National Aeronautics and Space Administration

SPACE LAUNCH SYSTEM

OCT-DEC 2024 HIGHLIGHTS

GOING VERTICAL:
PROGRESS CONTINUES TOWARD ARTEMIS II

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NASA has taken a big step forward in how engineers will assemble and stack future SLS (Space Launch System) rockets for Artemis Moon missions inside the Vehicle Assembly Building at the agency's Kennedy Space Center in Florida.

The Vehicle Assembly Building's High Bay 2 has been outfitted with new tooling to facilitate the vertical integration of the SLS core stage. That progress was on full display in mid-December when teams lifted the fully assembled core stage 225 feet into the high bay to complete vertical work before it is stacked on mobile launcher 1, allowing teams to continue solid rocket booster stacking simultaneously inside High Bay 3 for Artemis II.

The SLS rocket's core stage is the largest NASA has ever produced. At 212 feet tall, it consists of five major elements, including two huge propellant tanks that collectively hold more than 733,000 gallons of super-chilled liquid propellant to feed four RS-25 engines. During launch and flight, the stage will operate for just over eight minutes, producing more than 2 million pounds of thrust to propel four astronauts inside NASA's Orion spacecraft toward the Moon.

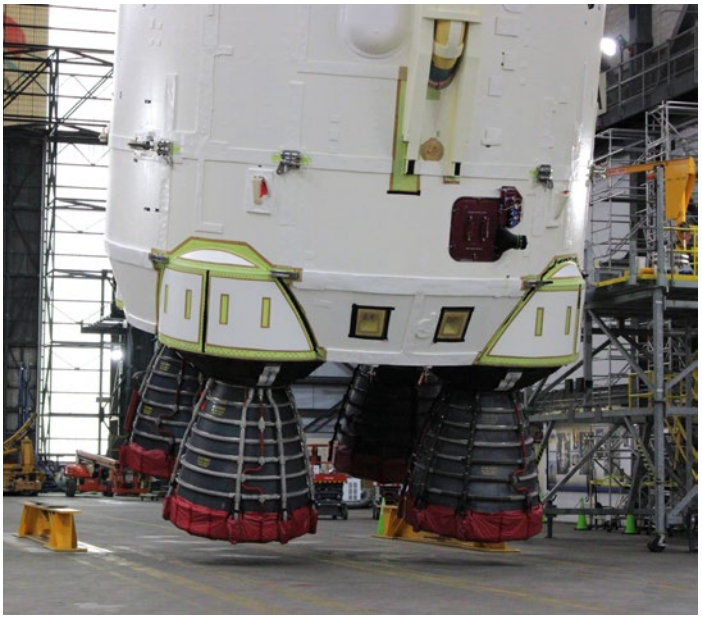
Engineers and technicians inside the Vehicle Assembly Building at NASA Kennedy stacked the first segment of the Artemis II SLS rocket boosters onto mobile launcher 1.

Comprising 10 segments total – five segments for each booster – the SLS solid rocket boosters arrived via train to NASA Kennedy in September 2023 from Northrop Grumman's manufacturing facility in Utah. The booster segments underwent processing in the spaceport's Rotation, Processing and Surge Facility before being transferred to the iconic Vehicle Assembly Building for stacking operations.

Read more: **go.nasa.gov/3ClfOJZ**

The Artemis II crew, including the two backup crew members, met with employees and suppliers in front of the Artemis II SLS core stage at NASA Kennedy.

The aft assemblies of the solid rocket boosters for NASA's SLS (Space Launch System) rocket that will launch the Artemis II mission are on mobile launcher 1 at NASA's Kennedy Space Center in Florida.



The SLS core stage for the Artemis II mission is lifted in the Vehicle Assembly Building at NASA Kennedy. The stage was placed in High Bay 2 in December 2024 for teams to complete processing before stacking and launch.

NASA SHARES ORION HEAT SHIELD FINDINGS, UPDATES ARTEMIS MOON MISSIONS - ARTEMIS II AND III

On Thursday, Dec. 5, 2024, a team returns the Artemis II Orion spacecraft to the Final Assembly and Test cell from a vacuum chamber inside the Neil A. Armstrong Operations and Checkout Building at NASA Kennedy Space Center where it underwent vacuum testing.

Through the Artemis campaign, NASA will land the next American astronauts and first international astronaut on the South Pole region of the Moon. On Dec. 5, NASA announced the latest updates to its lunar exploration plans.

Experts discussed results of NASA's investigation into its Orion spacecraft heat shield after it experienced an unexpected loss of charred material during re-entry of the Artemis I uncrewed test flight. For the Artemis II crewed test flight, engineers will continue to prepare Orion with the heat shield already attached to the capsule. The agency also announced it is now targeting April 2026 for Artemis II and mid-2027 for Artemis III. The updated mission timelines also reflect time to address the Orion environmental control and life support systems.

"The Artemis campaign is the most daring, technically challenging, collaborative, international endeavor humanity has ever set out to do," said NASA Administrator Bill Nelson.

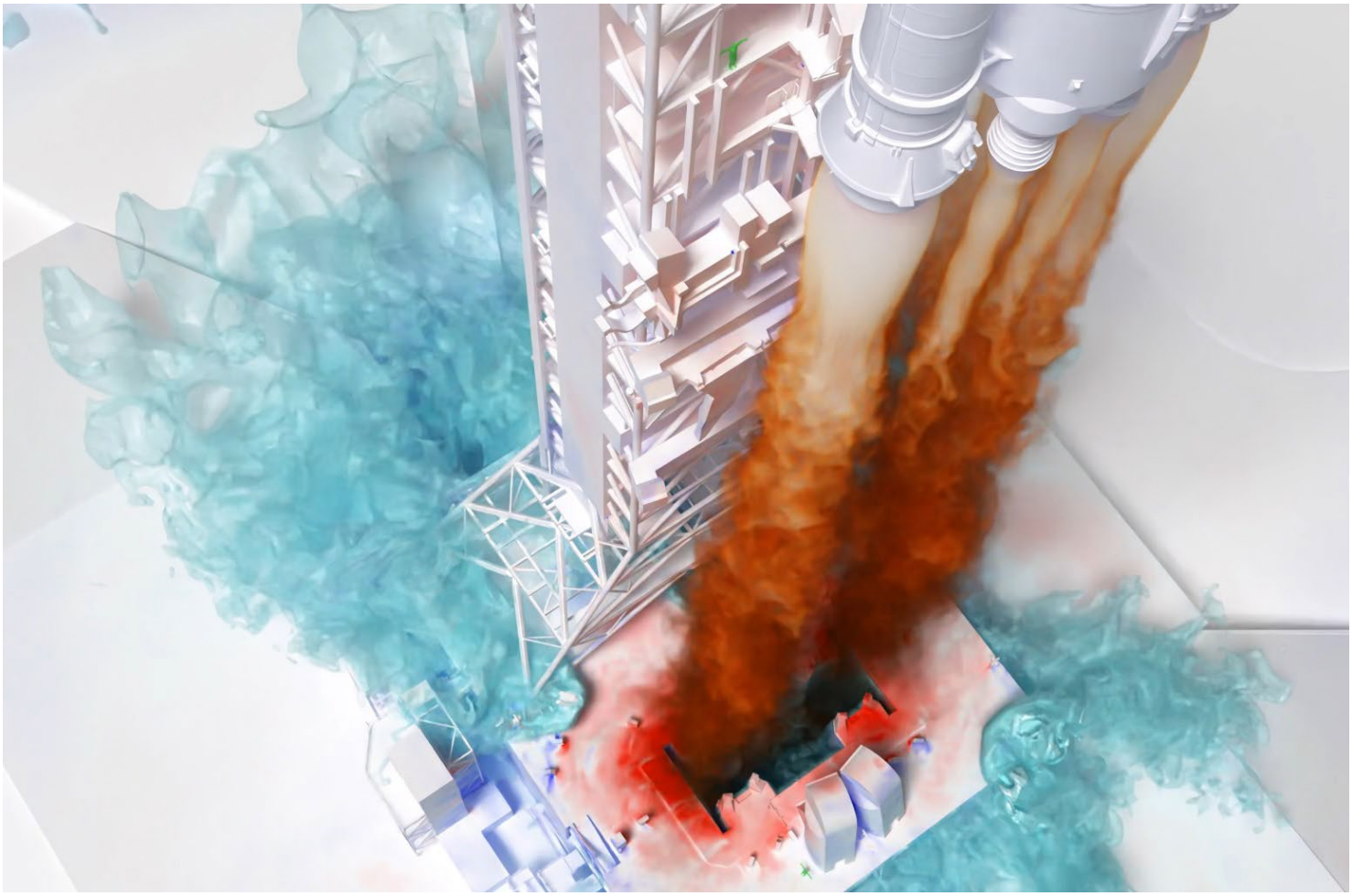
Read more: **go.nasa.gov/40sGEb3**

SIX WAYS SUPERCOMPUTING ADVANCES OUR UNDERSTANDING OF THE UNIVERSE

At NASA, high-end computing is essential for many agency missions. This technology helps us advance our understanding of the universe – from our planet to the farthest reaches of the cosmos. Supercomputers enable projects across diverse research, such as making discoveries about the Sun's activity that affects technologies in space and life on Earth, building artificial intelligence-based models for innovative weather and climate science, and helping redesign the launch pad that will send astronauts to space with Artemis II.

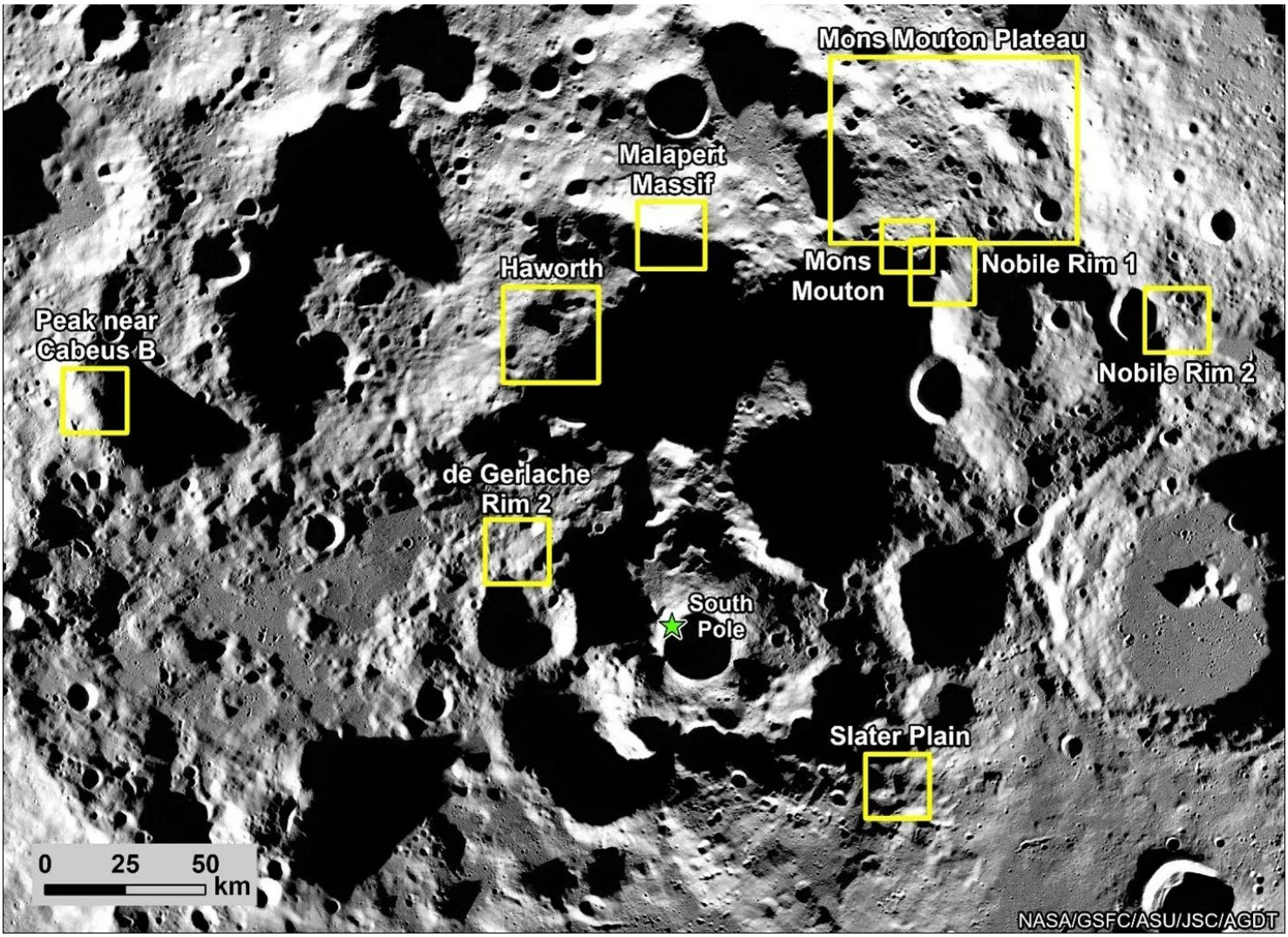
Researchers at NASA's Ames Research Center in California's Silicon Valley are helping ensure astronauts launch safely on the Artemis II test flight, the first crewed mission of SLS and Orion spacecraft, scheduled for 2026. Using the Launch Ascent and Vehicle Aerodynamics software, they simulated the complex interactions between the rocket plume and the water-based sound suppression system used during the Artemis I launch, which resulted in damage to the mobile launcher platform that supported the rocket before liftoff.

Read more: **go.nasa.gov/40lmUld**



This simulation of the Artemis I launch shows how SLS's exhaust plumes interact with the air, water, and the launchpad. Colors on surfaces indicate pressure levels—red for high pressure and blue for low pressure. The teal contours illustrate where water is present.

NASA PROVIDES UPDATE ON ARTEMIS III MOON LANDING REGIONS - ARTEMIS III



This image shows nine candidate landing regions for NASA's Artemis III mission, with each region containing multiple potential sites for the first crewed landing on the Moon in more than 50 years.

As NASA prepares for the first crewed Moon landing in more than five decades, the agency has identified an updated set of nine potential landing regions near the lunar South Pole for its Artemis III mission. These areas will be further investigated through scientific and engineering study. NASA will continue to survey potential areas for missions following Artemis III, including areas beyond these nine regions.

"Artemis will return humanity to the Moon and visit unexplored areas. NASA's selection of these regions shows our commitment to landing crew safely near the lunar South Pole, where they will help uncover new scientific discoveries and learn to live on the lunar surface," said Lakiesha Hawkins, assistant deputy associate administrator, Moon to Mars Program Office.

NASA's Cross Agency Site Selection Analysis team, working closely with science and industry partners, added and excluded potential landing regions, which were assessed for their science value and mission availability.

Read more: **go.nasa.gov/4jizdfn**

NASA STENNIS ACHIEVES MILESTONES IN PREPARATION FOR FUTURE ARTEMIS TESTING - ARTEMIS IV

Teams at NASA's Stennis Space Center in Bay St. Louis, Mississippi, complete a safe lift and install of an interstage simulator unit into the B-2 position of the Thad Cochran Test Stand for future testing of SLS's exploration upper stage.

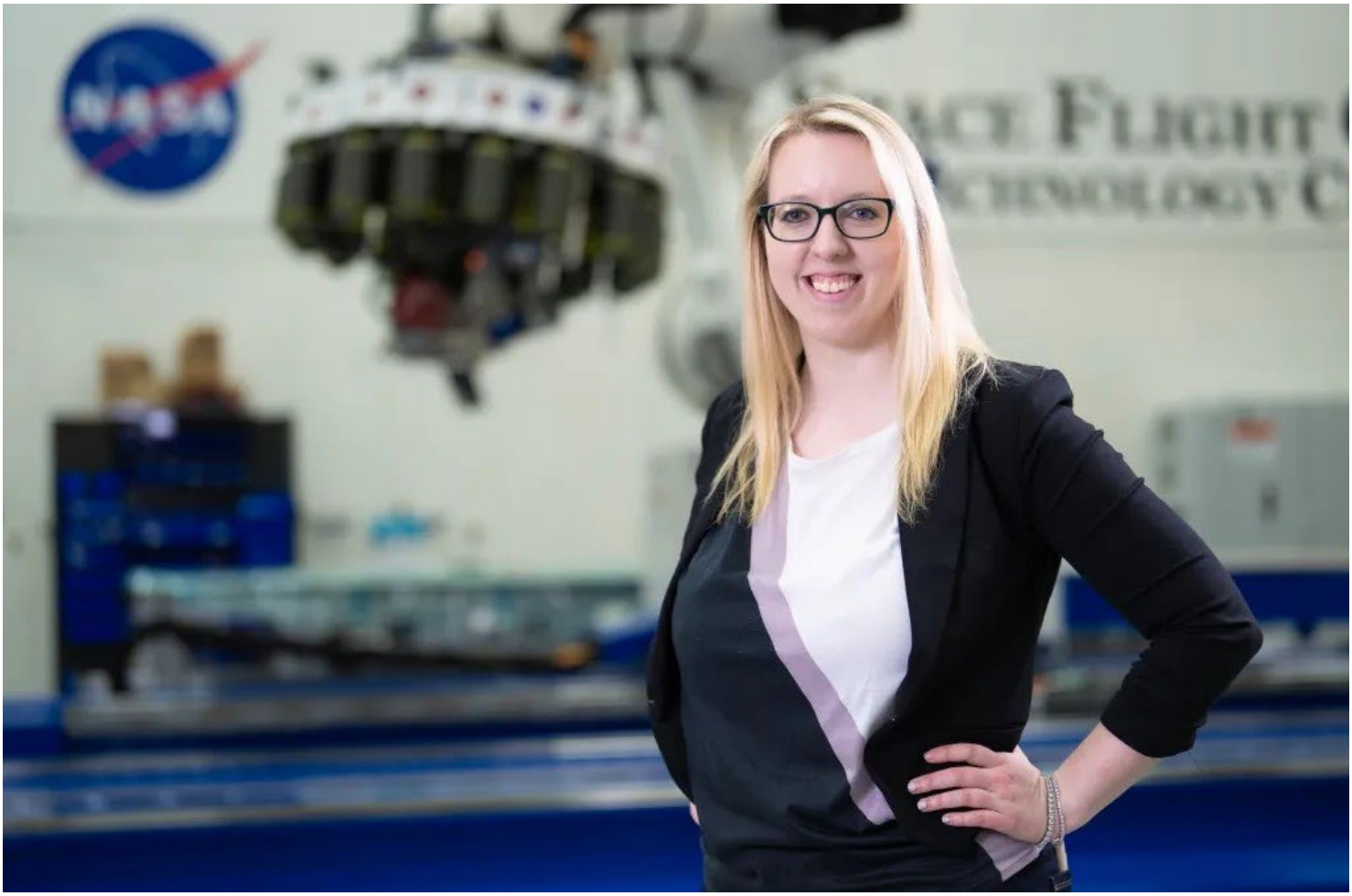
NASA's Stennis Space Center in Bay St. Louis, Mississippi, achieved a key milestone for testing a new SLS rocket stage to fly on future Artemis missions to the Moon and beyond.

Over a two-week period beginning Oct. 10, crews completed a safe lift and installation of the interstage simulator component needed for future testing of NASA's exploration upper stage in the B-2 position of the Thad Cochran Test Stand. The component will function like the SLS interstage section that helps protect the upper stage during Artemis launches.

"NASA Stennis is at the front end of the critical path for future space exploration," said Barry Robinson, project manager for exploration upper stage Green Run testing on the Thad Cochran Test Stand. "Installing the interstage simulator is a significant step in our preparation to ensure the new, more powerful upper stage is ready to safely fly on future Artemis missions."

Read more: **go.nasa.gov/3C4PC6o**

I AM ARTEMIS: *CASEY WOLFE*



NASA's Casey Wolfe and her team are hard at work creating the next-generation payload adapter for SLS.

While precision, perseverance, and engineering are necessary skills in building a Moon rocket, Casey Wolfe knows that one of the most important aspects for the job is teamwork.

"Engineering is vital, but to get this type of work done, you need to take care of the human element," said Wolfe, the assistant branch chief of the advanced manufacturing branch in the Materials and Processes Laboratory at NASA's Marshall Space Flight Center in Huntsville, Alabama.

Together with her team, Wolfe is developing and producing the next generation payload adapter for SLS. The adapter is made with some of the world's most advanced composite manufacturing techniques.

Read more: **go.nasa.gov/4aqgLx8**

I AM ARTEMIS: *MATT LAUER*

Mike Lauer manages production of the RS-25 main engines for NASA's heavy-lift SLS, which will launch astronauts back to the Moon as part of the agency's Artemis campaign.

Mike Lauer, an engineer who works for L3Harris Technologies, found his career inspiration in science fiction, but for the perspective it takes to execute complex space programs, he draws on real-world experience.

Growing up, Lauer spent many cold winter nights in the basement of his Sioux Falls, South Dakota, home, creating pictures of iconic space hardware from Hollywood space movies. "That really is what got me into it," he says.

Fast forward to today, and he's managing production of the RS-25 main engines for SLS, which will launch U.S. astronauts back to the Moon as part of the agency's Artemis campaign. When the scale and complexity of the undertaking appear daunting, Lauer thinks back to early in his career, when he designed hardware for the International Space Station, now in its third decade on orbit.

Read more: **go.nasa.gov/4jslbHO**

I AM ARTEMIS:
LANE POLAK

Storytelling, sketching, and skateboarding. These were a few things that Lane Polak was focused on as a kid while dreaming about becoming an author.

Growing up, Lane Polak didn't have much interest in space. Instead, he was busy writing stories, doodling, or riding his skateboard. He later dreamed of becoming an author but also considered stepping into the arena as an American Gladiator.

After earning a degree in communications with a minor in English from the University of Alabama in Huntsville, Polak chose to embrace his passion for storytelling and continued his path toward technical writing.

Fast forward 14 years and Polak is now a technical writer for SLS; a dream he never knew he had. In his current role at NASA Marshall, he is responsible for creating content that raises public awareness of NASA and specifically SLS. He also assists with outreach programs and supports exhibits, but it's the opportunity to engage with the community, especially children, that he finds most rewarding.

Read more: **go.nasa.gov/40q8K6L**

SLS REACHES THE ARTEMIS GENERATION

For World Space Week, SLS team members visited schools to discuss the wonders of space exploration, bringing with the new children's book and its characters. Read more: **bit.ly/3WQSpHx**

ROCKET ENGINE AMBIANCE LAUNCHES FOR WINTER AND HOLIDAY SEASONS

In time for the winter and holiday seasons, NASA released a virtual fireplace bringing the ambiance of launching lunar missions to wherever you are. Featuring SLS's four RS-25 engines and two solid rocket boosters, the video is available across multiple platforms.

See more here: **bit.ly/3WsrbXm**

NASA MARSHALL EMPLOYEES VISIT ARTEMIS HARDWARE AND LABS

On October 24, more than 500 NASA Marshall employees took part in a three-stop tour of the center that showed them multiple pieces of flight hardware, development hardware, and labs that play critical roles in returning humans to the Moon. SLS team members organized, hosted, and supported the 11 tours that enabled many employees to see flight hardware for the first time.

ROCK-ET-ING AROUND THE HUNTSVILLE SQUARE

SLS team members, along with other NASA Marshall employees, participated in the 10th annual Christmas parade in Huntsville. The float featured Santa's sleigh, powered by an RS-25 rocket engine – the engine used to help power the SLS.

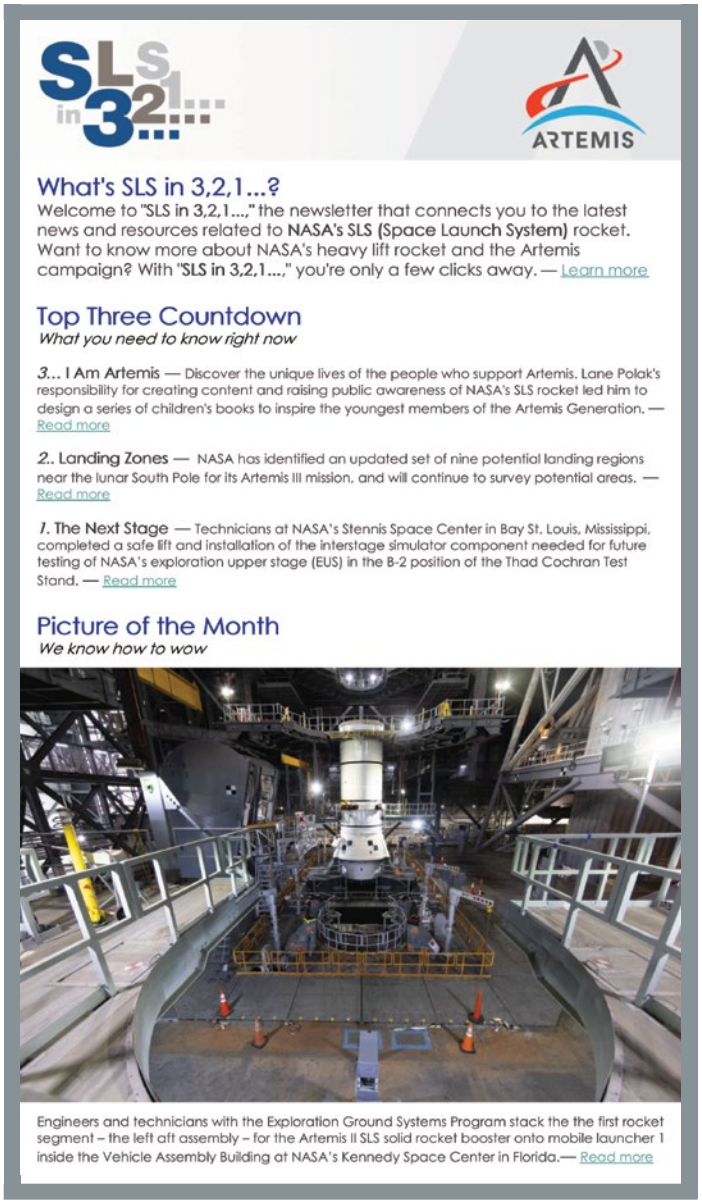
SPACEFLIGHT PARTNERS: Genesis Systems Group LLC

LOCATION: Augusta, Kansas

WHAT THEY DO FOR SLS:

D-J Engineering in Augusta, Kansas, manufactures parts for the SLS. The veteran-owned small business supplies quick disconnects, slosh baffles, and other components for the 212-foot tall core stage. For the SLS exploration upper stage, they provide liquid oxygen fill and drain lines, liquid oxygen and liquid hydrogen covers, anti-vortex brackets, and more.

GET THE LATEST SLS UPDATES SENT TO YOUR INBOX EACH MONTH!



SLS in 3,2,1...

ARTEMIS

What's SLS in 3,2,1...?

Welcome to "SLS in 3,2,1...," the newsletter that connects you to the latest news and resources related to NASA's SLS (Space Launch System) rocket. Want to know more about NASA's heavy lift rocket and the Artemis campaign? With "SLS in 3,2,1...," you're only a few clicks away. — Learn more

Top Three Countdown

What you need to know right now

3... **I Am Artemis** — Discover the unique lives of the people who support Artemis. Lane Polak's responsibility for creating content and raising public awareness of NASA's SLS rocket led him to design a series of children's books to inspire the youngest members of the Artemis Generation. — Read more

2.. **Landing Zones** — NASA has identified an updated set of nine potential landing regions near the lunar South Pole for its Artemis III mission, and will continue to survey potential areas. — Read more

1. **The Next Stage** — Technicians at NASA's Stennis Space Center in Bay St. Louis, Mississippi, completed a safe lift and installation of the interstage simulator component needed for future testing of NASA's exploration upper stage (EUS) in the B-2 position of the Thad Cochran Test Stand. — Read more

Picture of the Month

We know how to wow

Engineers and technicians with the Exploration Ground Systems Program stack the the first rocket segment – the left aft assembly – for the Artemis II SLS solid rocket booster onto mobile launcher 1 inside the Vehicle Assembly Building at NASA's Kennedy Space Center in Florida.— Read more

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