



National Aeronautics and Space Administration



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John C. Stennis Space Center

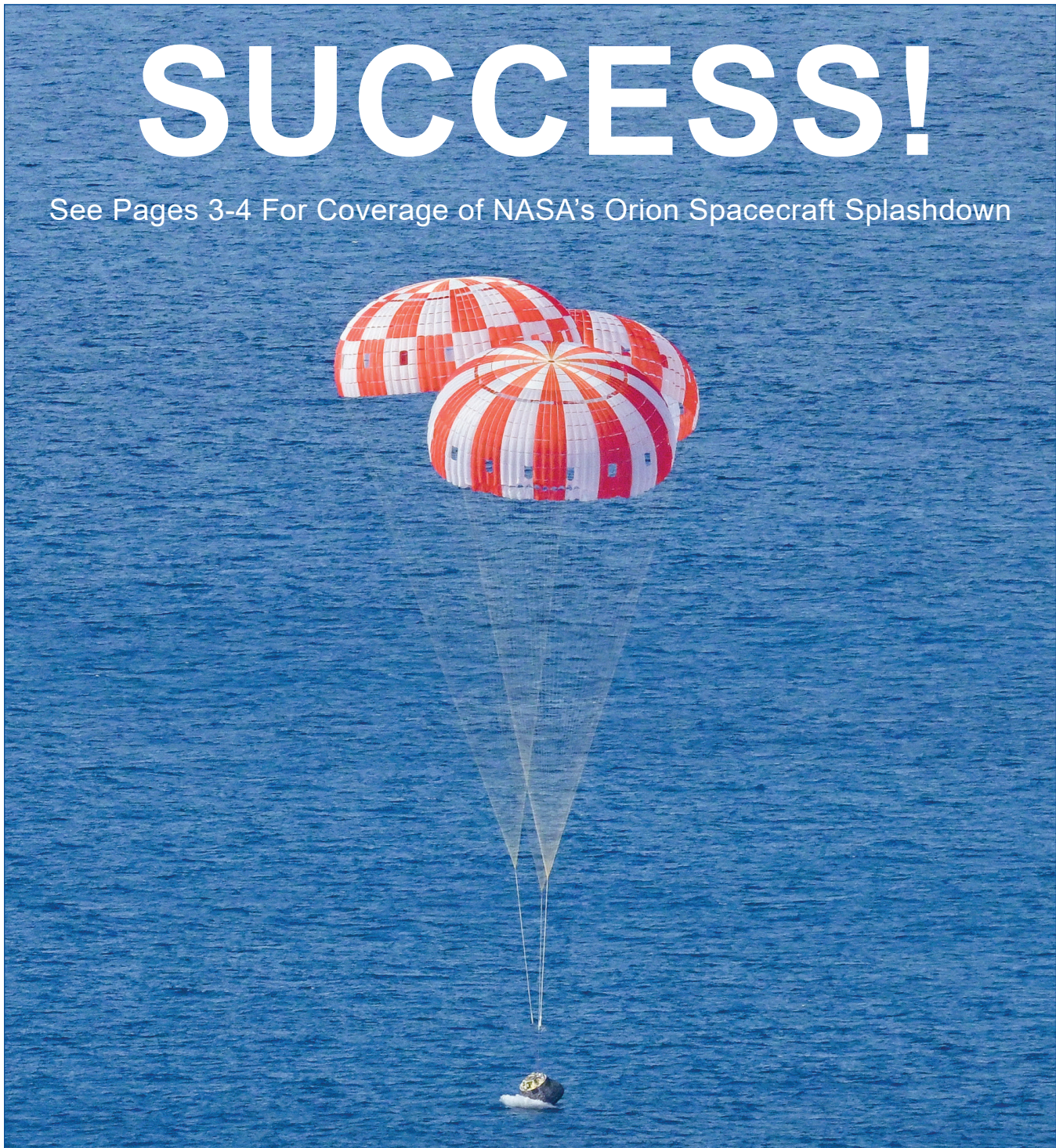
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SUCCESS!

See Pages 3-4 For Coverage of NASA's Orion Spacecraft Splashdown



NASA's Orion spacecraft splashes down in the Pacific Ocean on Dec. 11 after a 25.5 day mission to the Moon. Photo Credit: (NASA/ Josh Valcarcel)

This is the season that a classic Christmas song considers the most wonderful time. Friends and family say it, or even sing it, regularly throughout December. Gator is no music expert, but I am willing to bet a cup of eggnog you know the referenced song.

The sentiment is especially true for NASA this month. I will do one better. At NASA's Stennis Space Center, the most wonderful time of the year is not limited to only one month on the calendar. It can be a challenge at times for your favorite friendly gator not to get distracted, but I have ample reasons to get lost in space right now. Ark!

As we gather in the company of others, there will be time to share stories from years past and reasons to feel hopeful for the years to come.

This month marks 50 years since NASA's last mission – Apollo 17 – in which humans traveled to, and walked, the Moon. The launch occurred Dec. 7, 1972, and 12 days, later the crew splashed down in the Pacific Ocean on Dec. 19.

Five decades later, we witnessed the Orion spacecraft splashdown in the Pacific Ocean this month as the nation prepares to return to

the Moon on future Artemis missions. It is a remarkable time in history for all, especially the younger generation. A new generation can experience the excitement of NASA exploring deeper into space than ever before – wonderful times indeed.

The wonderful times at NASA Stennis began five months before the classic Christmas song about the season debuted in October 1963. In May 1963, crews cut the first tree marking the largest construction effort in the state of Mississippi. Since then, the south Mississippi has added chapter after chapter to the books of space history.

A wise gator once said connecting the dots is easy looking back, but much harder looking ahead. History has shown there are many more wonderful times ahead for NASA Stennis. The reasons to be hopeful for the future deliver the same level of power as testing RS-25 engines do. With RS-25 engine testing resuming this month, I hear 2023 will be an active testing time.

This holiday season, enjoy the wonderful times, but remember that the wonderful times are not simply reserved for a limited time. Merry Christmas and Happy Holidays to all!



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Splashdown! NASA's Orion Returns to Earth After Historic Moon Mission



(Top left photo) NASA's Orion spacecraft nears splashdown in the Pacific Ocean, west of Baja, California, at 11:40 a.m. CST on Dec. 11 after a record-breaking mission, traveling more than 1.4 million miles on a path around the Moon and returning safely to Earth, completing the Artemis I flight test. Splashdown is the final milestone of the Artemis I mission that began with a successful liftoff of NASA's Space Launch System (SLS) rocket Nov. 16, from Launch Pad 39B at NASA's Kennedy Space Center in Florida. Over the course of 25.5 days, NASA tested Orion in the harsh environment of deep space before flying astronauts on Artemis II. "The splashdown of the Orion spacecraft – which occurred 50 years to the day of the Apollo 17 Moon landing – is the crowning achievement of Artemis I," said NASA Administrator Bill Nelson. "From the launch of the world's most powerful rocket to the exceptional journey around the Moon and back to Earth, this flight test is a major step forward in the Artemis Generation of lunar exploration. It wouldn't be possible without the incredible NASA team. For years, thousands of individuals have poured themselves into this mission, which is inspiring the world to work together to reach untouched cosmic shores. Today is a huge win for NASA, the United States, our international partners, and all of humanity." During the mission, Orion performed two lunar flybys, coming within 80 miles of the lunar surface. At its farthest distance during the mission, Orion traveled nearly 270,000 miles from our home planet, more than 1,000 times farther than where the International Space Station orbits Earth, to intentionally stress systems before flying crew. Photo Credit: (NASA)



(Bottom left photo) Flight controllers in mission control at NASA's Johnson Space Center in Houston spent about two hours performing tests in open water to gather additional data about the Orion spacecraft following its splashdown Dec. 11. Orion was recovered by NASA's Landing and Recovery team, U.S. Navy and Department of Defense partners aboard the USS Portland. Recovery personnel also spent time collecting detailed imagery of the spacecraft before beginning to pull the capsule into the USS Portland's well deck. The ship returned to U.S. Naval Base San Diego, in preparation for transport back to Kennedy Space Center in Florida for post-flight analysis. Follow Orion's travels on Earth by visiting the Artemis I blog [here](#). Photo Credit: (NASA/James M. Blair)

NASA's Orion Splashdown Symbolizes Great Achievement and Bright Future

Note: The following is an op-ed by Dr. Rick Gilbrech, director of NASA's Stennis Space Center near Bay St. Louis, Mississippi, regarding the splashdown of NASA's Orion spacecraft and its Artemis Program. Artemis is the first step in the next era of human exploration. Together with commercial and international partners, NASA will establish a sustainable presence on the Moon to prepare for missions to Mars.

Splashdown and recovery of NASA's uncrewed Orion spacecraft in the Pacific Ocean on Dec. 11 concludes a successful maiden mission and sets the stage for the agency to move ahead in its effort to explore the secrets of the universe for the benefit of all.

Orion's successful re-entry from space and splashdown off the coast of California is shared by so many who contributed to Artemis I and puts the nation on track for human deep space missions to come. The Artemis I test flight is the first in a series of increasingly complex missions paving the way for humans to return to the Moon and eventually travel to Mars.

The return of Orion is particularly momentous for everyone associated with NASA's Stennis Space Center. As the nation's largest propulsion test center, Stennis has a long history of frontline work to help power the U.S. human space exploration program.

The site initially was built to test rocket stages that launched the first humans to the Moon in 1969 during the Apollo Program. In like fashion, the center tested the RS-25 engines and Space Launch System (SLS) core stage that sent the Orion spacecraft on its recent trip around the Moon.

SLS is the most powerful rocket ever assembled and the only one capable of sending Orion, astronauts, and cargo directly to the Moon on a single mission. It is powered by two solid rocket boosters and a core stage with four RS-25 engines.

RS-25 engines for the first four SLS missions are former space shuttle main engines modified to provide additional power. NASA Stennis conducted several series of hot fire tests to help guide modification of the engines and validate the various changes.

In addition, NASA Stennis conducted a historic Green Run test series of the first SLS core stage, concluding with a historic hot fire of the stage's



As director, Dr. Rick Gilbrech provides executive leadership, overall direction and management of the center. He is responsible for implementing NASA's mission in the area of rocket propulsion testing, developing and maintaining NASA's world-class rocket propulsion test facilities. He serves as a federal manager hosting an integrated multi-agency federal laboratory.

four RS-25 engines in March 2021, just as during the actual launch. It marked the most powerful propulsion test at NASA Stennis in more than 40 years and set the stage for the Artemis I launch last month.

Even as we celebrate the success of that mission, NASA Stennis is continuing its frontline work. The path to deep space will continue directly through Mississippi as the center tests new RS-25 engines, as well as the Exploration Upper Stage that will provide SLS with even more power and capability.

The nation now is set to return humans, including the first woman and the first person of color, to the Moon and to prepare for journeys to Mars. Both are daunting missions, with the Moon more than 235,000 miles away from Earth and Mars, on average, some 140 million miles.

Yet, with the Dec. 11 splashdown of Orion and the continued contributions of the dedicated NASA Stennis team, I have never felt closer to both.

NASA Conducts First Test of Redesigned Moon Rocket Engine

NASA conducted the first test of the newly redesigned [RS-25](#) engine for future flights of the [Space Launch System](#) (SLS) rocket Dec. 14, completing 209.5 seconds of a scheduled 500 second hot fire at the agency's [Stennis Space Center](#) near Bay St. Louis, Mississippi.

The hot fire test was shut down early by a non-flight system used to monitor the engine. NASA and Space Launch System lead engine contractor Aerojet Rocketdyne are analyzing data to review the monitoring system, evaluate engine performance, and identify the reason for the early test cutoff. Because the test was being done for redesigned engines in support of Artemis V and beyond, no impacts to RS-25 hardware for earlier missions is expected.

“Much like launch, test campaigns are dynamic events that allow us to learn more about the SLS rocket hardware,” said Johnny Heflin, liquid engines manager for the Space Launch System at NASA's [Marshall Space Flight Center](#) in Huntsville, Alabama. “NASA and Aerojet Rocketdyne teams were successful in running the first test of the new RS-25 restart engine for 209.5 seconds that will help power future missions with the SLS rocket. Preliminary data indicates the engine was performing nominally. Data analysis is underway.”

The single-engine hot fire, known as a confidence test, was designed to confirm all is ready to proceed with a series of certification tests early next year on a full RS-25 certification engine. NASA and the company modified 16 of the engines remaining after the Space Shuttle Program for use on [Artemis](#) mission I through IV. The upcoming series of testing is for the RS-25 engines that will be used beginning with Artemis V.

“Each test, even one that does not go full duration, helps us gather valuable data and helps us prepare to fly safely,” said Chip Ellis, Stennis RS-25 project manager.

The test on the [Fred Haise Test Stand](#) at Stennis came just days after NASA

successfully completed the [Artemis I](#) flight test in preparation for future missions to the Moon.

The test provided initial data to aid NASA and Aerojet Rocketdyne as the company prepares to begin production of new RS-25 engines to power future Artemis missions to the Moon and beyond. For each SLS flight, four RS-25 engines, along with a pair of solid rocket boosters and core stage, help power the rocket at liftoff.

The hot fire was testing new RS-25 components to be used in production of future engines, including a new powerhead component. Additional components, including a new nozzle and controller, will be installed on the engine prior to the start of the certification series.

The hot fire marked the first test on the Fred Haise Test Stand since March when NASA completed [developmental testing](#) for Aerojet Rocketdyne efforts to modernize manufacturing processes and reduce production costs of future engines.

Since that time, Stennis teams have completed critical test stand maintenance projects to support the RS-25 testing program. These included work to upgrade the stand's [high-pressure industrial water system](#), [flame deflector](#), [thrust vector control system](#), and [data acquisition system](#). Four RS-25 engines help power each SLS flight, firing simultaneously to generate a combined 1.6 million pounds of thrust at launch and 2 million pounds of thrust during ascent.

Every RS-25 engine that will help power SLS will be tested at Stennis. RS-25 tests at the site are conducted by a combined team of NASA, Aerojet Rocketdyne and Syncom Space Services operators. Syncom Space Services is the prime contractor for Stennis facilities and operations.

Through Artemis missions, NASA will land the first woman and the first person of color on the surface of the Moon, paving the way for a long-term lunar presence and serving as a stepping stone on the way to Mars.



NASA conducts an RS-25 hot fire on the Fred Haise Test Stand at Stennis Space Center in south Mississippi on Dec. 14. Photo Credit: (NASA/Danny Nowlin)

NASA's Stennis Space Center Recaps Moments From 2022

A flurry of activity happened within and beyond the gates of [NASA's Stennis Space Center](#) in 2022 as NASA continues exploring the secrets of the universe for the benefit of all.

The year began much like it will end – by testing [RS-25 engines](#) to help power NASA's [Space Launch System](#) rocket on future deep space missions. Every RS-25 engine that will help power the SLS rocket at launch for Artemis missions will be tested at NASA Stennis, including those that will send the first woman and the first person of color to the Moon.

Between test series, NASA Stennis completed multiple upgrades to the Fred Haise Test Stand uniquely tailored for the RS-25 testing effort. The projects included installation of new test stand piping, [drilling a special flame bucket hole pattern](#) to help cool RS-25 engine exhaust, and updating the stand's [thrust vector control](#) and [data acquisition systems](#).

Additionally, a vital [component](#) needed for Green Run testing of the Exploration Upper Stage to be used on future Artemis missions arrived at NASA Stennis as teams continued preparation work.

Meanwhile, the Autonomous Systems Laboratory (ASL) at NASA Stennis continues to be a leader in the design and deployment of autonomous systems. NASA Stennis is working with other agency centers to create a concept for a lunar rover that will autonomously mine lunar raw materials for processing and use on the Moon.

As one member of the ASL team shared in a media interview that can be seen [here](#), NASA is a place

for people of all backgrounds to contribute as the agency inspires the world through discovery.

In 2022, the Strategic Business Development Office continued its work to promote the NASA Stennis federal city model and attract new companies on site.

Meanwhile, Relativity Space set a testing milestone in its work at Stennis, then announced plans to [expand](#) its presence at the south Mississippi site. Another aerospace [company](#) agreed to locate its engine test complex on site as NASA Stennis continues to be a model of government efficiency.

The story of NASA Stennis continued to be shared through outreach events to a wide and diverse audience in 2022.

In addition, people from all walks of life continued to visit INFINITY Science Center, which celebrated its 10th anniversary as the official NASA Stennis visitors center.

The year also was highlighted by the first in-person Space Sprouts event hosted in Hattiesburg for one of the largest pre-K programs in Mississippi. NASA Stennis launched Space Sprouts to reach preschool students and spur early interest in space and STEM (science, technology, engineering, and math).

On the same lines, the [ASTRO CAMP®](#) program launched at Stennis set new highs for participants as it expanded its national and global reach.

All in all, the past year added a new chapter to the NASA Stennis history books even as the center set its sights squarely on moving forward into the future.

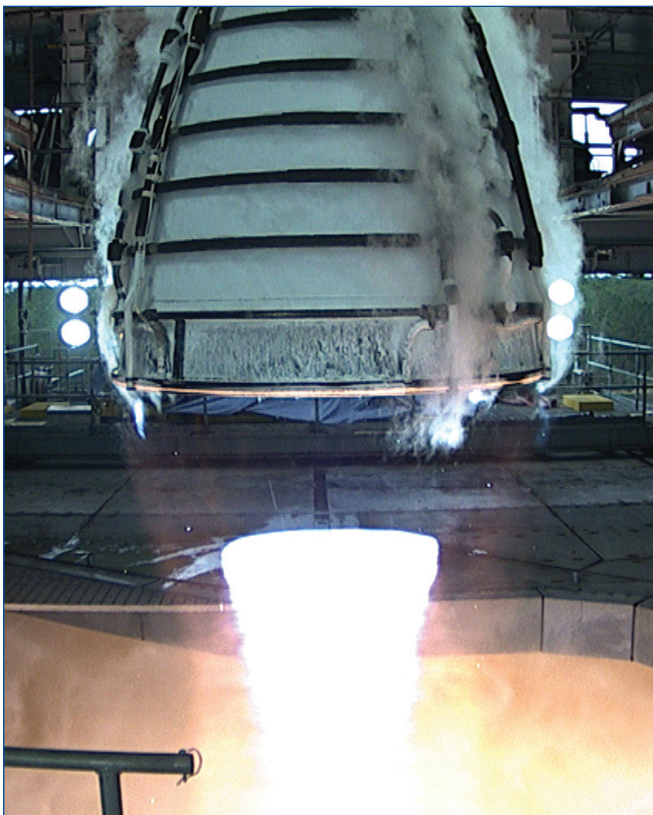


NASA conducted its second RS-25 engine hot fire test of 2022 on Feb. 8 on the Fred Haise Test Stand. Each test in the series provided valuable operational data to NASA's lead engines contractor, Aerojet Rocketdyne, on a variety of new

components manufactured with state-of-the-art fabrication techniques as the company begins production of new RS-25 engines. Every RS-25 engine that helps power the SLS rocket at launch will be tested at NASA Stennis.



A NASA Stennis Space Center drone captures high quality images and live stream video of an RS-25 test and its associated liquid oxygen ground disbursement on Feb. 24, 2022. Piloting unmanned aircraft systems, commonly called drones, are not just for fun any longer. At NASA Stennis, drones are becoming a go-to resource for use on difficult and potentially dangerous jobs, helping to save time and costs. Given modern lightweight cameras and other sensors, drones have become highly innovative and versatile flying tools. NASA is using drone technology for a variety of reasons, such as aerial imagery, inspections, and mapping.



NASA powered up its third RS-25 engine hot fire test of the year on Feb. 24, on the Fred Haise Test Stand at Stennis Space Center. Operators fired the engine past recent testing at the 111% power level and up to 113% for a period of time. NASA is testing RS-25 engines to help power the agency's Space Launch System (SLS) rocket on future deep space missions.



Apollo 13 astronaut Fred Haise (l) visits with former NASA Stennis Space Center Director Jerry Hlass following the Fred Haise statue dedication ceremony in Biloxi, Mississippi, on Feb. 13, 2022. During the activities, Haise, a Biloxi native, was escorted in a parade to the Biloxi Lighthouse, where a six-foot statue in his likeness was unveiled by city officials.



(Above photo) Tessa Keating (l) and Samone Wilson, public affairs specialists in the NASA Stennis Space Center Office of Communications, share NASA information and materials with exhibit visitors during NASA Day at the Capitol activities in Jackson, Mississippi, on March 3.

(Top right photo) An Artemis I banner stands to the right of the table as students reach for NASA items at the New Orleans Saints and Pelicans STEM Fest on April 1. The banner represents NASA's commitment to return American astronauts, including the first woman and the first person of color, to the Moon. Through the Artemis lunar exploration program, NASA plans to establish a long-term presence on the Moon, while preparing for eventual missions to Mars. The Artemis I mission is the first integrated flight of the Space Launch System rocket and Orion spacecraft.

(Near right photo) A young visitor views a model of NASA's new Space Launch System rocket, built to send astronauts on deep space missions to the Moon and Mars, during early 10th anniversary activities at INFINITY Science Center on April 2.

(Far right photo) For INFINITY Science Center leaders, commemoration of the 10th anniversary of the Hancock County, Mississippi, facility on April 30 represented not just a celebration but a renewed beginning. In addition to marking a decade of growth and tens of thousands of visitors, INFINITY is poised to emerge from its pandemic status and take its place as a premier visitor center and tourist attraction, said Michelle Anderson, chief executive officer and executive director of the center. "We really are a hidden jewel for many people," she said. "But I look around at similar facilities across the country and see INFINITY Science Center growing as big and popular as any of them in the days ahead."





(Left photo) Crews use a shoring system to hold back soil March 23, 2022, as they install new 75-inch piping leading from the NASA Stennis Space Center High Pressure Industrial Water Facility to the valve vault pit serving the Fred Haise Test Stand. "This task is a major undertaking, as there are a number of underground utilities around the Fred Haise Test Stand that we must be careful not to disturb," said Casey Wheeler, the NASA engineer spearheading the project at the time. "However, it serves a critical need. This is the first time the water pipeline leading to the structure has been upgraded since its original installation." A typical single engine test at Stennis requires a lot of water – to cool super-hot engine exhaust, reduce test-related noise and vibrations, and use in the event of a facility or propellant barge fire. As much as 1.4 million gallons of water flows to the test stand during an eight-and-a-half-minute hot fire. At pressures reaching 225 pounds per square inch, the output is enough to fill 2,125 standard bathtubs a minute. The water flows from a 66-million-gallon reservoir at the NASA Stennis High Pressure Industrial Water Facility. Built in the 1960s, maintaining the facility and its related piping is an ongoing challenge. NASA launched an effort in the mid-2010s to repair and replace system components, including pipes and valves leading to the site's large test stands.

(Right photo) A work crew at NASA's Stennis Space Center removes RS-25 engine No. 0525 from the Fred Haise Test Stand on April 14. Removal of the engine followed completion of developmental testing for the production of new RS-25 engines to help power deep space missions with NASA's Space Launch System rocket. NASA completed developmental engine testing on March 30 with a full-duration RS-25 hot fire, to support future engines that will launch Space Launch System (SLS) astronauts deeper into space than ever. Operators fired RS-25 engine No. 0525 for about eight-and-a-half minutes (500 seconds) and up to 111% power level. The March 30 hot fire completed the fourth developmental test in the current series and sets Aerojet Rocketdyne, the lead contractor for NASA's SLS engines, on pace to produce new RS-25s for future use. "We've conducted a total of 25 tests during this remarkable development test program to modernize manufacturing, on-ramp additive manufacturing, and reduce the cost of the RS-25 engines for the Space Launch System," said Johnny Heflin, manager for the SLS Liquid Engines Office at NASA's Marshall Space Flight Center in Huntsville, Alabama. "These tests are helping us ensure the success of not only the flight of Artemis I but also of future missions that will lead to long-term exploration of the Moon." This series concluded a thorough testing campaign for NASA and its engine contractor as Aerojet Rocketdyne completed modifications to adapt the existing space shuttle main engines needed for early SLS missions.





NASA's Stennis Space Center Director Rick Gilbrech delivers an annual state of NASA Stennis address to community leaders gathered at INFINITY Science Center on May 4. Partners for Stennis and Michoud hosted the annual center director's community briefing as an in-person event for the first time since 2019. The 2020 event was canceled due to COVID-19, and last year's event was conducted virtually. About 125 leaders and guests attended the May 4 gathering. In his remarks, Gilbrech updated briefing participants on the future of work at NASA Stennis as the center continued to transition out of its COVID-19 framework. He also reported on NASA Stennis propulsion activity, including the center's ongoing testing for NASA's Space Launch System rocket, which launched on the maiden Artemis I test mission to the Moon on Nov. 16. Gilbrech noted the center had enjoyed a busy propulsion schedule, with a total of 571 tests conducted on seven of 12 test positions during the previous 16 months.



NASA's Stennis Space Center employees participate in a dialogue luncheon session with NASA Chief Resilience Officer Melanie Saunders and NASA Future of Work Agency Lead Sonia Miller on May 10. The two NASA leaders spent a day at NASA Stennis, meeting with various groups to discuss workplace changes and challenges as the agency emerged from its COVID-19 response framework. Saunders and Miller met with the NASA Stennis executive team, senior managers, Future of Work team members, supervisors, and NASA employees representing various center offices and directorates. Employees at NASA Stennis and other NASA centers returned to on-site work in May following two years of largely telework status. Many employees assumed a hybrid work schedule that includes both on-site and telework activities. Saunders and Miller discussed lessons learned from the past two years and answered questions about the future of work across the agency.



Symbolizing the growth and impact of commercial partnerships at NASA's Stennis Space Center, Rocket Lab marked a pair of major milestones in testing of its new 3D-printed rocket and engines during 2022. The company successfully completed a full-duration mission duty cycle (MDC) test for its integrated Stage 2, marking the first time a 3D-printed rocket stage had undergone acceptance testing (above left photo). Rocket Lab also completed acceptance testing for all nine Aeon 1 engines for Stage 1 of its Terran 1 rocket. In October, the company also outlined plans for a major expansion of its rocket and engine test facilities at NASA Stennis.



Officials cut the ribbon during a Nov. 4 ceremony marking an agreement for Rocket Lab USA to locate its new engine test complex at NASA's Stennis Space Center. Participating in the ceremony were (l to r): Rocket Lab Vice President of Launch Systems Shaun D'Mello, U.S. Sen. Roger Wicker of Mississippi, NASA Stennis Space Center Director Rick Gilbrech, and U.S. Sen. Cindy Hyde-Smith of Mississippi. NASA, Rocket Lab, and key elected officials gathered in the NASA Stennis Test Complex for an official ribbon cutting ceremony to mark the launch of the new 10-year agreement.



(Above photo) NASA's Stennis Space Center engineers and technicians perform a June 22 water flush of the critical FIREX system at the Fred Haise Test Stand. The FIREX system, in addition to putting out a fire, can be utilized to mitigate an event involving a cryogenic fluid. To ensure the system is available as needed, NASA Stennis conducts this routine maintenance procedure every 12 to 24 months. During the procedure, engineers look for leaks and verify the spray patterns are properly situated. Functioning like a large plumbing system, water flows from a 66-million gallon reservoir through underground pipes to the test stands. Much of the system is made up of carbon steel pipe, which can be damaged by cryogenic fluid. Over time, the carbon steel pipe produces carbon steel rust. The smaller pipes in the system can become clogged with debris, which can impact the FIREX nozzles. "When you build up that debris, it becomes evident, and it comes out at your nozzles and can plug them," said Jeff Henderson, test director at the Fred Haise Test Stand. "When the nozzle is plugged and water cannot flow, that can affect safety and performance of the testing."

(Right photo) Teams at NASA's Stennis Space Center install RS-25 engine No. 10001 (E10001) on the Fred Haise Test Stand on Nov. 15 in preparation for an upcoming series of certification hot fires. The certification series is designed to confirm the design and process that contractor Aerojet Rocketdyne will use in producing new RS-25 engines to help power NASA's Space Launch System rocket on future Artemis missions to the Moon. The future engines will feature new components and involve updated production processes designed to save time and cost. To certify the new components and new processes, operators plan to conduct 13 tests during the upcoming series – one system check hot fire and 12 certification tests in 2023.



(Above photo) A critical component needed for future testing in support of NASA's Artemis missions to the Moon and beyond arrives at the NASA's Stennis Space Center in south Mississippi. The interstage simulator special test equipment arrived at NASA Stennis on Sept. 21 via barge from NASA's Michoud Assembly Facility in New Orleans where it was fabricated. The simulator, 31 feet in diameter and 33 feet tall, will be used during Green Run testing of the new Exploration Upper Stage (EUS). EUS will fly on future Space Launch System (SLS) missions as NASA continues its mission to explore the universe for the benefit of all. EUS is being built at Michoud as a more powerful second stage to send the Orion spacecraft to deep space. EUS is expected to fly on the Artemis IV mission. Prior to that time, it will undergo Green Run testing on the B-2 Test Stand at NASA Stennis, where the SLS core stage also was tested.

(Right photo) NASA Stennis Visitor Relations Specialist Holley Argus teaches pre-K students from Hattiesburg Early Learning Collaborative about life in space on Sept. 9. A gasp could be heard from the crowd when the students 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. It was a morning of learning and activity for the students, thanks to the Space Sprouts event hosted by NASA Stennis, which 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).



NASA Stennis Flashback: NASA Stennis Sets the Stage(s) for Historic Apollo Mission



A derrick crane lifts the Saturn V S-IC-12 onto the B-2 Test Stand at NASA's Stennis Space Center on July 18, 1969, in preparation for hot fire testing and use on the final Apollo 17 mission to the Moon.



NASA conducts a hot fire test of the Saturn V S-IC-12 stage on the B-2 Test Stand at NASA's Stennis Space Center on Nov. 3, 1969. A little more than a year later, the unit fired again to launch the Apollo 17 mission to the Moon.



Teams at NASA's Stennis Space Center install the Saturn V S-II-12 stage on the A-2 Test Stand on Dec. 22, 1969, in preparation for hot fire testing prior to use on the Apollo 19 mission.

NASA's launch of Apollo 17 to the Moon 50 years ago, early on the East Coast morning of Dec. 7, 1972, marked the final flight of the ambitious space program that sent the first humans to the lunar surface about three years earlier.

It also helped close the opening chapter in the storied history of NASA's Stennis Space Center, the nation's largest propulsion test site that continues to test systems and engines to help NASA explore the universe for the benefit of all.

As it had for each of the previous eight Apollo missions, NASA Stennis teams tested both the first and second Saturn V stages that launched the Apollo 17 astronauts – Commander Eugene Cernan, command module pilot Ron Evans, and lunar module pilot Harrison Schmitt – in 1972.

The trio established several lunar records during the mission, including the longest human landing mission, the only scientist to walk on the Moon (Schmitt), the longest period of surface extravehicular activity, and the largest sample return.

They also took the iconic Blue Marble image of the Moon – one of the most widely distributed photos in history.

NASA Stennis played a key role in making the history possible, testing the Saturn S-IC-12 first stage on Nov. 3, 1969, and the Saturn V S-II-12 second stage on March 4, 1970. As with the actual lunar mission, testing the stages also provided noteworthy moments.

This was particularly true for the Saturn V first stage, installed on the B-2 Test Stand at NASA Stennis on July 18, 1969. One month later, on Aug. 17, 1969, as teams prepared for stage testing, Hurricane Camille arrived on the Mississippi Gulf Coast as well.

It was one of the most powerful storms ever to hit the United States. Winds reached upwards of 200 miles per hour, and the storm produced about a 24-foot storm surge, wrecking the coastal area.

NASA Stennis responded, serving as a driving force for hurricane relief and recovery. Center teams also responded, moving forward with critical propulsion test work.

By mid-October, testing of the S-IC-12 stage was resuming, even as another storm initially threatened the region. Instead, Hurricane Laurie dissipated to a tropical

depression before making landfall in northern Mexico.

NASA Stennis teams completed a hot fire test of the Saturn V S-IC-12 stage in early November. The stage, with its five F-1 engines producing a combined 7.5 million pounds of thrust, fired for 125 seconds, just as during an actual launch.

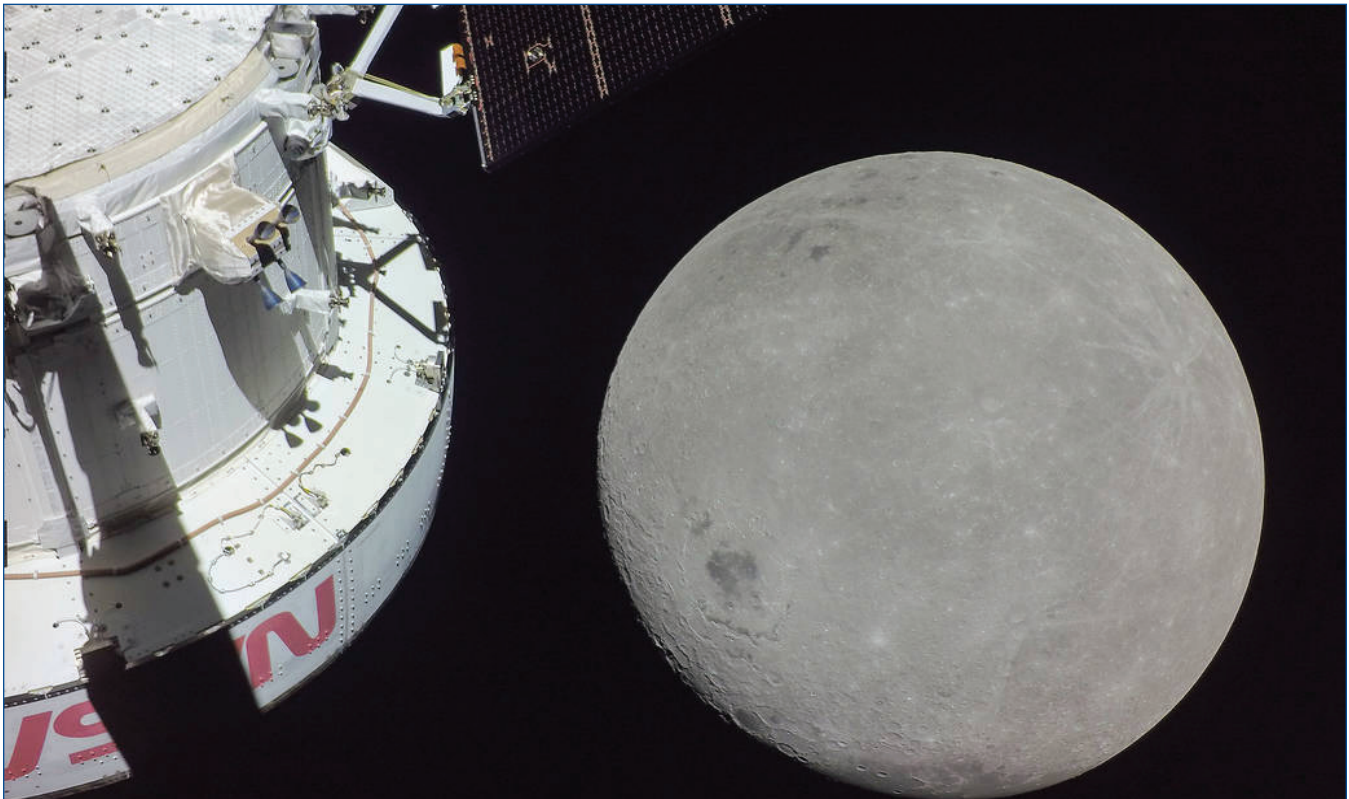
Following that effort, attention turned to testing the Saturn S-II-12 stage, installed on the A-2 Test Stand on Dec. 22, 1969. Test preparations extended into the new year.

Four attempts at hot fire were aborted due to various issues. However, the fifth attempt in early March 1970 was successful, with the stage's five J-2 engines firing to produce more than 1.1 million pounds of combined thrust for 376 seconds.

The stage was removed from the A-2 stand on March 18, then re-installed on the sister A-1 Test Stand in mid-July to perform checkout tests on some needed modifications. The checkouts were completed in subsequent weeks.

Saturn V S-II-12 was removed from the A-1 stand on Oct. 15, 1970, then shipped to Kennedy Space Center for launch preparations. By the time the sun rose on Dec. 7, both stages had fired as needed. Apollo 17 was on its way to the Moon.

Orion Spacecraft Approaches Moon



A portion of the far side of the Moon looms large just beyond the Orion spacecraft in this image taken on Nov. 21, the sixth day of the Artemis I mission, by a camera on the tip of one of Orion's solar arrays. The darkest spot visible near the middle of the image is Mare Orientale. For the latest, read the [Artemis I blog](#). Photo Credit: (NASA)

NASA in the News

NASA James Webb Telescope Receives Popular Science 'Best of What's New' Award

NASA's James Webb Space Telescope was named a Popular Science 2022 "The Best of What's New Award" winner in the aerospace category. "Each of us on the team dedicated a part of our lives to building the James Webb Space Telescope to open the next door of exploration for humankind," said Julie Van Campen, Webb Integrated Science Instrument Module systems engineer and deputy commissioning manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland. "The public's enthusiasm for both the engineering and science has been incredible and rewarding. Receiving this award is a tribute to all who contributed to its success." Webb is an infrared observatory that will complement and extend the discoveries of the Hubble Space Telescope, with longer wavelength coverage and greatly improved sensitivity. Read more [here](#) about the unique mission.

NASA Commits to Future Artemis Moon Rocket Production With Contract

NASA finalized a contract with Boeing of Huntsville, Alabama, for approximately \$3.2 billion to continue manufacturing core and upper stages for future Space Launch System (SLS) rockets for Artemis missions to the Moon and beyond. It extends production activities and preparations for work through July 2028. Under the SLS Stages Production and Evolution Contract action, Boeing will produce SLS core stages for Artemis III and IV, procure critical and long-lead material for the core stages for Artemis V and VI, provide the exploration upper stages (EUS) for Artemis V and VI, as well as tooling and related support and engineering services. NASA previously provided initial funding and authorization for Artemis III core stage work and targeted long-lead materials and cost-efficient bulk purchases. Read more [here](#) about the contract.

NASA Stennis News



Circuit Judge Tours NASA Stennis Site

Mississippi 15th Circuit Court Senior Judge Prentiss Harrell (center) and staff stand atop the B Test Stand at NASA's Stennis Space Center during an afternoon visit on Nov. 30. The group, hosted by Stennis Legislative Affairs Officer Troy Frisbie, toured the NASA Stennis federal city and test complex. The group met NASA engineers for an overview of testing at NASA Stennis. Following the visit to the B Test Stand, the guests went to the High Pressure Industrial Water Facility. Photo credit: (NASA/Shane Corr)



NASA Stennis Lights Tree

NASA Stennis Space Center employees join Dr. Rick Gilbrech and senior staff to officially kick off the holiday season by lighting the holiday tree in the lobby of the Roy S. Estess Building lobby on Nov. 28. Members of senior staff led participants in festive carols and refreshments were provided by the NASA Exchange. Photo Credit: (NASA/Danny Nowlin)

NASA Stennis Employee Named Space Hero

To mark progress in NASA's Artemis program that will return humans, including the first woman and first person of color, to the Moon, the space agency continues to recognize Space Heroes performing necessary and critical work. Overall, 37 NASA Stennis Space Center employees have been cited for their Artemis-related efforts. The latest honoree is NASA employee Kimberly Dribergen. As lead management and program analyst for NASA Stennis Space Center's Resources Management Division in the Office of the Chief Financial Officer, Dribergen supported all rocket

engine testing tasks and projects, including the Space Launch System (SLS) core stage and engine testing projects. She is recognized for providing exceptional leadership to the SLS core stage, Block 1B, and engine testing teams to enable mission success by ensuring adequate resources were available, in addition to providing critical project control. Dribergen created cost savings through streamlining SLS elements with business partnerships. Through the Space Heroes recognition, Dribergen is commended for managing a team of high performers, for her dedication to excel on multiple teams, and for exploring



ways to work efficiently for the future.

NASA Engineer Adds to Country's Space History

The launch of NASA's Space Launch System (SLS) rocket in the early morning hours of Nov. 16 turned out to be nothing short of thrilling for NASA Stennis Space Center employee Robert Simmers. The historical moment will be read about for generations to come.

As NASA explores the unknown in space through the Artemis program, it inspires Simmers as his work at NASA Stennis directly contributes to it.

"Having worked on the Green Run test series for the SLS core stage, through the preparation, practice runs, and actual hot fire and getting to see the vehicle launch after all the effort we put into it, it was exhilarating," Simmers said. "It was a once in a lifetime opportunity to make history, rather than read it out of a book."

The Slidell native works in the Safety and Mission Assurance (SMA) Directorate at NASA Stennis. Simmers is the B-2 Test Stand safety and quality representative. He worked night shift as a SMA representative when the SLS core stage made NASA Stennis its home at the B-2 Test Stand from 2020-21. The NASA engineer created the facility hazard analysis for B-2 and helped ensure the safety of operations before each hot fire attempt.

The Mississippi State graduate received an Honoree Award in August for his efforts through the Space Flight Awareness Program. In recognition of his support of human spaceflight, Simmers toured NASA's Kennedy Space Center in Cape Canaveral, Florida.

The Green Run test series culminated in March 2021 with the most powerful propulsion test at NASA Stennis in 40 years. The full duration hot fire of the SLS core stage and its four RS-25 engines conducted by the NASA Stennis team happened before the world witnessed the actual launch in November.

"I'm a fan of the small team dynamic we have at NASA Stennis," Simmers said. "The fact that many people

here know a good portion of the NASA and contractor teams by name goes to show how well the Stennis family gets along with each other to achieve the goals of the agency. The workplace culture is that of a family here and the diversity of the family shows. The different backgrounds, origins, and specializations of the people at Stennis are what enables us to perform at the level we do."

As NASA Stennis prepares for future testing related to the Artemis program,

Simmers will support Green Run testing of the new Exploration Upper Stage (EUS) at the B-2 Test Stand. EUS is being built at Michoud Assembly Facility in New Orleans as a more powerful second stage to send the Orion spacecraft to deep space. EUS is expected to fly on the Artemis IV mission and will replace the interim cryogenic propulsion stage being used on initial Artemis flights. The new stage will allow NASA to send 40% more payload to the Moon – 38 metric tons compared to 27 metric tons on initial missions.

"I am excited by the new projects coming in," Simmers said. "It is nice to see and hear all the new programs coming to NASA Stennis to advance the future of propulsion testing and human space flight."



NASA Engineer Robert Simmers stands in front of the B-2 Test Stand at NASA's Stennis Space Center, where he will support future Green Run testing of the new Exploration Upper Stage that is expected to fly on the Artemis IV mission.

Office of Diversity and Equal Opportunity

The Holiday Season: A Time For Building Community

The holiday season ushers in a sense of fellowship and community. [The Foundation for Community Encouragement](#) defines community as “a group of two or more people who, regardless of the diversity of their backgrounds, have been able to accept and transcend their differences. They are able to communicate openly and effectively; and to work together toward common goals, while having a sense of unusual safety with one another. Community building is a group process that can lead to deeper, more authentic communication... [it] is an adventure in human interaction based on a set of guidelines and principles.”

Community can also be identified as having three characteristics: diversity, inclusive and effective communication, and group cohesion. Dr. M. Scott Peck shares his methods for achieving these characteristics in a book, “The Different Drum: Community Making and Peace,” that identifies four stages of community building.

- **Pseudo-community:** In this stage, people pretend to have a balanced and open friendship with one another. Sometimes during this stage, people cover up differences and act as if they do not exist. The pretending acts as a barrier to the community. Thus, to continue to grow, individuals should maintain open communication and a commitment to celebrating diversity.
- **Chaos:** When pseudo-community fails to work, the members start falling upon each other, giving vent to their mutual disagreements and differences. During this time, people in the community realize that differences cannot be ignored.
- **Emptiness:** This stage is not what it sounds like; people learn to empty themselves of ego-related factors, that are preventing their entry into the community.
- **True Community:** Having worked through emptiness, the people in community are in complete empathy with one another. During this stage, people can relate to each other’s feelings. Discussions, even when heated, never get sour, and motives are not questioned.

Once a true community is developed, groups can begin to develop the skills to maintain it. According to [One Community Global](#), “maintaining community

means recognizing that community building is a socioemotional development process with specific stages, and committing to go through those stages as necessary.”

In Peck’s book, he shares foundational tenants for maintaining true community:

- **Inclusivity, commitment, and consensus:** Member’s accept and embrace each other, celebrating their individuality and transcending their differences. They commit themselves to the effort and the people involved. They make decisions and reconcile their differences through consensus.
- **Realism:** Members bring together multiple perspectives to better understand the whole context of the situation. Decisions are more well-rounded and more humble, rather than one-sided and arrogant.
- **Contemplation:** Members examine themselves. They are individually and collectively self-aware of the world outside themselves, the world inside themselves, and the relationship between the two.
- **A safe place:** Members allow others to share their vulnerability, heal themselves, and express who they truly are. Once a group has achieved community, the single most common thing members express is: “I feel safe here.”
- **A laboratory for personal disarmament:** Members experientially discover the rules for peacemaking and embrace its virtues. They feel and express compassion and respect for each other as fellow human beings.

To read the list, visit [here](#).

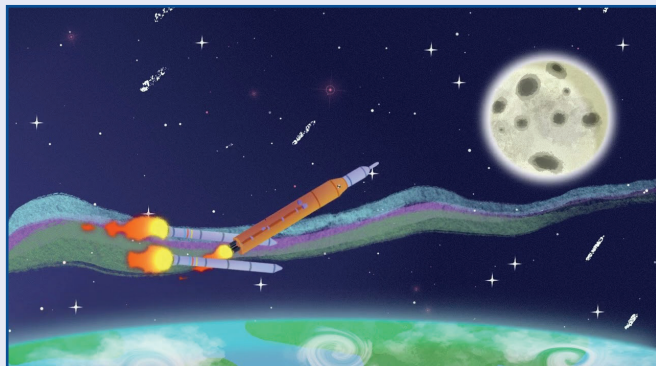
The holiday season offers a time to continue building communities in life. Remember a community can be found in any space where people are present, but true community embraces diversity, includes all members of the group, participates in effective communication, and works together for a common goal.

To learn more about creating true community, visit: [Creating and Living in True Community as a Path to Global Transformation](#)

Online Resources

Click the links below for more about NASA's Stennis Space Center

- [WLOX: NASA Stennis Test Conductor Gives Artemis Update](#)
- [WLOX: NASA Stennis Engineers React to Successful Artemis I Mission](#)
- [NASA Stennis Video Short: Stennis Begins Work on Key Testing Component](#)
- [NASA Stennis Video Short: Data Acquisition System](#)
- [NASA Stennis Video Short: Thrust Vector Control System](#)
- [NASA's Stennis Space Center Fact Sheets](#)
- [I Am Stennis Facebook Videos](#)



Watch Orion's Journey

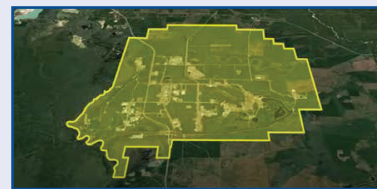
- Part 1: [Leaving Earth](#)
- Part 2: [Entering Distant Retrograde Orbit](#)
- Part 3: [Return Home](#)



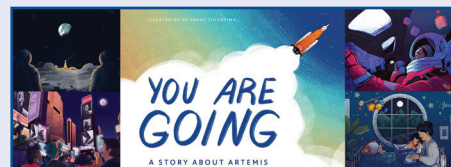
First Woman Graphic Novel



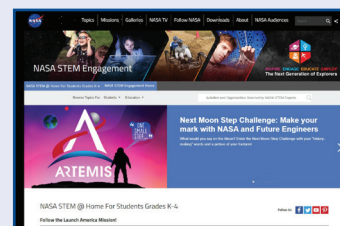
NASA Stennis Artemis Resources



NASA Stennis Virtual Tour



You Are Going Children's Book



NASA STEM@Home for Students