



National Aeronautics and Space Administration



# LAGNIAPPE

John C. Stennis Space Center

Volume 18 Issue 9

[www.nasa.gov/centers/stennis](http://www.nasa.gov/centers/stennis)

September 2022



## Stennis Space Sprouts!

See Pages 3-4

**I**sometimes wonder how many people ever take time to think about how a telescope works. Often, they use tools or pieces of equipment but give less thought to how the items properly function.

Those who have the patience of my grandgators also might be more concerned with the end result and less interested in the process of getting there. That process crossed my mind recently when looking into the sky.

With the naked eye, one can see the brightness of the stars but not much more detail beyond that. With the telescope, my, oh my! The night sky becomes clear and beautiful. It is a magical experience.

The short answer for how telescopes work, according to [NASA](#), is that early telescopes focused light using pieces of curved, clear glass, called lenses. However, most telescopes today use curved mirrors to gather light from the night sky. The shape of the mirror or lens in a telescope concentrates light. That light is what people see when they look into the telescope.

My imagination wonders – what would it be like to peer into a telescope and be able to see deep into the future. How cool would that be?

It makes me think of NASA's vision to return to the Moon on Artemis missions and eventually to travel to Mars. The agency has established where it is going and now is working through the process of getting there. Through NASA's leadership and the team here at Stennis, the nation is well on its way.

Preparing for the Artemis I launch, much like the optics of a telescope, must be almost perfect. For a telescope, that means the mirrors and lenses must be just the right shape to concentrate the light. For Artemis I and liftoff of the world's most powerful rocket, Space Launch System, and the Orion spacecraft, having everything just right is crucial to ensure safety.

A telescope cannot have any spots, scratches, or other flaws. If it does, what one sees can become

blurry and difficult to see.

For Artemis, crews far and wide, including those at Stennis, are working hard so that the future I imagine will soon become a clear reality. Just like looking through a telescope to see the beauty of the night sky, returning to the Moon and eventually traveling to Mars will be a magical experience, too.



*Lagniappe* is published monthly by the Office of Communications at NASA's John C. Stennis Space Center.

Access monthly copies at: [www.nasa.gov/centers/stennis/news/publications/index.html](http://www.nasa.gov/centers/stennis/news/publications/index.html)

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# Stennis Program Teaches Students About Return to Moon

A gasp could be heard among the four-year-old Hattiesburg Early Learning Collaborative students sitting in the Lillie Burney Multipurpose Building in Hattiesburg, Mississippi, on Sept. 9 when they learned NASA would be returning to the Moon.

The energy of the early-morning gathered noticeably sky-rocketed upon discovering that NASA's Stennis Space Center, only an hour from where they sat, would help accomplish something that had not happened for 50 years. The students cheered when they learned NASA expects to send the first woman and first person of color to the Moon on future Artemis missions launched on the new Space Launch System (SLS) rocket.

It was a morning of learning and activity for the students, thanks to the Space Sprouts event hosted by Stennis. Stennis launched the Space Sprouts initiative in 2021 as an effort to reach preschool students and spur early interest in space and STEM (science, technology, engineering, and math). Stennis hosted several virtual Space Sprouts events through the COVID-19 pandemic. During that time, Stennis reached over 5,000 preschool-aged students across Mississippi by hosting live virtual events, mailing activity packets, and sending pre-recorded videos to schools that could not support the virtual events.

Following a successful pilot program, the Space Sprouts program went on the road, with the Hattiesburg effort being the first in-person event conducted by the center.

"We want to connect with the students earlier in their development through engaging activities that peak their interest and hopefully inspire them to pursue STEM-related careers when they are older," said NASA Public Affairs Specialist Samone Wilson. "This event and the Space Sprouts program are an opportunity for them to see new things and maybe dream of what's possible in the future."

The Hattiesburg Early Learning Collaborative, one of the largest such programs in the state, includes 20 classes that serve more than 300 pre-K students in the school district. For the Sept. 9 activity, about 150 students gathered at the Lillie Burney Multipurpose Building. Others were sent materials that allowed them to conduct similar sessions in their home locations.

In all instances, students were introduced to SLS, the world's most powerful rocket, and the RS-25 engines that are tested at Stennis to help power launches of the rocket on missions to the Moon and beyond.

"We are excited about the Space Sprouts program and the opportunities for our four-year-olds to kick off their interest into STEM-type (science, technology, engineering, and math) projects, the love for science, and what it can lead to," said Hope Mikell, director of pre-K5 curriculum and instruction for Hattiesburg Public Schools. "I'm grateful for [Stennis Space Center] coming to us."

Many students were introduced to NASA and Stennis through the day-long event. Each class participated in hands-on activities with multiple booths set up throughout the building. Students got a taste of what it is like to live and work beyond Earth's orbit, seeing different kinds of food and drinks astronauts consume in space. They strapped on a sleeping bag to experience how an astronaut sleeps in space. The students also learned how to protect their skin from the Sun.

"We had an amazing day with the Hattiesburg Early Learning Collaborative," Wilson said. "The students were eager to learn and engage with us, and the teachers and staff were so welcoming. We look forward to continuing this partnership and sharing the in-person Space Sprouts program with other early childhood organizations in the future."



Stennis Visitor Relations Specialist Holley Argus teaches pre-K students about life in space, showing the group what astronauts drink as part of a meal during their time beyond Earth. Photo credit: (NASA/Bo Black)

# Stennis Space Sprouts Inspires Students To Dream



The Stennis Space Sprouts program held its first in-person event since the COVID-19 pandemic when it visited the Hattiesburg Early Learning Collaborative, one of the largest pre-K collaboratives in the state of

Mississippi, Sept. 9. In the above photo, students look at food and drinks astroanuts have while living and working beyond Earth's orbit. Photo credit: (NASA/Bo Black)



A young student admires her NASA tattoo during the Space Sprouts program in Hattiesburg, Mississippi. The NASA event provided an opportunity for many of the pre-K students to participate in their first field trip since starting school.



Stennis Visitor Relations Specialist Eunice Lichtenstein teaches students about the Sun.



A pre-K student shows excitement as he finishes coloring a picture of a NASA rocket.



Stennis Visitor Relations Specialist Vicki Bess applies a NASA tattoo to a Space Sprouts student.



T-38 planes fly in formation above NASA's Space Launch System (SLS) rocket on Launch Pad 39B at Kennedy Space Center in Cape Canaveral, Florida, on Aug. 25. NASA is preparing to launch SLS and the Orion spacecraft on the Artemis I test mission to the Moon. Astronaut Andrew Morgan posted the above photo to Twitter, thanking NASA centers across the country that have contributed to the Artemis I mission. This includes Stennis Space Center, where the four RS-25 engines and core stage of SLS were tested and proven flightworthy. Photo credit: NASA/ Josh Valcarcel

## NASA in the News

### NASA Identifies 13 Candidate Regions for Landing Next Americans on Moon

NASA has identified 13 candidate landing regions near the South Lunar Pole as the agency prepares to send astronauts back to the Moon under the Artemis program. The identified regions contain multiple landing sites for Artemis III, which will be the first Artemis mission to bring crew to the lunar surface, including the first woman to set foot on the Moon. "Selecting these regions means we are one giant leap closer to returning humans to the Moon for the first time since Apollo," said Mark Kirasich, deputy associate administrator for the Artemis Campaign Development Division at NASA Headquarters in Washington. "When we do, it will be unlike any mission that's come before as astronauts venture into dark areas previously unexplored by humans and lay the groundwork for future long-term stays." For more about why the 13 identified regions are considered scientifically significant, visit [here](#).

### James Webb Space Telescope's Jupiter Images Showcase Auroras, Hazes and More

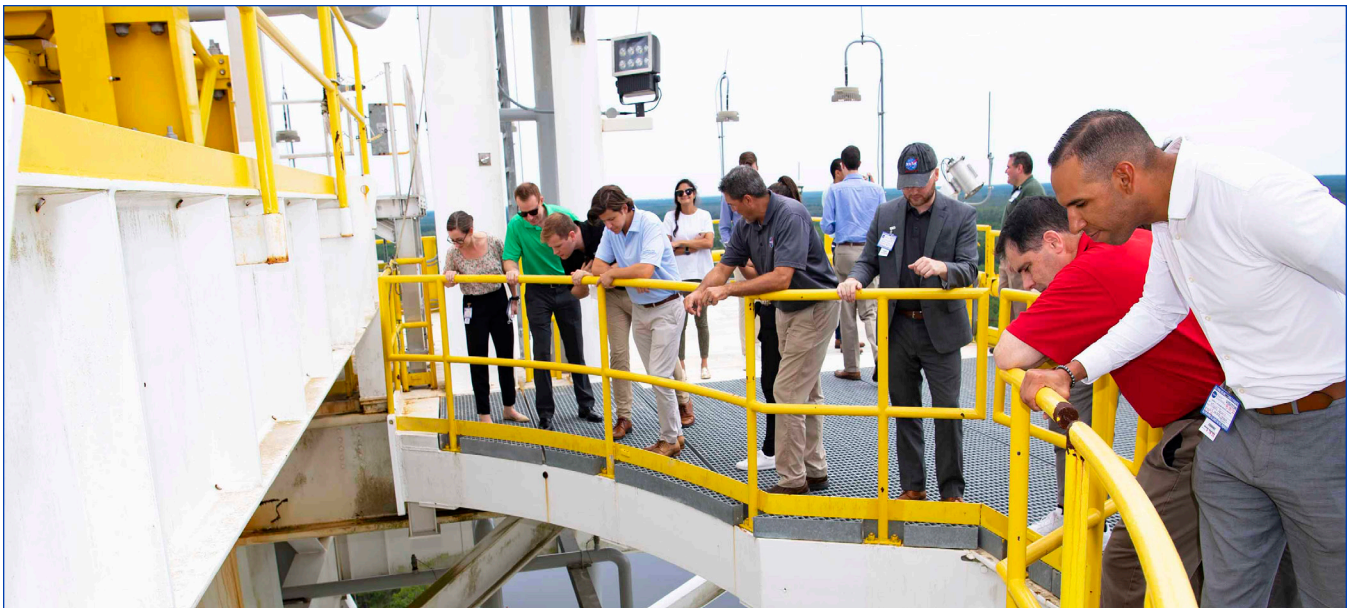
A lot is happening on planet Jupiter, as new images captured by NASA's James Webb Space Telescope reveal. Webb's Jupiter observations will give scientists even more clues to Jupiter's inner life. "We hadn't really expected it to be this good, to be honest," said planetary astronomer Imke de Pater, professor emerita of the University of California, Berkeley. De Pater led the observations of Jupiter with Thierry Fouchet, a professor at the Paris Observatory, as part of an international collaboration for Webb's Early Release Science program. Webb itself is an international mission led by NASA with its partners ESA (European Space Agency) and CSA (Canadian Space Agency). "It's really remarkable that we can see details on Jupiter together with its rings, tiny satellites, and even galaxies in one image," she said. For more about the intricate details of the captured images from the Webb Telescope, visit [here](#).

# Stennis News



## Stennis Welcomes Congressional Staff Delegates For Stennis Space Center Tour

(Above photo) Stennis Space Center Director Rick Gilbrech (seated, l) and Rear Adm. Ron Piret, commander of the Naval Meteorology and Oceanography Command (seated, r), welcome members of the U.S. Congressional Staff Delegation to Stennis on Aug. 18. The visitors, pictured in the Logtown Conference Room in the Roy Estess Building, represented seven states (Alabama, California, Florida, Illinois, Pennsylvania, Virginia, and Washington) and a number of key U.S. House committees. The group attended briefings and toured various Stennis facilities, including the B-2 Test Stand (bottom photo). As shown, the group peers into the bottom of the B-2 Test Stand, site of the Green Run test series on the first Space Launch System core stage, which is preparing to launch the Artemis I mission. The Green Run series concluded with a hot fire of the core stage and its four RS-25 engines, just as during an actual launch, in March 2021. The tour also included visits to the E Test Complex, Relativity Space, and Special Boat Team-22 facilities. Congressional offices represented included: Rep. Robert Aderholt of Alabama; Rep. Anna Eshoo of California; Reps. Mike Waltz and Bill Posey of Florida; Rep. Adam Kinzinger of Illinois; Rep. Guy Reschenthaler of Pennsylvania; Reps. Ben Cline and Don Beyer of Virginia; and Rep. Adam Smith of Washington. Photo credit: (NASA/ Danny Nowlin)



# NASA Engineer Reflects on Path to Stennis

Barry Robinson always wanted to participate in NASA's space program, but even he was surprised it would happen in south Mississippi, only two hours east of where he grew up in Morgan City, Louisiana.

Robinson has worked at Stennis Space Center for 32 years and now plays a vital role in NASA's push to return to the Moon through its Artemis missions and prepare for eventual flights to Mars.

"This is the largest project of its kind to hit Stennis since the Apollo program," Robinson said. "Back then, Stennis tested S-IC stages in our quest to go to the Moon. So, here we are again, at the forefront of providing transport to the Moon on the largest rocket ever built (Space Launch System or SLS) and testing RS-25 engines that will send it, here in south Mississippi at the place made just for doing such things.

"How much more exciting can it be?"

Robinson is currently project manager for Green Run testing of the Exploration Upper Stage (EUS) that will fly on the SLS rocket for future Artemis missions. EUS, which passed its critical design review in 2020, will replace the Interim Cryogenic Propulsion Stage that is being used on initial Artemis flights. It will allow NASA to send astronauts and larger payloads to the Moon on a single mission.

Robinson also was project manager for the Green Run test series on the first SLS core stage on the B-2 Test Stand at Stennis. The series of tests on the stage's integrated systems culminated with a hot fire of its four RS-25 engines, just as during an actual launch. The successful test series concluded in March 2021.

To better understand how Robinson made his way to Stennis, one would have to glimpse into a time period that helped develop the Slidell, Louisiana, resident – his time as a student at Southern University and A&M College in Baton Rouge, Louisiana.

"My experiences at Southern University have been invaluable in that it helped me to understand obstacles that manifest themselves in our lives are merely challenges well worth overcoming," he said.

Robinson graduated in 1988 with a bachelor's degree in mechanical engineering.

"Where better could you go to understand a different perspective of how diverse people – nationally, internationally, and culturally – can interact successfully in a mostly smaller, more intimate atmosphere without



Stennis Space Center Engineer Barry Robinson credits his time at Southern University for successfully preparing him to contribute to NASA's space program. Photo credit: (NASA/Danny Nowlin)

fear of bias or retaliation in current or future endeavors," Robinson said.

"This exposure (at an HBCU) is a great prerequisite to a global setting for which one can thrive in business, technical fields, liberal arts, and other areas because they've met, talked, interacted and sometimes learned from someone different."

Upon graduation, Robinson was hired by Rocketdyne (now Aerojet Rocketdyne) to work as test engineer for the space shuttle main engine project for four years. After serving as a development engineer for a year, Robinson was hired by NASA as test operations engineer.

He spent one year as a Stennis liaison at Marshall Space Flight Center in Huntsville, Alabama, for the previous Constellation Program and space shuttle main engine project offices before returning to Stennis as an engineering project manager.

"Being a civil servant who works for NASA in the technical aspects, and meeting people who have influenced or changed work in those areas or who are experts in a very narrow field of rocketry – how cool is that?" Robinson said. "And looking ahead, I am so excited about seeing how we re-invent ourselves in this evolving industry where commercialization is playing a larger role."

# National Aerospace Program Forms E-2 Test Facility

Stennis Space Center's E-2 Test Facility has evolved from its original purpose when it was built in the 1990s. The National Aerospace Plane (NASP), a program unveiled by the Reagan-Bush Administration in 1988, led to the construction of what is now E-2.

Stennis expanded its propulsion test expertise with data from the space shuttle main engine testing and work conducted in what was then the Component Test Facility and the High Heat Flux Facility.

In May 1992, Stennis was selected to test new materials for the NASP that would allow the plane to withstand an extreme change in temperature when it flew into Earth's orbit and landed in destinations across the globe.

While the High Heat Flux Facility was built to support the NASP project, Stennis leaders and engineers were forward thinking. This outlook resulted in the facility being highly versatile.

In addition to testing NASP components, the facility evolved into a test complex that could handle hot gas, cryogenic fluids, gas impingement, inert gases, industrial gases, specialized gases, hydraulics, and deionized and industrial water. When the NASP program was cancelled, Stennis leaders developed the site into needs of the future.

E-2 is now capable of supporting tests of complete flight or flight-like stages, as well as rocket engines and combustion devices.



An aerial photo shows Cell 1 (l) and Cell 2 (r) of the E-2 Test Facility (formerly known as the High Heat Flux Facility) at Stennis Space Center. Since its construction in the 1990s, Cell 1 has been modified to support advanced component and engine development projects. Its capabilities include supporting up to 100,000 pounds of thrust from combustion devices or turbopumps with liquid oxygen, liquid nitrogen, liquid hydrogen, isopropyl alcohol, refined petroleum, water, gaseous hydrogen, gaseous oxygen, gaseous methane, and gaseous nitrogen. Photo credit: (NASA/SSC)

## Past Propulsion Test Activities at E-2 Test Facility

- SpaceX Raptor Engine Subscale Components
- NASA Constellation Program Chemical Steam Generators in support of A-3 Test Facility design and construction
- NASA Test Technology Program – Instrumentation Test Article Testing
- NASA Next Generation Launch Technology – RS-84 Subscale Preburner Testing
- LR-89 liquid oxygen, refined petroleum engine – Department of Defense
- Peroxide Hybrid Upper Stage Motor – Lockheed Martin
- External Tank Frost Testing
- External Tank Diffuser Testing
- Valve Testing

Learn more about test facilities at Stennis Space Center [here](#).

## Hail & Farewell

NASA welcomes the following:

**Rose Taverna**

Accountant

Office of the Chief Financial Officer



## Office of Diversity and Equal Opportunity

# Celebrate Hispanic Heritage Month Through Inclusivity

The United States celebrates Hispanic Heritage Month annually from Sept. 15 to Oct. 15.

The observance honors the histories, cultures, contributions, and achievements of Hispanic/Latino/Latinx Americans whose ancestors came from Latin American countries and territories.

There are 20 Latin American countries and territories: Spain, Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Ecuador, Peru, Bolivia, Paraguay, Chile, Argentina, Uruguay, Cuba, Puerto Rico, and the Dominican Republic.

This year's theme for Hispanic Heritage Month is, "Unidos: Inclusivity for a Stronger Nation." Ily Soares, a supervisory accountant at Farm Credit Administration, submitted the winning theme, stating: "Hispanics in the United States are a diverse group who bring a rich combination of language, culture, educational backgrounds and experience to the great American experiment. This diverse background brings with it a wealth of ideas and perspectives. ... When different voices are sitting at the metaphorical table and included in key decisions, the entire community benefits from greater solutions. ... Whether it be education, government, business, or the environment, ensuring that all voices are represented [results] in better and more thoughtful decision."

[Hispanic Heritage Month Theme](#)

Incorporating diverse voices and experiences into the workplace can help create new and innovative ideas and practices. As highlighted on [History.com](#), the following inventions were possible by the inclusion of Hispanic/Latino/Latinx voices:

- **Color TV:** Guillermo González Camarena, an electrical engineer, created the first Trichromatic Field Sequential System. This technology transmits moving images in variations of red, green and blue to achieve a spectrum of color. Before this innovation, TV only broadcasted in black and white.
- **Earthquake sensing technology:** In 1970, Arturo Arias Suárez, a professor at University of Chile, developed a mathematical formula to assess the strength of earthquake tremors. With the Instrumental Seismic Intensity, or Arias Intensity method, engineers can design buildings that are better equipped to withstand seismic activity.
- **CAPTCHA:** Luis von Ahn developed the cybersecurity system CAPTCHA, which stands for Completely Automated Public Turning test to tell Computers and Humans Apart. The system is designed to stop spam bots from accessing computer systems, and most people have probably used it before. The software most commonly asks users to click if they are not a robot. Von Ahn also is a cofounder of Duolingo, a language learning app.
- **Stent:** Julio Palmaz and Richard Schatz invented a balloon-expandable stent that keeps heart arteries open following angioplasty. An angioplasty is an operation that helps unclog blood arteries which makes it easier for blood to flow to the heart.
- **X-ray reflection microscope:** In 1948, Alberta Vinicio Báez co-invented the X-ray reflection microscope to produce enlarged images of items that are too small or difficult to see. The device has been used to examine living cells and to study galaxies.
- **Contraceptive pill:** In 1951, Luis Miramontes worked with a lab team at Syntex SA to synthesize the birth control pill. The team utilized norethindrone, which is a molecule found in the tortoise plant, as an active ingredient in the first birth control pill. The norethindrone birth control pill has been an industry standard ever since.
- **Artificial hearts:** In 1969, Domingo Santo Liotta created the first artificial heart that was successfully implanted into a human. The device was implanted in a patient with severe heart failure, which allowed the patient to live for three days until a heart from a human donor became available.

Hispanic/Latino/Latinx American citizens have contributed to many of the advancements in technology and medical practices that many benefit from today. Individuals are encouraged to take time during Hispanic Heritage Month to learn about the history, culture, contributions, and achievements of Hispanic, Latino, and Latinx people to think of ways to include diverse voices.

To learn more about Hispanic Heritage Month, visit the links below:

[National Council of Hispanic Employment Program Managers](#)  
[National Park Service Hispanic Heritage Month](#)

# Online Resources

## Watch Orion's Journey

Part 1: [Leaving Earth](#)

Part 2: [Entering Distant Retrograde Orbit](#)

Part 3: [Return Home](#)



[WLOX Celebrates Women in STEM with NASA Engineer Megan Martinez](#)

[MPB Interviews Stennis Engineer Tristan Mooney about Artemis I](#)

[Associated Press: Gulf Coast Powers NASA's New Moon Rocket](#)

[Stennis Space Center Fact Sheets](#)

[Video Short: Data Acquisition System](#)

[Video Short: Thrust Vector Control System](#)



Stennis Artemis Resources

[Stennis Emergency Management](#)

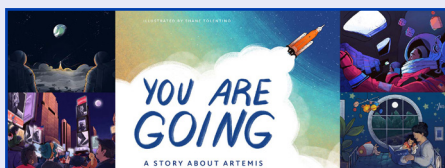
[I Am Stennis Facebook Videos](#)



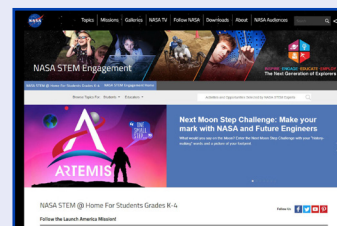
Stennis Virtual Tour



First Woman Graphic Novel



You Are Going Children's Book



NASA STEM@Home for Students