



National Aeronautics and  
Space Administration

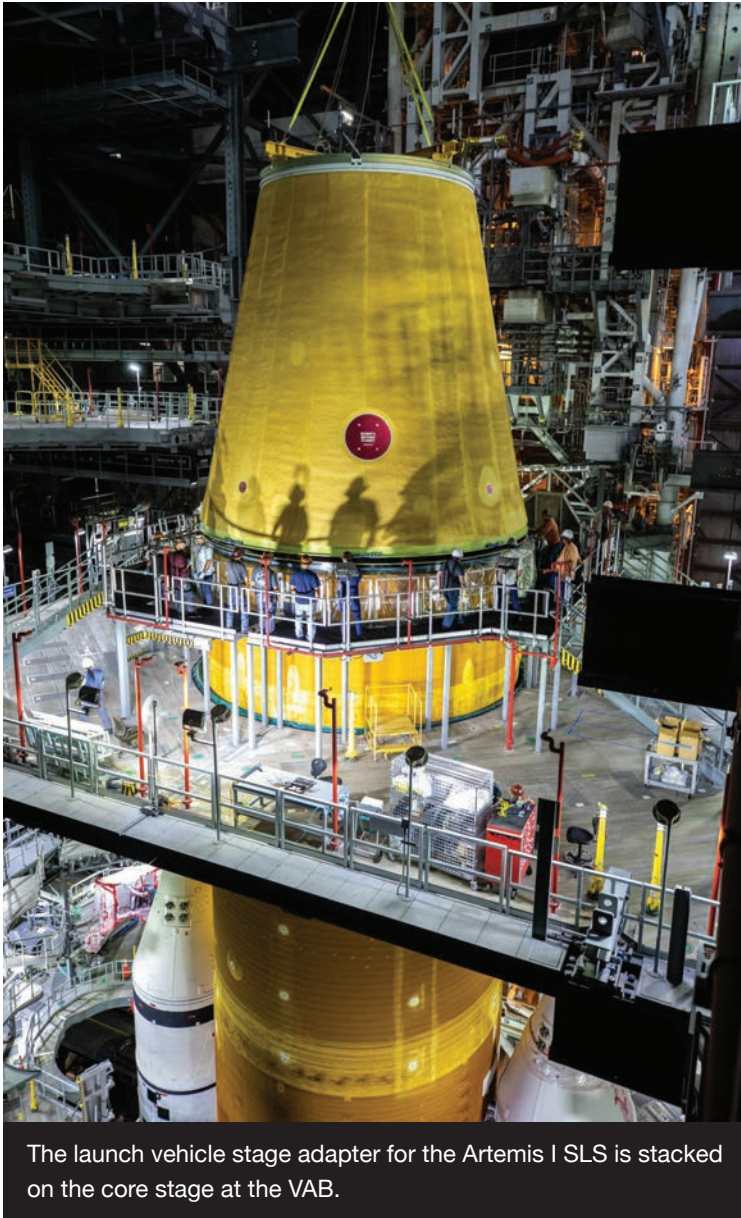


# SPACE LAUNCH SYSTEM

MAY 2021 – AUGUST 2021

# ARTEMIS I SLS ROCKET STACKED FOR TESTING AND LAUNCH

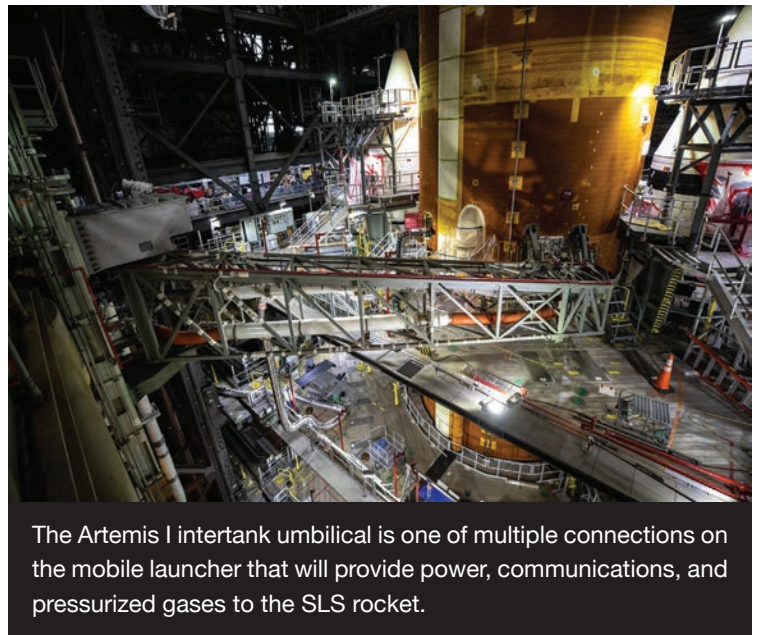




The launch vehicle stage adapter for the Artemis I SLS is stacked on the core stage at the VAB.



The SLS Artemis I core stage seen in the transfer aisle of the VAB at NASA's Kennedy Space Center.



The Artemis I intertank umbilical is one of multiple connections on the mobile launcher that will provide power, communications, and pressurized gases to the SLS rocket.

The Artemis I mission reached multiple milestones this summer inside the Vehicle Assembly Building (VAB) at NASA's Kennedy Space Center. On July 5, teams with [Exploration Ground Systems \(EGS\)](#) and contractor Jacobs stacked the [interim cryogenic propulsion stage \(ICPS\)](#) atop the SLS rocket. The ICPS's RL10 engine is housed inside the launch vehicle stage adapter (LVSA), which will protect the engine during launch. The adapter connects the rocket's core stage with the ICPS, which was built by Boeing and United Launch Alliance. Prior to the LVSA's stacking, the Artemis I core stage was mated with the solid rocket boosters in the VAB. Following the LVSA, the ICPS was stacked for launch.

Read more: [go.nasa.gov/3Be6BwG](https://go.nasa.gov/3Be6BwG)



# NASA MOON ROCKET FLIGHT SOFTWARE READIED FOR ARTEMIS I LAUNCH



The SLS Artemis I core stage is lowered into position on the mobile launcher between the solid rocket boosters at the VAB.

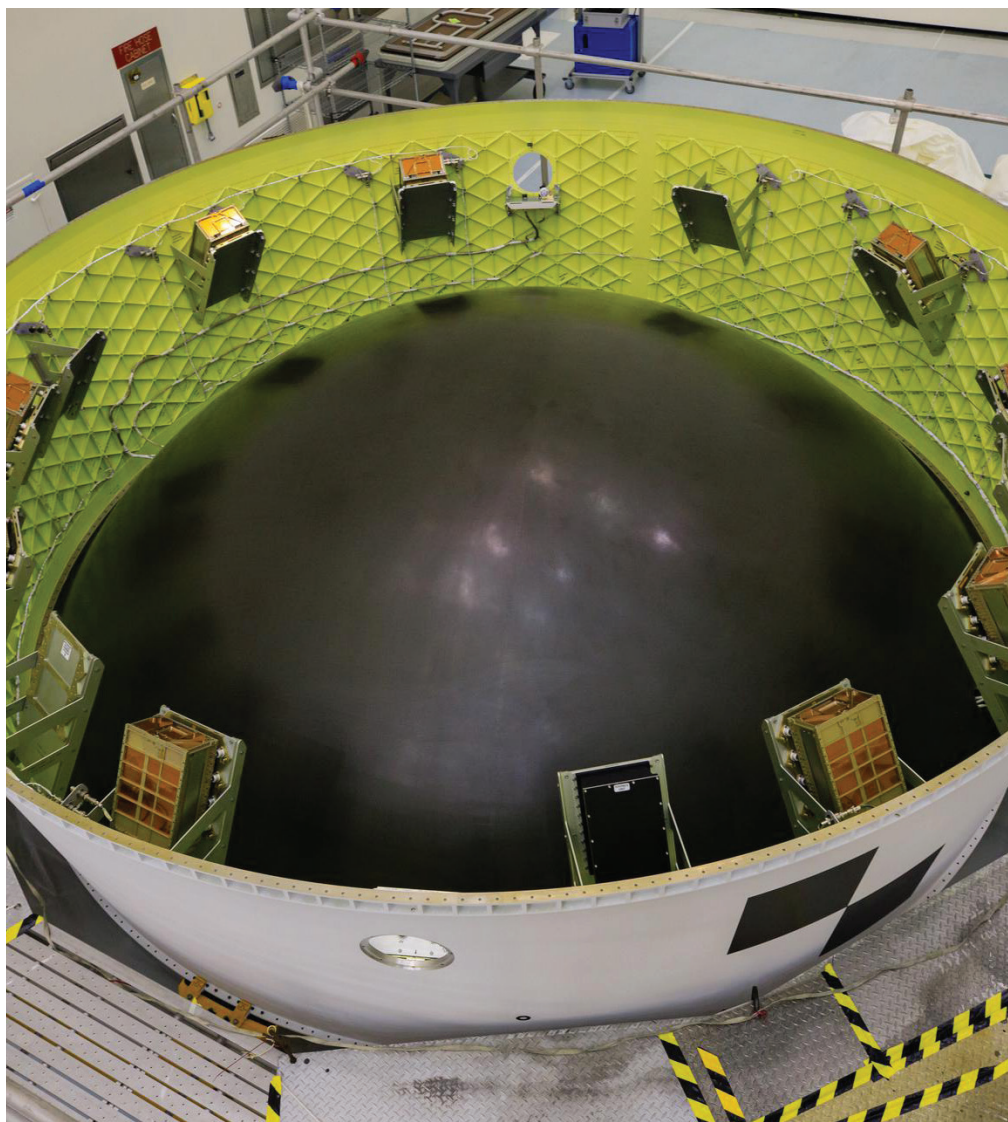
As crews at NASA's Kennedy Space Center in Florida assemble the Moon rocket for the Artemis I mission, teams have installed the flight software that will help steer, fly, track, and guide the [Space Launch System \(SLS\)](#) rocket during launch and ascent to space. Engineers loaded the flight software onto the rocket on Aug. 6 after the initial power-up of the [core stage](#), which contains the flight computers. With the software installed, engineers are supporting final checkouts and completing tests to certify the software for the mission.

The software is loaded on three [flight computers](#), along with the [avionics systems](#) inside the SLS rocket's core stage. The software and avionics operate with the rocket's three flight computers to harness the power of the rocket through ascent and communicate with avionics systems inside the engines and the boosters. That same software is monitored in real time by NASA's EGS team at the agency's launch complex at Kennedy and SLS Program engineers at the [SLS Engineering Support Center](#) at Marshall.

Read more: [go.nasa.gov/2U7jXuY](https://go.nasa.gov/2U7jXuY)



# ORION STAGE ADAPTER READYED FOR RIDE ON ARTEMIS I



The Orion stage adapter for Artemis I is loaded with nine CubeSats and avionics unit (black) and prepared for launch at NASA's Kennedy Space Center. The CubeSats were loaded in August, and final preparations and installations will be completed prior to stacking later this fall.



On July 14, the Near-Earth Asteroid (NEA) Scout and Lunar IceCube secondary payloads were the first to be installed in the SLS rocket's Orion stage adapter for the Artemis I mission at NASA's Kennedy Space Center in Florida.



The OMOTENASHI (Outstanding MOon exploration Technologies demonstrated by NANO Semi-Hard Impactor) team prepares its payload for a ride on NASA's SLS rocket during the Artemis I mission. If successful, OMOTENASHI will be the smallest spacecraft ever to land on the lunar surface and will mark Japan as the fourth nation to successfully land a craft on the Moon.

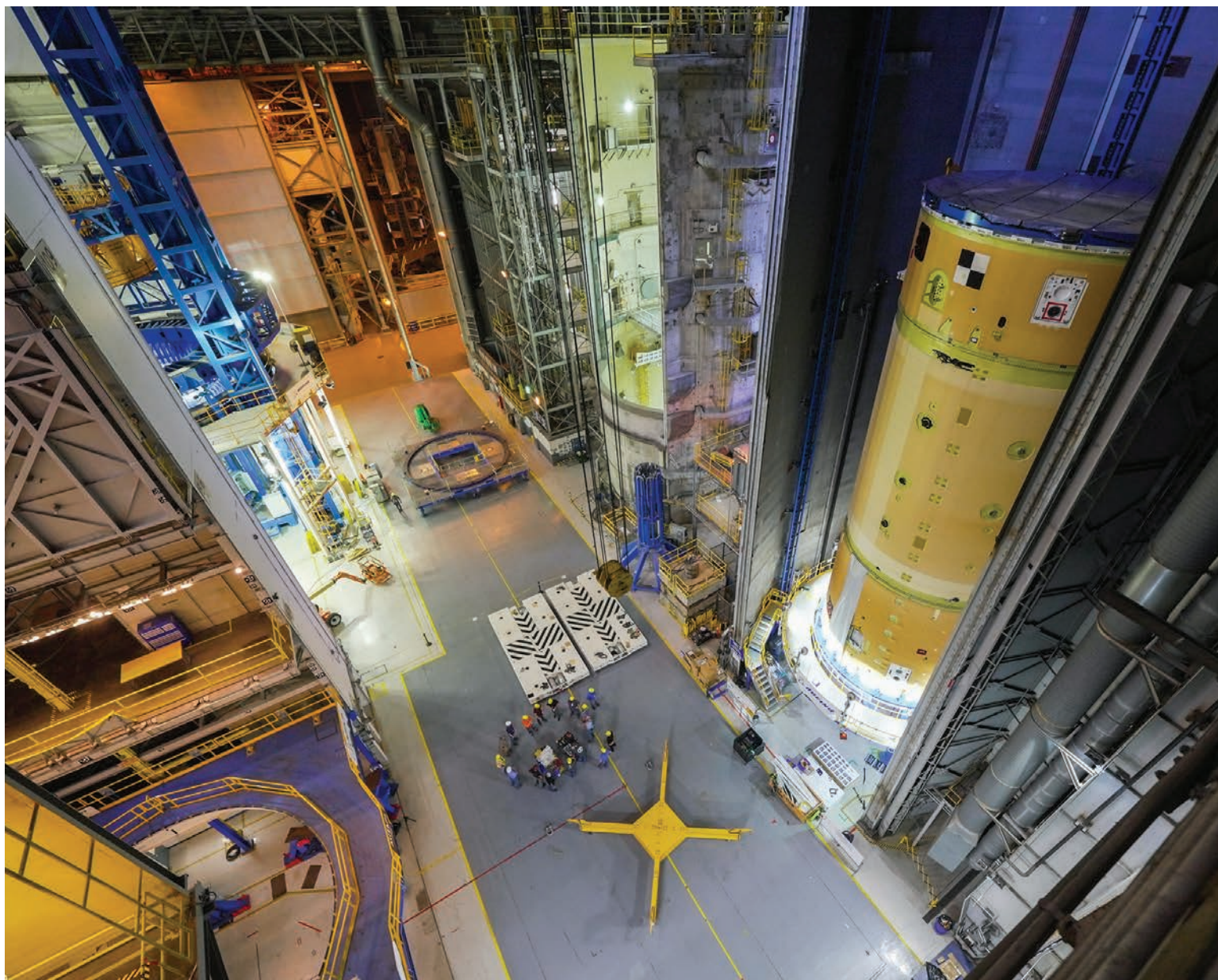
Technicians continue to prepare small satellites, called [CubeSats](#), at NASA's Kennedy Space Center in Florida for their upcoming launch on the [Artemis I](#) mission. Technicians from the agency's [Exploration Ground Systems](#) and contractor Jacobs worked with developers of the shoebox-sized secondary payloads as they underwent final processing and were secured inside the Orion stage adapter.

The ring-shaped stage adapter will be connected to the SLS interim cryogenic propulsion stage and the [Orion spacecraft](#) will be secured on top. All CubeSats will be deployed after SLS completes its primary mission, launching the Orion spacecraft on a trajectory toward the Moon. Although small in size, the CubeSats will conduct a variety of science experiments and technology demonstrations including some that will expand our knowledge of the lunar surface during the Artemis I mission.

Read more: [go.nasa.gov/2UdadPT](https://go.nasa.gov/2UdadPT)



# NASA STACKS ELEMENTS FOR UPPER PORTION OF ARTEMIS II CORE STAGE



The Artemis II core stage forward skirt, liquid oxygen tank, and intertank are joined at NASA's Michoud Assembly Facility.

NASA's SLS team fully stacked three hardware elements together May 24 to form the top of the rocket's core stage for the Artemis II mission. NASA and core stage prime contractor Boeing connected the forward skirt with the liquid oxygen tank and intertank flight hardware inside an assembly area at NASA's [Michoud Assembly Facility](#) in New Orleans. Teams had [previously stacked](#) the liquid oxygen tank and intertank on April 28. The [joining of the three structures together](#) is the first major assembly of core stage hardware for Artemis II, the first crewed Artemis mission and second flight of the SLS rocket. Next, technicians will work to complete outfitting and integrating the systems within the upper structure. The liquid oxygen tank in the upper portion of the stage will hold 196,000 gallons of liquid oxygen cooled to minus 297 degrees Fahrenheit. Meanwhile, the forward skirt and intertank house avionics, flight computer, and electronic systems for the rocket stage.

Read more: [go.nasa.gov/3uqydes](https://go.nasa.gov/3uqydes)



# FIRST PIECE OF ARTEMIS II ROCKET HARDWARE ARRIVES IN FLORIDA



The interim cryogenic propulsion stage (ICPS) for the second flight of SLS rocket arrived in Florida on July 28 for the final phase of production. The stage and its single RL10 engine provide the in-space propulsion needed to send NASA's Orion spacecraft and its crew on a precise trajectory to the Moon for Artemis II, the first crewed mission of NASA's Artemis lunar missions. It is the first major completed element of the rocket for the Artemis II flight to arrive in Florida. Boeing and United Launch Alliance, the contractor team for the stage, shipped the ICPS from ULA's facilities in Decatur, Alabama, to its Delta IV Operations Center at Cape Canaveral Space Force Station. The stage will undergo final processing and checkout before it is transported to NASA's Kennedy Space Center for launch preparations.

Read more: [go.nasa.gov/3AMLKjO](https://go.nasa.gov/3AMLKjO)

# NASA CONTINUES RS-25 TESTING WITH SIXTH INSTALLMENT AT STENNIS SPACE CENTER



An RS-25 engine for the SLS Program is fired up as part of a new test series at Stennis Space Center.

NASA conducted its sixth RS-25 single-engine hot fire Aug. 5 on the [A-1 Test Stand](#) at Stennis Space Center near Bay St. Louis, Mississippi, a continuation of its [seven-part test](#) series to support development and production of engines for the agency's SLS rocket on future missions to the Moon. Operators fired the engine for more than eight minutes (500 seconds), the same amount of time RS-25 engines need to fire for launch of the SLS rocket. Four [RS-25 engines](#), with a pair of solid rocket boosters, will help power SLS at launch.

In addition to providing performance data to Aerojet Rocketdyne, lead contractor for the SLS engines, the Aug. 5 test enabled the team to evaluate new engine components manufactured with cutting-edge and cost-saving technologies, eliminate operating risks, and enhance engine production. In addition to operating the engine at 109 percent of its original power level for extended periods during the hot fire, NASA verified new manufacturing processes while evaluating the performance of the engine's low-pressure fuel turbopump. The pump significantly boosts the pressure of liquid hydrogen delivered to the high-pressure fuel turbopump to help prevent cavitating, the forming of "bubbles" or "voids," that can collapse or cause shock waves that may damage machinery. NASA is building SLS as the world's most powerful rocket to send the agency's Orion spacecraft to the Moon

Read more: [go.nasa.gov/3fz9ksn](https://go.nasa.gov/3fz9ksn)

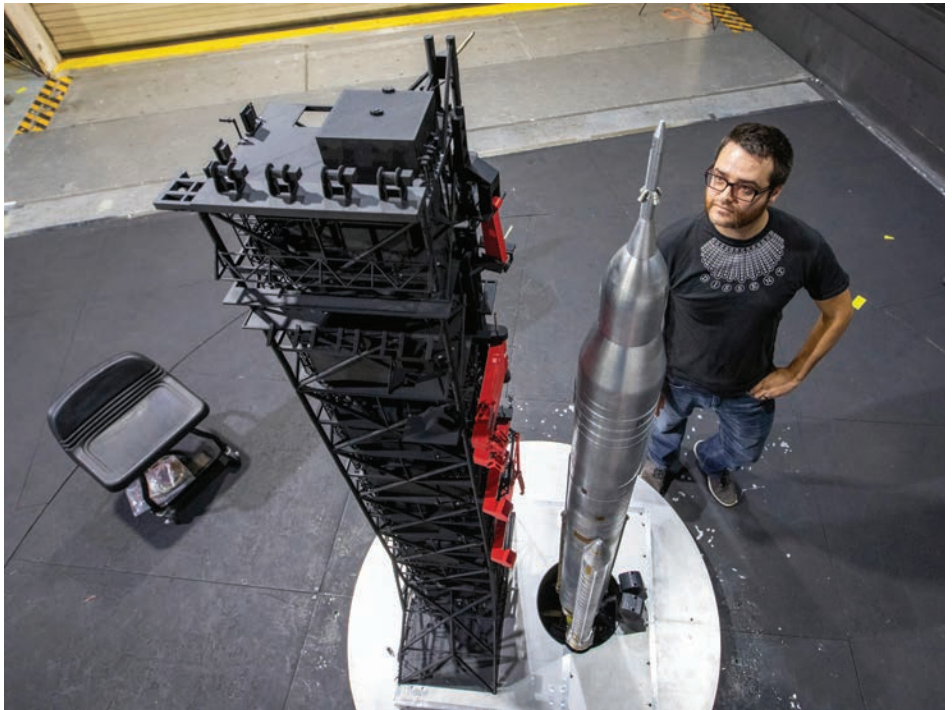


# WHAT'S NEW IN SLS SOCIAL MEDIA

## SLS FEELS THE BREEZE IN ONGOING TEST SERIES

Researchers are completing testing and looking ahead to future Artemis missions to ensure the next version of the SLS rocket will safely transport crew and cargo.

Read more here: [go.nasa.gov/3Bwls5F](https://go.nasa.gov/3Bwls5F)



## ARTEMIS I SIMULATIONS RAMP UP FOR THE COUNTDOWN



In July, teams participated in the first joint integrated launch countdown simulation for Artemis I. The training exercise involved engineers from multiple centers, including Marshall's SLS Engineering Support Center, coming together to rehearse all aspects of the launch countdown, from cryogenic loading to liftoff. Read more: [go.nasa.gov/3eCuYLZ](https://go.nasa.gov/3eCuYLZ)



# SLS ON THE ROAD



SLS Strategic Communications Manager Marcia Lindstrom updated teachers from across the country at Space Academy for Educators at the U.S. Space and Rocket Center on July 16. Lindstrom gave a briefing on SLS and Artemis to the group.



NASA Space Launch System Chief Engineer Dr. John Blevins, right, and Deputy Chief Engineer Mat Bevill filmed a congratulatory video for the competitors of NASA's Student Launch Artemis Challenge, which was held virtually this year.

Watch here: [go.nasa.gov/2WpBOOS](https://go.nasa.gov/2WpBOOS)



# SPACEFLIGHT PARTNERS:

## *Major Tool & Machine*

**NUMBER OF EMPLOYEES:** 411

**LOCATION:** Indianapolis, Indiana

### WHAT THEY DO FOR SLS:



*Major Tool & Machine works with Aerojet Rocketdyne to produce critical hardware for the RS-25 restart production contract. Combining state-of-the-art computerized numerical control (CNC) machines and innovative processes, Major Tool has successfully produced parts for all sections of the RS-25 engine: the powerhead, the main combustion chamber, and the nozzle. The company also supports the SLS program with machining and testing for the boosters, core stage, Orion crew module, and Orion stage adapter.*



NASA and Aerojet Rocketdyne recognize Major Tool & Machine for their performance and contributions to the RS-25 program.

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

[View as Webpage](#)



### Top Three Countdown

*What you need to know right now*

- 3... Six down, one to go — NASA conducted its sixth RS-25 engine hot fire in a seven-test series to evaluate components for future SLS missions. [Read more](#)
- 2.. Along for the ride — Three more CubeSat secondary payloads are ready to travel on the Artemis I mission. [Read more](#)
1. Powered up and loaded — Crews at NASA's Kennedy Space Center have uploaded the SLS rocket's flight software. [Read more](#)

### Picture of the Month

*We know how to wow*



Artemis Astronaut Victor Glover stands inside Kennedy Space Center's Vehicle Assembly Building near NASA's SLS rocket that will power the Orion spacecraft on the Artemis I mission. See more images from NASA astronauts' visit [here](#).

Every day, the SLS rocket gets closer to launch. Get updates in your inbox each month by subscribing to [SLS in 3..2..1.](#)



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