the world use to identify invisible flames and a no-leak valve design now available for licensing and commercial use.

The list goes on and on. NASA is about so much more than space, which would be a good thing to point out to folk as you watch the New Orleans-area Zurich Classic golf tournament later this month. I will be there, hoping to pick up a tip or two to help my swing. Maybe this year, I will get something other than the advice I received last year – to switch to bowling. Ark!



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FULFILLING NASA'S EXPLORATION MISSION

Stennis signs its 1st Commerical Space Launch Act

Stennis Space Center has entered into its first-ever Commercial Space Launch Act with Relativity Space, a private company focused on a new approach to developing small rocket launch vehicles.

Relativity Space co-founder and Chief Operating Officer Tim Ellis announced the agreement March 21. It grants Relativity exclusive use of the E-4 Test Complex at Stennis to develop multiple vertical engine test stands, along with a second- and first-stage hold-down test stand, for testing its engines and vehicles. Relativity estimates the agreement will save them up to \$30 million in terms of infrastructure and other testing facilities they will no longer need to build themselves.

“This is an exciting time for us,” Stennis Director Rick Gilbrech said. “Signing of our first CSLA agreement with Relativity Space opens yet another avenue for commercial customers to perform cost-efficient engine testing at Stennis.”

Ellis agreed. “Our partnership with Stennis is an important milestone for Relativity,” he said. “We are an emerging leader in America’s commercial space industry and, as the company moves into its next phase of growth, this agreement gives us the certainty and flexibility we need to develop our vehicle in the most efficient way possible. Our team and the path-breaking technology they have developed are reimagining the way rockets are built and flown, and this partnership will help us make our vision a reality. Relativity Space looks forward to serving the rapidly growing market for launch services, and we are grateful to the entire Stennis team for their support.”

Relativity already has a Space Act Agreement with Stennis for testing its Aeon 1 engine on the E-3 Test Stand. Dozens of tests have been conducted on the engine, and the company plans to continue the testing as the E-4 facilities are being completed.

The new Commercial Space Launch Act terms are for a 10-year initial use with an option for a 10-year extension. The 25-acre E-4 complex originally was developed

by NASA with multiple test cells able to test engines up to several hundred thousand pounds of thrust. Full construction of the cells were not completed, and the existing infrastructure is currently unused. Over time, Relativity plans to use E-4 to initially qualify and acceptance test more than 36 vehicles and 360 engines per year.

Last month, Ellis was selected to serve on the National Space Council’s Users’

Advisory Group, a select group of private, public and non-governmental stakeholders to advise the council as it seeks to foster close coordination, cooperation, and technology and information exchange across the nation’s space enterprise. Relativity is the only early-stage commercial space company represented on the advisory group.

Relativity is seeking to create an entirely new process to build and fly rockets. The company has created the world’s largest metal 3D printer to 3D print their own rockets and launch satellites into space. Relativity’s process aims to cut rocket part count by 100 times and to enable rockets to be built in days instead of years. Based in Los Angeles, California, Relativity is privately funded by Social Capital, Y Combinator Continuity and Mark Cuban.



An aerial photos shows the A-1 Test Stand (top right) and the E Test Complex (foreground facilities) at Stennis Space Center. The E-4 test area to be developed by Relativity Space is the small cluster of facilities and unfinished test cells at the top left, indicated by the red square.

Site leaders visit Mississippi Capitol to share Stennis story with state officials



Astronaut Stephanie Wilson, Stennis Space Center leaders and Stennis resident agency representatives visited Jackson, Mississippi, on March 21 to host Stennis Day at the Capitol activities for state legislators. Members of the visiting delegation addressed members of the state Senate and House of Representatives, visited with individual Mississippi leaders and provided information on Stennis Space Center and its range of work.

(Top left) Astronaut Stephanie Wilson stands with Mississippi Gov. Phil Bryant.

(Top right) Astronaut Stephanie Wilson appears before members of the Mississippi House of Representatives. She is joined (l to r) by Mike McDaniel of Aerojet Rocketdyne, Stennis Assistant to the Director Darryl Gaines, Speaker of the House Philip Gunn of Clinton, Stennis Deputy Director Randy Galloway, Stennis Legislative Affairs Liaison Anne Peek, Stennis Strategic Business Development Manager Don Beckmeyer and Speaker Pro Tempore Greg Snowden of Meridian.

(Bottom left) Astronaut Stephanie Wilson speaks with a group of students during Stennis Day at the Capitol activities March 21.

(Bottom right) Stennis Advanced Technology and Technology Transfer Branch Manager Duane Armstrong shares information about his work at Stennis with an exhibit visitor during recent Stennis Day at the Capitol activities.



'Lot of exciting work on the books' – Stennis hosts area leaders for annual site briefing



Both NASA and Stennis recorded good years in 2017 and are focused on continuing to move forward, Stennis director Rick Gilbrech (left) indicated in his annual site report to community leaders April 5. The Stennis federal city is alive and thriving, Gilbrech told Gulf Coast leaders gathered for the annual director's briefing event, hosted this year by Partners for Stennis and Michoud at the Northshore Harbor Center in Slidell. "There is a lot of exciting work on the books and a lot of challenges to meet," the Stennis leader said. Gilbrech reported that Stennis conducted 209 rocket engine/component tests on seven separate test stands in 2017 and is continuing preparations for testing the core stage of NASA's new Space Launch System in the first half of 2019. In addition to Gilbrech, briefing attendees heard from Todd May (top right), director of Marshall Space flight Center in Huntsville, Ala., and Bill Burnett, technical director of the Naval Meteorology and Oceanography Command at Stennis. May updated participants on SLS rocket work under way at Michoud Assembly Facility in New Orleans, which is operated by Marshall. "This rocket is real, ..." May said. "It's exciting to see all that hardware (being built at Michoud)." The three leaders fielded questions following their presentations and spoke with media members, as did Mike McDaniel (below right), site manager for Aerojet Rocketdyne at Stennis and Partners for Stennis and Michoud chair.





Stennis helps staff NASA exhibit at national fest

Nick Middleton, a visitor relations specialist at Stennis Space Center (I) talks to visitors at an exhibit booth during the USA Science and Engineering Festival on April 6 at the Walter E. Washington Convention Center in Washington, DC. The festival was open to the public April 7-8. At the festival, NASA showcased the future of human space exploration – including the Orion spacecraft and the Space Launch System rocket. Exhibits also allowed attendees to learn about viewing the universe through the Hubble Space Telescope; X-rays and gamma rays; looking for the ingredients for life on other worlds; living and working on the International Space Station; breakthroughs with small satellites; NASA aeronautics' plans for new X-planes; and more.

NASA in the News

NASA awards supersonic plane contract

NASA has taken another step toward re-introducing supersonic flight with the April 3 award of a contract for the design, building and testing of a supersonic aircraft that reduces a sonic boom to a gentle thump. Lockheed Martin Aeronautics Co. was selected for the Low-Boom Flight Demonstration contract, valued at \$247.5 million. Under the contract, Lockheed Martin will complete the design and fabrication of an experimental aircraft by the close of 2021. The so-called X-plane is being designed to cruise at 55,000 feet at a speed of about 940 mph, while creating a sound about as loud as a car door closing, 75 Perceived Level decibel (PLdB), instead of a sonic boom. Once the plane is delivered, NASA will perform additional flight tests to prove the craft's capabilities and that it is safe to operate. Beginning in mid-2022, NASA will fly the X-plane over select U.S. cities and collect data about community responses to the flights. The data set will be provided to U.S. and international regulators for their use in considering new sound-based rules regarding supersonic flight over land.

Launch of Webb telescope now 2020

NASA's James Webb Space Telescope currently is undergoing final integration and test phases that will require more time to ensure a successful mission. After an independent assessment of remaining tasks for the highly complex space observatory, Webb's previously revised 2019 launch window now is targeted for about May 2020. Testing the hardware on the observatory's telescope element and spacecraft element demonstrate that these systems individually meet their requirements. However, recent findings from the project's Standing Review Board indicate more time is needed to test and integrate these components together and then perform environmental testing. The James Webb Space Telescope will be the world's premier infrared space observatory and the biggest astronomical space science telescope ever built. Webb is expected to help solve mysteries of the solar system, look beyond to distant worlds around other stars and probe the mysterious structures and origins of the universe and Earth's place in it. For more information, visit: <https://www.nasa.gov/webb>.

Stennis hosts activities at student career expo



Stennis Office of Communications and Office of Education personnel teamed up to host activities at the Pathways2Possibilities Delta Interactive Career Expo on March 21-22 in Greenville, Miss. More than 2,400 Mississippi middle school students participated in the event, which presented opportunities for them to explore and learn about a variety of career paths.

The event is designed to engage and inspire middle school students to pursue STEM (science, technology, engineering and mathematics)-related studies and careers. Stennis activities at the event included an interactive challenge that allowed students to experience what it is like to live and work in space, as well as a chance to launch “stomp rockets.”

Hail & Farewell

Andrew Guymon
Tiffany Hawkins
Justin Junell
George Piccolo

NASA bids farewell to the following:

Mechanical Engineer	Engineering and Test Directorate
Aerospace Engineer	Safety and Mission Assurance Directorate
AST, Technical Management	Engineering and Test Directorate
Contract Specialist	Office of Procurement

NASA welcomes the following:

Cody Beckmeyer

Electrical Engineer	Engineering and Test Directorate
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Stennis supports annual robotics competition

Stennis volunteers and Office of Education personnel supported more than 1,400 high school students during the annual Bayou Regional *FIRST*[®] (For Inspiration and Recognition of Science and Technology) Robotics Competition in Kenner, Louisiana, on March 22-24.

FIRST[®] competition seeks to inspire students around the world to pursue STEM (science, technology, engineering and mathematics) studies and careers. Teams are given identical parts kits and six weeks to build robots to compete in scheduled tournaments. In this year's *Power Up* competition, teams "trapped" in an arcade game performed robotic tasks to defeat the boss and escape.

Fifty-seven teams from across the nation and Mexico competed in this year's Bayou Regional, supported by Stennis volunteers who served as mentors and judges. Educators and volunteers also shared information about NASA intern and career opportunities and hosted STEM activities, including a virtual reality look at current NASA apps, a hands-on extravehicular activity challenge highlighting technology used on the International Space Station and a "moon landing" activity testing participants' knowledge of what it would take to survive on the moon.

Mississippi legislators visit Stennis



A pair of Mississippi state representatives and staff members stand near the B-1/B-2 Test Stand at Stennis Space Center during a site visit April 11. Stennis Space Center Deputy Director Randy Galloway (standing, second from left) hosted the group, which included Mississippi Speaker of the House Philip Gunn of Clinton (center) and Rep. Stacey Wilkes of Picayune (standing, fourth from left). In addition to learning about ongoing work at the site, the group viewed an RS-68 rocket engine test on the B-1 Test Stand.

Stennis observes Women's History Month



Julie A. Van Kleeck, vice president of advanced space and launch business unit at Aerojet Rocketdyne, speaks to Stennis space Center employees during a Women's History Month program March 19. March has been observed as National Women's History Month in the United States since 1987 as a way to recognize and celebrate the achievements of American women. This year's theme was "NEVERTHELESS SHE PERSISTED: Honoring Women Who Fight All Forms of Discrimination Against Women."

For SaiTech employees, safety extends beyond work

Note: The following is part of a regular focus on safety and health at Stennis Space Center. It was submitted by SaiTech safety specialist Ronnie Good.

SaiTech is an OSHA Voluntary Protection Program (VPP) Star Certified company at Stennis Space Center. Members of its information technology services (ITS) team recently were asked how VPP, the safety program and the Stennis safety culture has changed or modified their safety thinking and habits when away from work. Here is what they said:

- “I now wear eye protection, hearing protection, gloves, light-colored clothes and a wide-brim hat while working in the yard (mowing, etc.). I believe the ITS safety program has had a definite impact on this.”

- “My nature has always been to be overly careful, protective and timid to avoid accidents/injuries as much as possible.

Because the safety awareness bulletins and training at work have increased my knowledge and understanding, I am more confident and less afraid of serious accidents/injuries occurring due to improper conduct. Because I am more aware of techniques that can prevent injuries, I am still cautious but not overly nervous or worried about an accident waiting to happen, such as knowing more about what can lead to ladder falls and properly planning for lifting and moving objects based on proven techniques.”

- “I am more aware of eye safety when working in the yard, weed eating and mowing.”

- “Our safety program has helped me become more aware of hazards around my home. I purchased a home fire extinguisher because of our training (something I had never done), and began inspecting my electrical extension cords before I begin work on outdoor projects.”

- “Something I am much more aware of is lifting heavy

items at home – back safety and lifting properly. For example, when grocery shopping and buying cases of water, I am trying to keep my back straight and lift through and with my legs and not use my back.”

- “My husband and I were putting up outside Christmas lights. I noticed that he pulled his truck in the front of the house and grabbed the ladder. He said he was about to put some lights in the gable of the house. I said, I know you are not going to put that ladder in the back of the truck and stand on it. He said, yes I am. Well, with all of the safety training that I have been through at work and the many videos I have watched, that did not happen. And our Christmas lights were still pretty, even if they were not put to the peak of the house.”

- “I check fire extinguishers in my kitchen and garage when I change smoke alarm batteries (time changes).”

- “I’ve become a safer driver. I don’t text while driving and maintain a better situational awareness of other traf-

fic, which has kept me safe from accidents. During bad weather, I slow to a safer speed, which recently kept me from being involved in a three-vehicle wreck that happened directly in front of me. Two vehicles were speeding in bad weather, one skidded into the other and then slammed into the retainer fence. Another vehicle that was also speeding could not slow down and slammed into the vehicle that caused the accident. If I had been driving at the speed limit, I doubt if I would have been able to stop in time to avoid the accident.”

- “I’m more conscientious about checking smoke alarms. Also, I’m more apt to read and get familiar with the hazard information on chemicals we use.”

- “Being part of the VPP safety program has taught me to think about my safety on and off the job and, most importantly, to think about the safety of others at work and at home and to teach others that you know and love about safety.”



An engaged safety culture keeps Stennis Space Center rocketing forward!

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1978 – NASA tests shuttle propulsion system

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.

In the 1970s, the Apollo Era was coming to a close. Saturn rocket testing had ended at the Mississippi Test Facility, but a new engine roar was soon to be heard, the space shuttle main engine.

In 1971, the testing of the space shuttle main engines was assigned to the Mississippi Test Facility, and work began on modifying the test stands for this new endeavor.

The space shuttle main engine test project at Stennis officially began on May 19, 1975. The so-called "burp" test last did not include full ignition of the engine. The first full ignition space shuttle main engine test occurred on June 12, 1975. Twelve days later, on June 24, 1975, Stennis conducted the first full-duration space shuttle main engine test.

With single-engine testing under way, attention at the newly-renamed National Space Technologies Laboratory squarely turned to testing the shuttle's main propulsion test article (MPTA). For that project, the site brought in the best test conductors in the country.

The shuttle MPTA consisted of three main engines, an external propellant tank, associated systems and a simulated orbiter aft section. All of the components were

installed on the B-2 Test Stand and the engines test fired simultaneously, just as during an actual launch, to prove the propulsion system would operate as needed to power shuttle flights.

The MPTA testing was critical due to the unique nature of the shuttle design. Every previous rocket system was tested with uncrewed flights prior to launching human

missions. That was not the case with the space shuttle. The first time it launched, it carried two astronauts, who were relying on the work that had been done at Stennis to carry them safely to space.

Harry Johnstone first headed up the program, and through the years the MPTA test team, consisted of Tom Baggette, John Plowden, Tom Lyddon, Marv Carpenter, Lou Nelson, Boyce Mix, Doug Howard and Bill Lindsey, just to name a few members of the team.

In March 1978, the MPTA test team went

through a Firing Readiness Review that was done by NASA's Review Board. Each element and part of the operation was reviewed, and at the end of the extensive two-day session, the operation received the "thumbs up" for test firing.

So, on April 21, 1978, 40 years ago, the first shuttle MPTA test was conducted on the B-2 stand at 11:34 a.m. The hot fire was only 1.90 seconds and signaled by just a small puff of smoke, but it was an important chapter in testing history at what is now Stennis Space Center.



A trio of space shuttle main engines fire simultaneously during a test of the vehicle main propulsion test article on the B-2 Test Stand at Stennis. The series of test to certify the design and operation of the shuttle propulsion system was a critical milestone leading up to the maiden launch of the vehicle and is considered by many to represent one of Stennis' finest hours.

Office of Diversity and Equal Opportunity

Holocaust Days of Remembrance focus on victims, liberators

We must never forget the great atrocity of which mankind is capable.

Each year, the U.S. Holocaust Memorial Museum leads the nation in commemorating Holocaust Days of Remembrance. The annual emphasis was established by the U.S. Congress to memorialize the 6 million Jews murdered in the Holocaust – as well as the millions of non-Jewish victims of Nazi persecution.

Holocaust is a word of Greek origin meaning “sacrifice by fire.” The Nazis, who came to power in Germany in January 1933, believed that Germans were “racially superior” and that the Jews, deemed “inferior,” were an alien threat to the so-called German racial community.

German authorities also targeted other groups because of their perceived “racial inferiority” – Roma (gypsies), individuals with disabilities, and Slavic peoples (Poles, Russians, and others). Other groups were persecuted on political, ideological, and behavioral grounds, among them Communists, Socialists, Jehovah’s Witnesses and homosexuals.

Each year, the Days of Remembrance emphasis seeks to honor and remember the victims of the Holocaust and their liberators. One of the many Holocaust survivors was Anthony Acevedo, a Mexican American and World War II veteran.

Acevedo was born in 1924 in San Bernardino, California, to Francisco Guillermo and Maria Luisa Acevedo. In 1937, his Mexican-born parents were deported and the family relocated to Durango, Mexico. In 1943, Acevedo joined the Army and was assigned as a medic to Company B, 275th regiment, 70th Infantry Division. His company fought in the Battle of the Bulge, one of the bloodiest battles of World War II, and was taken prisoner at Falkenberg Hill in January 1945.

Acevedo and 350 of his fellow soldiers were transported to the Berga An Der Elster, a slave labor camp, and a sub camp of the Buchenwald concentration camp. While a

prisoner of war, Acevedo kept a diary of the soldiers’ experiences. In his diaries, he recorded a grim roster of prisoner deaths (by dysentery, heart attack, jaundice, influenza and starvation), the cruelty of the guards and rumors of American troops closing in on the Berga camp.

The diary was a rare accounting of Nazi atrocities by an American prisoner of war. Acevedo was liberated on April 23, 1945, by the 11th Armored Division.

He weighed just 87 pounds.

Acevedo received several awards, including the Bronze Star for his wartime service. In 2010, he donated his diary to the U.S. Holocaust Memorial Museum along with personal artifacts. He also became the first Mexican American to register with the museum’s Holocaust survivor list. Acevedo died on February 20, 2018 at the Veterans

Affairs Hospital in Loma Linda, California. He was 93.

Upon presentation of the diary to the museum, Director of Curatorial Affairs Scott Miller said, “This diary exemplifies the fact that the Holocaust is a story that belongs to many types of people from various ethnic, religious, national groups.”

He went on to say to Acevedo, “You did your best as a medic, you did your very best as a witness to history by writing this diary for us and future generations.”

The annual Days of Remembrance carry forward the proud legacy of men and women of the U.S. Armed Forces who played an essential role in liberating the camps at Buchenwald, Dora-Mittelbau, Flossenbürg, Dachau, and Mauthausen. American forces not only secured freedom for the survivors of Nazi horrors but also ensured that the world would know about all that happened.

For more information about Anthony Acevedo and to view his diaries, visit www.ushmm.org. Information in this article came from the Defense Equal Opportunity Management Institute www.deomi.org.

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 SCC; To be an excellent resource for our customers, stakeholders, and partners; To have a sustained impact on NASA SCC and beyond.*



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.



Robert Southers



Robert Southers came to Stennis Space Center for a summer job – and found a “village” that continues to nurture him. Southers worked as a summer high school intern at Stennis in 2005, returned as a safety and mission assurance cooperative education student in 2010 and joined the Stennis Safety and Mission Assurance Directorate team fulltime following his college graduation in 2012. Since then, he has served in a range of safety and mission assurance roles, including as safety representative for various test projects. As the Stennis audit manager, he now is responsible for implementing, managing and reporting on all internal and external center audits. As interim response team lead, he also coordinates the preservation of evidence and scenes for all Stennis injuries and mishaps. Through it all, the best part has been working with mentors, sponsors and

colleagues, some of whom are like parent figures. “This ‘village’ helped raise me, both personally and professionally,” Southers said. “People here are more like extended family members instead of coworkers.” Southers looks forward to being part of the older generation of that family years from now, having witnessed NASA’s travel to Mars from conception to end goal. In the meanwhile, he welcomes chances to participate in various NASA outreach and educational efforts, which has included work on a NASA leadership development team that created a successful – and ongoing – design activity to educate students about STEM (science, technology, engineering and mathematics) careers and promote collaboration and innovation. For Southers, all such efforts represent a chance to inspire others and to give back to both the community and the “village” that has brought him this far.